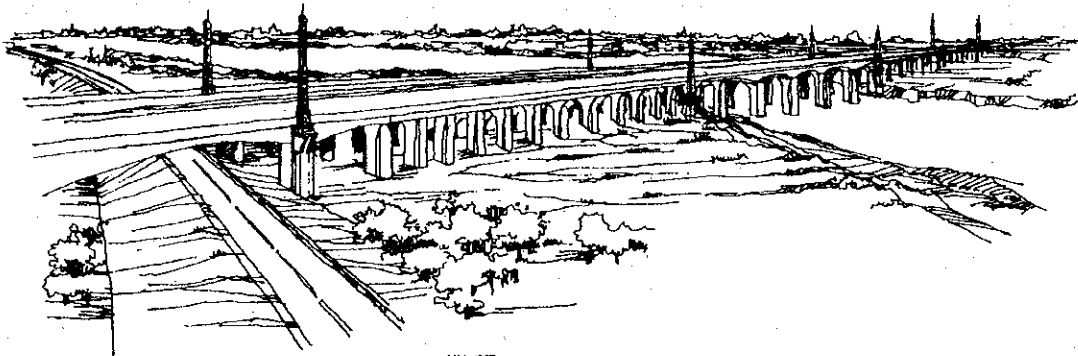


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
PROJECT MANAGEMENT UNIT THANG LONG  
MINISTRY OF TRANSPORT  
THE SOCIALIST REPUBLIC OF VIET NAM

**THE DETAILED DESIGN  
OF  
THE RED RIVER BRIDGE (THANH TRI BRIDGE)  
CONSTRUCTION PROJECT  
IN  
THE SOCIALIST REPUBLIC OF VIET NAM**

FINAL REPORT

VOLUME V : TENDER DOCUMENTS (DRAFT)



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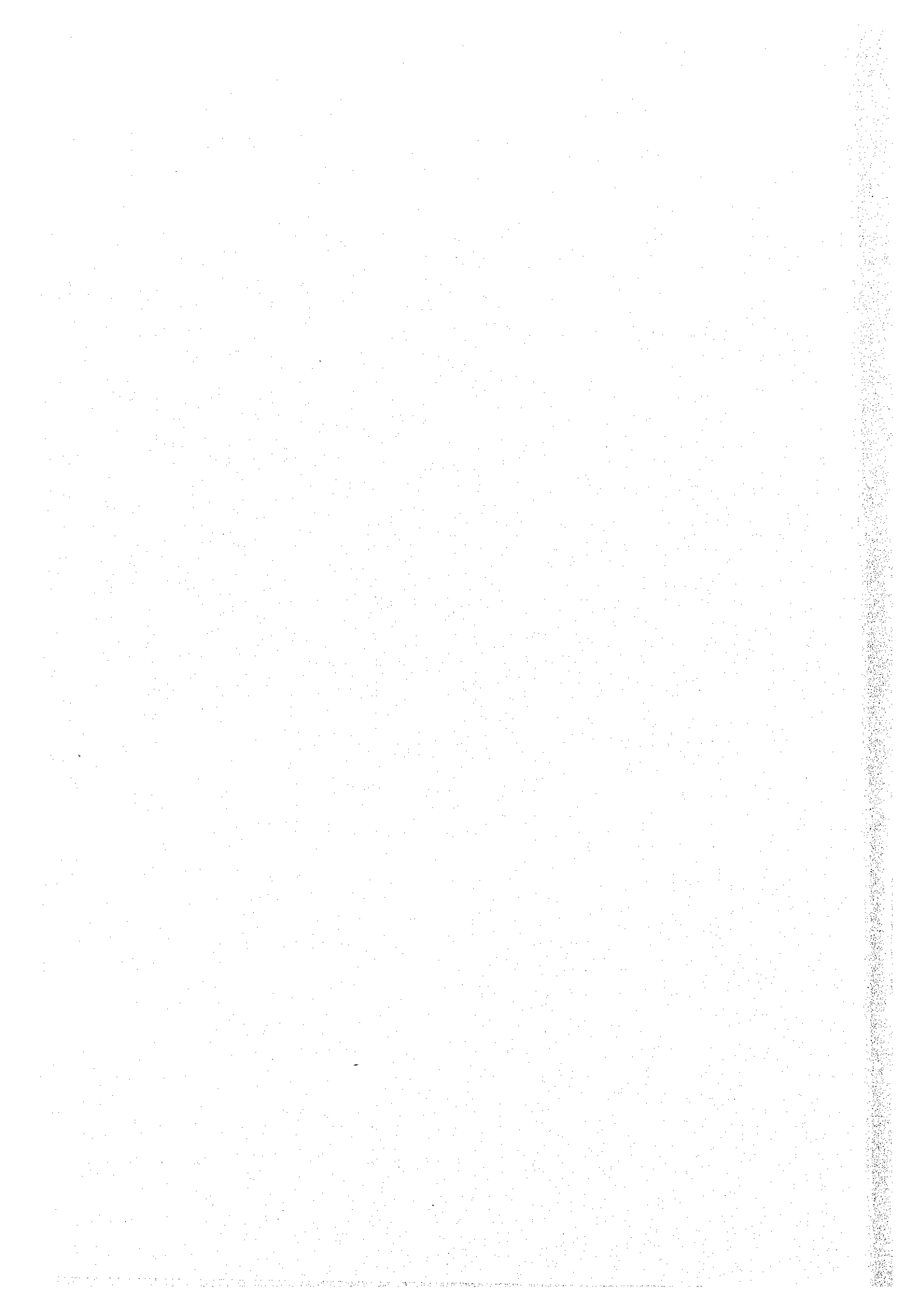
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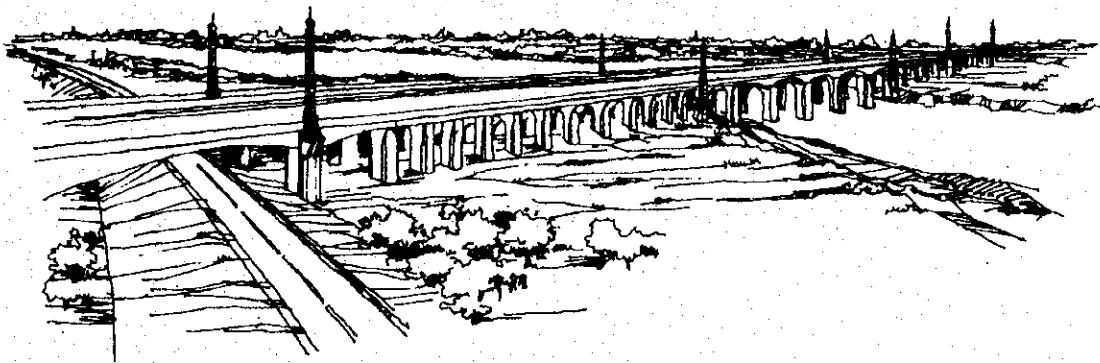


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## **LIST OF FINAL REPORT**

<b>Volume</b>	<b>I: Summary</b>
<b>Volume</b>	<b>II: Main Report</b>
<b>Volume</b>	<b>III: Appendix</b>
<b>Volume</b>	<b>IV: Design Report</b>
<b>Volume</b>	<b>V: Tender Document (Draft)</b>
<b>Volume</b>	<b>VI: Engineer's Cost Estimates</b>
<b>Volume</b>	<b>VII: Drawings &lt;Package-1&gt;</b>
<b>Volume</b>	<b>VIII: Drawings &lt;Package-2&gt;</b>
<b>Volume</b>	<b>IX: Drawings &lt;Package-3&gt; (1 of 2)</b>
<b>Volume</b>	<b>X: Drawings &lt;Package-3&gt; (2 of 2)</b>
<b>Volume</b>	<b>XI: Drawings &lt;Package-4&gt;</b>

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**TENDER DOCUMENTS**

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**FORM OF CONTRACT  
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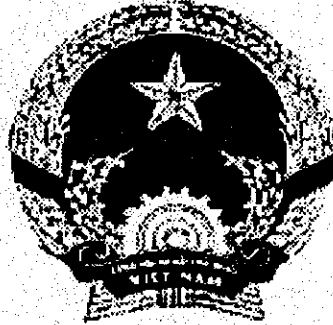
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**PACIFIC CONSULTANTS INTERNATIONAL**

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE**

**INSTRUCTIONS TO BIDDERS**

**JUNE 2000**

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**DRAFT**

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**INSTRUCTIONS TO BIDDERS**

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## INSTRUCTIONS TO BIDDERS

### PREAMBLE

In accordance with the Prime Ministers Decision No. \_\_\_\_\_ concerning the Red River Bridge Construction Project, Projects Management Unit Thang Long as agent for the Ministry of Transport of the Government of The Socialist Republic of Vietnam intends, under this package, to construct the Red River Bridge.

The project includes the construction of PC concrete bridges over the Red River for the total length of 3,084m including a 680m length PC continuous box girder main bridge, two 290m length PC continuous box girder dike bridges, a 1,390m length PC continuous box girder approach bridges and 434m length PC I-girder approach bridges. The Project covers also the procurement of maintenance/administration equipment together with the construction of workshop facility.

Main features of the construction of the Red River Bridge will include:

- Main Bridge
  - Length = 680m
  - Effective Width (between curbs) = {Inner Shoulder (0.25m) + Outer Carriageway (3.75m) + Inner Carriageway (3.75m) + Outer Shoulder (3.75m) + Space for Bicycle Users (3.5m)} x 2 Directions = 30.0m.
  - Bridge Type = 6-Span Continuous Prestressed Concrete Box Girder by Cantilever Erection
  - Bridge Area = 20,400m<sup>2</sup>
- Dyke Bridge
  - Length = 290m (Thanh Tri side) and 290m (Gia Lam side)
  - Cross section components same as main bridge
  - Bridge Type = 3-Span Continuous Prestressed Concrete Box Girder by Cantilever Erection
  - Bridge Area = 17,400m<sup>2</sup>
- Approach Bridge 1
  - Length = 540m (Thanh Tri side) and 850m (Gia Lam side)
  - Cross section components same as main bridge
  - Bridge Type = Continuous Prestressed Concrete Box Girder
  - Bridge Area = 41,700m<sup>2</sup>
- Approach Bridge 2
  - Length = 236m (Thanh Tri side) and 198m (Gia Lam side)
  - Cross section components same as main bridge
  - Bridge Type = Simple Prestressed Concrete I-Girder
  - Bridge Area = 13,020m<sup>2</sup>

It is anticipated that construction work could commence in \_\_\_\_\_ 2002.

The works will be funded by the Government of the Socialist Republic of Vietnam from the proceeds of a loan arranged from Japan Bank for International Cooperation, hereinafter referred to as "JBIC", towards the cost of Red River Bridge Construction Project. Disbursement of this loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999. No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any claim to the loan proceeds.

The work is being tendered on an International Competitive Bidding basis and participation in the bidding will be open to pre-qualified contractors from all countries and areas. It should be noted that foreign bidders who wish to participate in the bidding will be encouraged to form a Joint Venture commitment with a Vietnamese bidder or agree to use a Vietnamese sub-contractor.

Bidders shall have a sufficient knowledge of the terms and conditions of the above mentioned Loan Agreement including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999 and will bear all costs associated with the preparation and submission of their Bids, and the Employer will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding or the bid evaluation process.

Bids shall be prepared and submitted strictly in accordance with the instructions given in this document and with all prevailing Government of the Socialist Republic of Vietnam rules and regulations regarding taxation, import duties and other matters relevant to successful execution of the Works. It is the responsibility of each Bidder to appraise himself fully of all relevant Government rules and regulations, irrespective of whether or not specific reference to them is made in the Contract Documents.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1  
RED RIVER BRIDGE**

**INSTRUCTIONS TO BIDDERS**

Article 1 Scope of Work

Contractors are invited to submit a bid for Package 1 –Red River Bridge between km 6+218.5 and km 9+302.5.

Article 2 Bidding Time Schedule

The sequence of dates for carrying out the bidding for this Contract Section has been programmed as shown in Table No. 1.

Article 3 Bidding Documents

The bidding requirements are stated in the Bidding Documents which consist of the following:

- Instructions to Bidders
- Volume I : General Conditions of Contract
- Volume II : General Specifications
- Volume III : Special Specifications
- Volume IV : Bid, including Appendices to Bid, Bid Schedule and Schedule of Rates and Prices
- Volume V : Drawings
- Volume VI : Addendum (if any)
- Volume VII : Detailed Work Schedule, Plant and Contractors Personnel List
- Form of Contract

Article 4 Declaration of Intention to Bid

Prospective Bidders shall, within the time schedule shown in Table No. 1, send by registered mail, or deliver personally against receipt, to the Employer's Bidding Committee a signed "Declaration of Intention to Bid" in accordance with Guide Form A of these Instructions to Bidders, in which they affirm their intention to submit a Bid for this Package.

**TABLE NO. 1**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE**

<b>EVENT</b>	<b>DATE</b>
a Issue of Bid Documents	2001
b Site Visit - prior to Pre-Bid Conference	2001
c Formal Pre-Bid Conference at Hanoi	2001
d Last Date for Bidders to Request Clarification of Bid Documents	2001
e Last Date for Employer to Issue Addenda	2001
f Last Date for Submission of Declaration of Intention to Bid	2001
g Last Date for Submission of Bids 10:00 hrs	2001
h Opening of Bids 10:15 hrs at the Employer's Office	2001
i Evaluation of Bids and Approvals	2001

Note: The aim of the Site Visit and Formal Pre-Bid Conference is to provide bidders with background information on the Employers' requirements for the expressway construction. It is recommended that all prospective bidders should attend.

Article 5

Pre-Bid Information

The Employer will assist the prospective Bidders in clarifying any questions they may raise concerning the Drawings, Specifications and other Bid Documents. This service includes a Formal Pre-Bid Conference to be held approximately forty five (45) days before Bid Opening at a venue to be advised by the Employer, and an official site visit at which Bidders may accompany representatives of the Employer and Engineer.

Bidders are requested to formally submit any questions in writing or by facsimile or telex to reach the office of the Bidding Committee in Hanoi not later than the last date for Bidders to request clarification of the Bid documents as given in Table No. 1 of these Instructions to Bidders.

All formally submitted questions will be formally clarified by the Employer by the issue of Addenda during the Bid Period in accordance with Article 14 of these Instructions to Bidders. Only pre-bid information confirmed in writing in Addenda during the Bid Period will form part of the Contract.

Article 6

Inspection of Bid Documents and Site of the Works

Bidders shall visit and inspect carefully the Site of the Works to be tendered for, and shall study all Contract Documents and guarantee forms prepared for the Contract before submitting a Bid.

The Bidder and any of the Bidder's personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder and the Bidder's personnel and agents will release and indemnify the Employer and the Employer's personnel and agents from and against all liability in respect of personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission would not have arisen.

The Employer will obtain all land or permission for the temporary use of land on which permanent works are to be constructed. but in certain areas the working space may be restricted. If considered necessary by the Employer further details of working space will be given at the Pre-Bid Conference and included in the formal answers to bidders questions.

Before submitting his bid the Bidder should thoroughly acquaint himself with the situation regarding utilities to be protected during the Works and the need to facilitate the work of utility contractors if any during the term of the main Contract.

The submission of a Bid shall be considered prima facie evidence that the Bidder has made such examination of the Site and Contract Documents, and is familiar with, and has allowed for in his Bid, the nature of the Site and its means of access, the character, quality and quantities of the Works to be performed, the availability and quality of materials to be furnished, the availability of labour, accommodation and transport, the difficulties inherent in executing the Works within the specified time including any limitations of local weather conditions, all relevant laws and regulations

of the Government of the Socialist Republic of Vietnam together with all risks, contingencies and other circumstances which may arise, and that he will not in the future express ignorance about any of the conditions pertaining to the execution of the Work, so far as these could be ascertained at the time of Bid Submission

All costs and charges in connection with visits to and examination of the Site and in the preparation of the Bid shall be borne by the Bidders.

#### Article 7

##### Preparation of Bid Schedule and Schedule of Rates and Prices

The Bid Schedule and Schedule of Rates and Prices shall be prepared on the forms furnished, or true copies thereof.

All entries in the Bid, Bid Schedule and Schedule of Rates and Prices shall be typewritten or computer printed.

Bid prices shall be determined by the Bidder entirely at his own responsibility and shall, with due regard to his examination of the Site and the Bid Documents as required under Article 6 of these Instructions to Bidders, be suitable for the satisfactory construction, completion and warranty of the Work being tendered.

Bidders are required to carefully study the works required under each pay item as given in the Drawings and Specifications. In particular the Bidder is strongly advised to thoroughly read and understand the "Method of Measurement" and "Basis of Payment" as given against each pay item.

Under no circumstances will the Employer entertain, at any time in the future, a claim for an increase in the Bid prices for reasons of ignorance, error or oversight on the part of the Bidder with respect to any of the conditions pertaining to the execution of the Works.

The Bidder shall enter his Bid Prices in the Bid Schedule forms given in Volume IV, "Bid, Bid Schedule and Schedule of Rates and Prices" or true copies of the same.

The Contract is to be established in a local currency component, Vietnamese Dong, and a foreign currency component, Japanese Yen, with component percentages nominated by the bidder for each unit price. These percentages shall also apply to any adjustment to the bid brought about by discounting.

However, for the purpose of evaluation and comparison of Bids, the prices entered in the Bid Schedule shall be expressed as the local currency equivalent of the combined local and foreign currency components of the Bid Prices. The exchange rate used for this calculation shall be the official selling rate of exchange between the foreign currency and the local currency, as quoted by the Vietcom Bank, ruling 30 days prior to the opening of the Bid. The Employer will formally notify Bidders of this exchange rate.

The Bid Schedule shall therefore be completed by the Bidder in accordance with the following requirements:

- (a) Unit Prices and Total Prices for each Pay Item or Section of the Bid Schedule and the Schedule of Rates and Prices shall be expressed in the currency of Vietnamese Dong and Japanese Yen.
- (b) Unit Prices shall only be entered against those Pay Items in the Bid Schedule for which quantities have been provided.
- (c) Lump Sum prices shall only be entered in the total bid price column of the Bid Schedule where such a price is called for.
- (d) The Total Price for each Unit Price Pay Item shall be entered in the columns provided for that purpose in the Bid Schedule by calculating the product of the respective unit prices and the estimated quantities. The Total Prices for each Section shall be computed and transferred to the Bid Summary and the sum of the Total Bid Prices for each Section of the Bid Schedule shall be calculated and entered in the appropriate space in the Bid Summary. The totals so obtained are the LOCAL CURRENCY component, and the FOREIGN CURRENCY component of the Net Bid Sum. The Bidder shall add to the LOCAL CURRENCY component that percentage that he calculates is required to cover his net obligation for Value Added Tax (VAT) payable in Vietnam. The LOCAL CURRENCY equivalent of the TOTAL BID SUM is thus derived and shall be stated by the Bidder in the appropriate spaces provided in the Bid and in the Bid Summary.
- (e) When determining Unit Prices, intending Bidders should note the following applicable conditions:
  - (i) The Unit Prices shall include all Vietnamese duties, taxes and other levies payable by the Contractor under the Contract except for VAT. The net allowance for VAT shall be expressed as a percentage, which will be added to the local currency component of the Bid, as shown in the Form of Bid document.
  - (ii) The amounts payable in respect of certain Pay Items may be subject to adjustment, in accordance with Clause G.70 of the General Conditions of Contract, on account of fluctuations during the performance of the Contract in the cost of labor, fuel, materials and equipment (escalation/ de-escalation).
  - (iii) The Unit Prices for each Pay Item shall be the rate used to calculate the amounts to be paid to the Contractor in the Monthly Certificates and the Final Certificate, subject to the provisions of the various Clauses in the General Conditions of Contract.
  - (iv) Payments to the Contractor shall be made in accordance with Clause G.58 of the General Conditions of Contract in both local and foreign currencies as determined by the breakdown of the unit prices in the Contract Agreement.



- (f) All Bidders will have been given a copy of the Bid Schedule and Schedule of Rates and Prices on a computer floppy. The Bidders should enter their rates and prices on this disk and return it to the Employer together with the other Bid documents. This is for the convenience of the Employer and if there is any discrepancy between the prices submitted on paper and those given on the floppy disk, then the information given on the papers will be binding and the computer data will be corrected accordingly.

Article 8 Interpretation of Quantities in Bid Schedule

The quantities entered for each Pay Item in the Bid Schedule are estimates only and are prepared for the comparison of Bids and Award of Contract. Payment will be made only for the certified quantities of work for each Pay Item actually performed in accordance with the Contract Documents. The scheduled Pay Item quantities of work to be executed may be increased or decreased as provided for in Clauses G.51 and G.52 of the General Conditions of Contract.

Article 9 Use of Local Contractors, Sub-contractors, Goods and Services

Successful bidders will be encouraged, in accordance with Vietnamese Regulations promulgated in conjunction with Decree No.43/CP, to undertake to form a joint venture with a Vietnamese Contractor or to use local Sub-contractors for construction and installation and purchase of materials and equipment able to be domestically produced or processed in Vietnam. However, in accordance with Clause G.04 of the General Conditions of Contract, intending Bidders should note that the total value of work which may be sub-let shall not exceed 50 (fifty) percent of the value of the Contract.

Article 10 Price Escalation/De-escalation

Price adjustment (escalation/de-escalation) will be applicable.

Article 11 Partnership or Association of Enterprises

Enterprises\* now proposing to bid shall have passed the pre-qualification (screening) executed by the Employer, have satisfied the conditions for business practicing certificate or license within Vietnam or in the bidders home country and be technically and financially able as stated elsewhere in the tender documents.

Bids may be received from;

- i) Enterprises of voluntarily created joint ventures and joint operations forming a partnership or association in one of the following forms:
- a) A Joint Venture Enterprise which means an enterprise established in Vietnam on the basis of a joint venture contract signed by one or more Vietnamese parties\*\* together with one or more foreign parties\*\*\* in order to invest and carry on business in Vietnam.

\* Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.

\*\* Vietnamese party shall mean one or more Vietnamese legal economic entities.

\*\*\* Foreign party shall mean one or more foreign individuals or legal economic entities.

A Joint Venture Enterprise shall be established in the form of a limited liability company and shall be a legal entity in accordance with the provisions of the law in Vietnam. (i.e. each joint venture party shall be responsible to the other party and to the joint venture enterprise to the extent of its contributed capital to the company.)

- b) A Joint Operation formed by existing Vietnamese Enterprises without the direct investment of foreign capital.
  - c) A Contractual Business Cooperation Agreement initiated by a foreign investor and signed by two or more parties which stipulates the responsibilities of and the sharing of business results between the parties, for the purposes of commencing business investment in Vietnam without creating legal entity.
- ii) An Enterprise With 100% Foreign Owned Capital defined as an limited liability company owned and established in Vietnam by a foreign investor who self manages the enterprise and takes full responsibility for the results of its business.

All Joint Ventures, Operations and Individual Enterprises are required to be pre-qualified. In the case of a Joint Venture, Joint Operation or a Consortium of several established Joint Enterprises - hereinafter referred to as a Joint Enterprise - this is a prerequisite even in the case where the parties to a Joint Enterprise are individually pre-qualified.

In the event that the successful Bidder is a Joint Enterprise, the Employer requires that the parties to the Joint Enterprise accept joint and several liability for all obligations under the Contract.

The Joint Enterprise shall therefore submit with the Bid a copy of the agreement indicating the percentage of capital contribution recorded or to be recorded in the company charter, the authorized signatory or signatories, the acceptance of joint and several liability for all obligations under the Bid and the Contract, and other pertinent features of the Joint Enterprise. If a Joint Enterprise has not been finalized then an Affidavit Agreement for Joint Enterprise as given in Guide Form B of these Instructions to Bidders shall be completed and submitted with the Bid.

The structure of a Joint Enterprise shall not be modified, except with prior approval of the Employer, at any time following pre-qualification or following submission of Bids or throughout the whole period of the Contract. Otherwise the Employer shall be entitled:

- 1) to disqualify the Bid and effect forfeiture of the Bid Bond;
- 2) to invoke the provisions of Clause G.63 of the General Conditions of Contract concerning the default of the Contractor.

In the case of the Employer granting approval for such modification, the Joint and Several Liability provisions herein described shall still apply and in no case will a participating party be allowed to reduce the level of his participation to zero.

Irrespective of the details of the agreed percentage of capital contribution of the parties in a Joint Enterprise, any of the parties together with the Employer, when necessary, shall have the right of full supervision of all aspects of the implementation of the contribution agreement, including full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant and equipment and personnel, telexes, subcontract agreements, correspondence, etc.

Article 12

Signatures

The signatures required for the Bid Documents shall be as follows:

- (a) Where the Bidder is a sole Enterprise, Joint Enterprise or Consortium (hereinafter called an Joint Enterprise) that is already licensed in Vietnam, then the legal authorized representative of the Enterprise shall sign.

A Power of Attorney which has been witnessed, or a duly certified copy of it, granting authority to sign shall be enclosed with the Bid.

In this respect the legal authorized representative of the Joint Enterprise shall be restricted to any person stated in the company registration as being a member of the board of directors or to any manager or branch manager of the Enterprise

- (b) Where various Bidders have formed or have agreed to form a Joint Enterprise in accordance with the requirements of Article 11 of this document, every Partner of the Joint Enterprise shall sign the Joint Enterprise Agreement or the Affidavit - Agreement for Joint Enterprise (Guide Form B) either personally or through their legal representative, so that all will be jointly and severally responsible for the Bid submitted.

Where one or more parties to the Joint Enterprise have signed the Agreement or Affidavit-Agreement in the name of an Enterprise, a Power of Attorney which has been witnessed, or a duly certified copy of it, empowering him, her or them to sign for the Enterprise must be enclosed with the Bid.

All other Contract Documents, including the Bid, will be signed by the designated representative as nominated on the Agreement or Affidavit - Agreement and this authorization shall be evidenced by submitting with the Bid a Power of Attorney which has been witnessed and which has been signed by the legally authorized signatories of all of the parties.

Article 13

Notice to Foreign Contractors

It should be clearly understood that, should the need arise, any party who participates in whatever manner in the Bid consents to be sued in any court or tribunal of competent jurisdiction within the Socialist Republic of Vietnam on any question or matter arising from the documents, award, and implementation of the project. For this purpose any

designated representative of the said party(ies) present in the territory of the Socialist Republic of Vietnam shall be authorized to receive process summons on behalf of the said party(ies) notwithstanding any restriction or limitation imposed by the said Contractor upon its designated representatives.

Article 14 Addenda Issued during Bid Period

Addenda to Bid Documents may be issued up to the last date for Employer to issue Addenda as given in Table No. 1 of these Instructions to Bidders for the purpose of clarifying the Bid Documents or to reflect modifications in the design or Contract terms. If Bidders are in doubt as to the true meaning of any part of the Bid Documents they should request clarification by notifying the Employer in writing prior to the last date for Bidders to request clarification of the Bid Documents as given in Table No. 1 of these Instructions to Bidders.

Any such clarification of the Bid Documents by the Employer will only be made by the formal issue of Addenda which will form part of the Bid Documents. Each Addendum so issued will be sent to all prospective Bidders to whom Bid Documents have been issued and will be binding upon them.

Article 15 Preparation of Bids

The Bid must be submitted under a covering letter and shall contain the documents mentioned hereunder all of which are essential. Guide Form F for the covering letter is given in these Instructions to Bidders.

All documents shall be written in English.

No alternative bids will be accepted.

- a.
  - i) If the Bidder is an existing Joint Enterprise which has been licensed as such in Vietnam or has formed a new Joint Enterprise, a duly certified copy of the Joint Enterprise Agreement between the various parties.
  - ii) If the Bidder is a proposed Joint Enterprise, the Affidavit-Agreement between parties, given in Guide Form B of these Instructions to Bidders, which has been completed and signed by all parties and shall be binding among them if awarded the Contract.
- b. If the bid is to be established on the basis of a Business Cooperation Contract the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. The Power(s) of Attorney as required in Article 12 above.
- d. Bidders latest balance sheet, list of owners, management organization, together with any revisions. In case of Joint Venture/ Operation the foregoing are required for each of the parties to the Agreement.
- e. Foreigners' labour permit (where applicable) in accordance the Labour Code.

- f. Tax registration number. In case of a Joint Enterprise each partner's tax registration number.
- g. Bank reference. In case of Joint Enterprise each of the parties bank references. In case of a foreign bank reference a recommendation letter is required from the Vietcom Bank, Vietnam.
- h. The Bid Bond according to Article 21 below and using the format given in the sample Guide Form E of these Instructions to Bidders.
- i. The Bid duly filled in, dated, stamped, and signed by the Bidder and Appendix to the Bid, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".
- j. The Bid Schedule and Schedule of Rates and Prices filled in, signed where required, and initialed on each page by the Bidder, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices". In accordance with Article 7 (f) of these Instructions the Bidders should also return a floppy disk copy of this data for use by the Employer.
- k. A Works Progress Schedule using Guide Form G in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List" as a guide, and completed in accordance with Clauses in the Contract Documents relating to the time for completion of the Works.
- l. Detailed Price Analyses for the Breakdown of the Cost of Materials for the Items listed in the Schedule of Rates and Prices Section C : Materials on Site, using the format shown in Guide Form C of these Instructions to Bidders.
- m. Detailed Price Analyses showing the complete breakdown of the prices from the elements involved (labour, equipment, materials) for the following Pay Items using the format shown in Guide Form D of these Instructions to Bidders:
  - All Pay Items in Section I - General, of the Bid Schedule
  - All Pay Items in Section 4.0-Earthworks
  - Pay Items 5.01(1) and (5) - Structure Excavation
  - All Pay Items in Section 10-Concrete Structures.Detailed Price Analysis of additional items may requested during the period of Bid Evaluation. Following Notice of Award the successful Bidder will be required to submit Detailed Price Analyses for all Pay Items.
- n. Method Statements as required under Article 27 of this document.
- o. An itemized list of Construction Plant, including sub-contractor's plant, giving the types, capacities and quantities of plant which the Bidder intends to use for the execution of the Contract work. Form H in Volume VII "Detailed Works Schedule, Plant and Contractors' Personnel List" should be used as a guide and a clear distinction made between equipment already owned, the equipment which is intended to be purchased or hired and sub contractor plant. (The equipment nominated in this list as already owned must be in good working order

and available for inspection, if considered necessary by the Employer, at the location indicated).

- p. Details of construction experience over the last five years giving names of contracts, names of employers, contract roles, scope of works, and contract sums, using the format shown in Guide Form L in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".
- q. A site staff organization chart and a list of the senior staff the Bidder intends to employ for the execution of the Works and who will actually be present on Site, showing the number of years of experience in similar construction works of each such staff member, using as a guide Form I in Volume VII, "Detailed Works Schedule, Plant and Contractors Personnel List". Full details of careers and works carried out shall be provided for the Project Manager (General Superintendent) and Technical Manager (Deputy General Superintendent) using Guide Forms J and K in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".

Candidates in the list of senior staff submitted with the Bid must correspond with the candidates listed in the Pre-qualification Questionnaire the requirements of which are reproduced as follows.

- Project Manager (General Superintendent)
  - Technical Manager (Deputy General Superintendent)
  - Site Supervisor(s)
  - Chief of Asphalt Mixing Plants.
  - Geotechnical Specialist Engineer.
- ◆ Project Manager should have at least 20 years of total experience in highway and bridge works and not less than 10 years of experience and 3 projects handled as Project Manager in similar projects;
  - ◆ Technical Manager should have at least 15 years of total experience in highway and bridge works and not less than 7 years of experience and 2 projects handled as Technical Manager in similar projects;
  - ◆ Site Supervisor should have at least 10 years of total experience in highway and bridge work and not less than 5 years of experience as Technical Manager in similar projects.
  - ◆ Chief of Asphalt Mixing Plants should have at least 10 years of total experience in asphalt road work and not less than 5 years of experience as chief of an asphalt mixing plant in similar projects;
  - ◆ Senior Geotechnical Specialist should have at least 10 years of total experience in the analysis of soft ground improvement methods using sand drainage systems as a means of consolidation
- r. List of the portions of the Works proposed to be sub- contracted, according to Guide Form M of these Instructions to Bidders.

- s. If a Bidder wishes to modify his bid price after completion of the bid schedule and the formal bid document, then this will be known as a Balancing Item. Notice of the Balancing Item should be given by way of a letter (to be hand delivered) which should confirm the total amount of the Balancing Item; whether it is an addition or subtraction to the Net Bid Sum.; and the manner that the Balancing Item is to be applied to the submitted bid prices. In the absence of such complete information the Employer will be at liberty to apply the balancing item in whatever manner he deems appropriate. The letter giving notice of the balancing item should be signed and witnessed by the same persons as signed the main bid. The letter should be placed in a sealed envelope, which should then be handed to the Bidding Committee immediately before the opening of the main bidding documents. After the bid opening has started, no further submissions will be accepted.

For guidance in the preparation of Detailed Unit Price Analysis required in item "m" above the main materials and equipment requirements are provided in Guide Form D-1 (Example Only). These requirements are to be utilized as a guide only for the preparation of Detailed Unit Price Analysis and Bidders are to determine their own material proportions and equipment and labour requirements.

Intending Bidders are to note that the Unit Price Analysis details which are submitted in accordance with this Article will be used by the Employer as an aid to bid evaluation and may also be used as a reference for determining new or revised unit prices should the need for such new or revised prices be required during the Contract Period.

The above Bid Documents shall be bound to form the following books:

Book I

- a. (i) Joint Enterprise Agreement (if applicable)
- (ii) Joint Enterprise Affidavit-Agreement (if applicable)
- b. Business Cooperation Contract - the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. Power(s) of Attorney
- d. Latest Balance Sheet(s), List of Owners, Management Organization(s) etc.
- e. Labour Permit(s) (if appropriate)
- f. Tax Registration Number(s) (if appropriate)
- g. Bank Reference(s)
- h. Bid Bond

Book II

- i. Bid and Appendix to Bid

- j. Bid Schedule and Schedule of Rates and Prices (together with a floppy disk containing the same data.)
- s. Letter with details of the Balancing Item (if appropriate)

Book III

- k. Works Progress Schedule
- l. Detailed Price Analyses for Materials
- m. Detailed Price Analysis of Pay Items
- n. Method Statements

Book IV

- o. List of Construction Plant
- p. Details of Construction Experience
- q. Site Staff Organization Chart and List of Senior Staff
- r. List of Works proposed to be sub-contracted

Article 16

Submission of Bids

The Bidder shall use, and submit with his Bid, the Form "Checklist of Documents to be Submitted", given in the front of Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".

- 1. The Bid and copies as described later shall be submitted each in a closed and sealed buff-coloured envelope, all enclosed in an outer envelope of the same colour.
- 2. The outer envelope must be sealed, must not be transparent and must not carry any indication of the identity of the Bidder. Both outer and inner envelopes shall be addressed to the Employer's Bidding Committee and marked as follows:

To:

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HANOI Vietnam

DOCUMENTS FOR  
RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE

DO NOT OPEN BEFORE 10:15 hrs

on.....2001 at HANOI

Only the inner envelopes, which contain the Bid, shall bear the name and address of the Bidder, to enable the Bid to be returned unopened in case it is declared "late" or otherwise disqualified.



If the inner and the outer envelopes are not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening and rejection of the Bid.

The Bid envelopes shall be hand delivered to the Bidding Committee and must be received not later than the deadline indicated in Table 1 of these Instructions to Bidders.

All pages in the Bid Envelopes must be initialed by the authorized signatory. No submission of initialed "Instructions to Bidders" and Volumes I, II, III, V and VI is required with the Bid, however these documents are required to be submitted by the successful Bidder after the notification of Award.

The complete Bid shall be without alterations, inter-lineations or erasures, except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

The original copy and three photocopies of all Bid Documents as required on the "Checklist of Documents to be Submitted" are required to be submitted. These four sets of Bid Documents shall be sealed in separate envelopes, with the envelope containing the original set and each of the original books being clearly marked "ORIGINAL" and each of the other three envelopes and books therein being clearly marked "COPY".

In the case of any discrepancy between the contents of the four sets of documents, the set marked "ORIGINAL" shall govern. The four envelopes of Bid Documents shall be submitted in the before mentioned outer envelope with a covering letter of transmittal, using Guide Form F of these Instructions to Bidders.

The covering letter shall be submitted separately from, but at the same time as, the envelope containing the Bid Documents. The purpose of the covering letter is to provide the name and address of the Bidder and to provide an official record of the time and date of transmittal to the Employer of the completed Bid Documents. If the Bidder has not yet a legal residence in Vietnam, a postal address in Hanoi must be provided to which all correspondence or communications will be directed.

The Bidder will be given a signed copy of the covering letter as his record of receipt of the Bid by the Employer.

## Article 17

### Opening of Bids

#### a) Opening of Bids

The opening of Bids will take place at the time and date fixed in Table No. 1 in these Instructions to Bidders by the Bidding Committee duly appointed by the Employer. The Bidders or their authorized representatives, may attend the opening of the Bids, if they so desire, and all Bidders or their representatives who are present at the opening shall sign a register evidencing their attendance. Two of the attendant Bidders or their representatives will be nominated to witness that the results of the Bid Opening are recorded correctly by the Bidding Committee.

Each Bid Envelope will be opened in turn and the Bidder's name, the presence or absence of the requisite Bid Bond, price of the Bid, and such other details as the Employer, at its discretion, may consider appropriate will be announced and recorded. In addition, as each Bid envelope is opened in turn, all pages of the original and copies of the Bid, Bid Schedule and the Schedule of Rates and Prices of Volume IV shall be countersigned by one member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

b) Preliminary Examination of Bids

During the Bid opening ceremony, the Bid Documents will be checked for general compliance with the requirements of the Bid. In particular the Bidding Committee will check and ascertain that all of the documents comprising the Bid as nominated in Article 15 of these Instructions to Bidders are included and have been correctly completed. Where Bid Documents are required to be signed the Bidding Committee will ascertain that all such documents bear the signature of the authorized signatory.

The Bidding Committee will also check that the price in the bid is clearly stated in figures and words, and that the amount written in figures is the same as the amount written in words. At the time of opening of Bids a Bid will be declared not substantially responsive to the Bidding Documents for the following reasons:

- a. if all documents comprising the Bid as required in Article 15 of these Instructions to Bidders are not included.
- b. if the Bid enclosing envelope is not marked only as required in Article 16 of these Instructions to Bidders.
- c. if the Bid is received after the time limit for submission of Bids.
- d. if the Bid price is not written in figures and in words.
- e. if the amount of the Bid price written in figures is not the same as the amount written in words.
- f. if the Bid documents have been sent to a member of the Bidding Committee or other official.

If a Bid is not dated and signed, the Bid can be made responsive to the Bidding Documents if these items are fulfilled at the time of opening of Bids.

If all of the foregoing requirements have been met in full and the Bid includes no reservations of any kind whatsoever, the Bid will be judged to be fully responsive to the Bidding Documents.

Any Bid determined by the Bidding Committee at the time of opening of Bids as not being substantially responsive to the Bidding Documents will be rejected by the Bidding Committee and may not subsequently be made responsive by the Bidder by correction of the non conformity.

The results of the preliminary examination of the Bids shall be recorded in a Process Verbal of the Bid Opening which shall be signed by each member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

#### Article 18

##### Evaluation of Bids

No information relating to the examination, clarification and evaluation of Bids, or to recommendations concerning Award, shall be communicated to any persons not officially concerned with these procedures.

The Bids received will be evaluated on the basis of their responsiveness to the Bidding Documents, on the basis of administrative, contractual and technical evaluations, and on the VND equivalent of the total Bid Sum.

The administrative, contractual and technical evaluations will be carried out first and provided these comply with all administrative, contractual and technical requirements and specifications the price evaluation will proceed.

In case of discrepancy being discovered between the total Bid Sum shown in the Bid and that obtained by adding the products of the listed quantities and the Unit Prices, the Unit Prices as quoted shall not be altered, but errors found in the said products, or in their addition, shall be corrected. Such corrections may result in the change of the total Bid Sum. In such case, the Bidder shall be given the option either of accepting the corrected total Bid Sum or of withdrawing his Bid in which latter case the Bid Bond will be forfeited under the provision of Article 22 of these Instructions to Bidders.

The Employer reserves the right, for whatsoever reason, to reject any or all Bids, to waive technicalities, to advertise for new Bids, or to proceed to do work otherwise, without the necessity of furnishing each Bidder with a statement giving the reason or reasons for the Employer's action. In the event that it becomes necessary for the Employer to invoke this right, the Employer will return all Bid Bonds without forfeiture.

After the submission of the Bid, any further clarification by the Employer of the Contract Documents or by the Bidder of his Bid will be formalized by a letter from one party and a reply letter from the other party, and these letters of agreement will then form a legally binding part of any Contract subsequently entered into.

During evaluation Bids may be considered irregular, and if not adequately clarified to the satisfaction of the Bidding Committee, may be rejected or disqualified for, but not limited to, the following reasons :

- a. if the Bid is not submitted on the forms furnished or true copies thereof, or if any of the forms as required under the provisions of these Instructions to Bidders are missing from the Bid;
- b. if there are any unauthorized additions, conditional or alternate Bids or irregularities of any kind which tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning;

- c. if the Bidder adds any provisions reserving the right to accept or reject an Award;
- d. if more than one Bid for the same work is submitted by an single Enterprise, a Firm, Corporation, Joint Enterprise or Consortium under the same or different name(s);
- e. if there is evidence of collusion between Bidders (Identical Bids would indicate collusion and the Employer reserves the right to reject any such Bids and, if necessary, to call for new Bids excluding the identical Bidders);
- f. if Bids are submitted in which the Unit Prices in the Bid Schedule and/or Schedule of Rates and Prices do not follow those included in the Detailed Unit Price Analyses;
- g. if the Bid is substantially unbalanced as a result of unreasonable weighting of certain Unit Prices;
- h. if the Bid Bond is not valid or is valid for less than the period established in Article 21 herein.
- i. if the respective proportions of contributed capital to the Joint Venture or Consortium have been modified without the prior written approval of the Employer.
- j. if the Bid Documents have been signed by a person other than one of the authorized signatories as defined under Article 12 of these Instructions to Bidders.

If, after the completion of evaluation and ranking of responsive Bids, any Pay Item Price has been found to be disproportionately high in the lowest qualified Bidder's Bid and the Bidder is unable to provide adequate justification in support of the quoted price, the Bidding Committee in consultation with the Bidder may agree on an alternative lower price that is acceptable to both parties and such agreed and lower price will be used for the payment of all work completed in excess of the quantity stated in the original Bid Schedule. If such agreement cannot be obtained, the Bid may be disqualified and the ranking of responsive Bids revised accordingly

#### Article 19

##### Validity of Bids

The Bid shall remain valid up to at least 150 ( one hundred and fifty ) calendar days after the date of opening of Bids. In exceptional circumstances prior to expiry of the original Bid validity period, the Employer may request the Bidder for a specified extension in the period of validity.

The request and the responses thereto shall be made in writing or by facsimile or telex. A Bidder may refuse the request without forfeiting his Bid Bond. A Bidder agreeing to the request will not be required nor permitted to modify his Bid, but will be required to extend the validity of his Bid Bond correspondingly.

If any Bidder withdraws his Bid before the validity period expires or if any Bidder refuses or fails to sign the Contract when requested by the Employer to do so, then the amount of the Bid Bond will be forfeited.

Article 20

Award and Signing of Contract

Within 120 (one hundred and twenty) days after the Opening of Bids the Employer will issue a Notice of Award to the successful Bidder together with a Draft of the Proposed Contract. The Bidder who receives the Notice of Award shall within 7 (seven) days of the date of issue of the Notice of Award notify the Employer in writing whether the Bidder is willing to carry out the Works and whether the draft Contract given by the Employer is acceptable.

Within 15 (fifteen) calendar days after the date of issue of the Notice of Award or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, and before signing the Contract, the successful Bidder is required to submit Performance Bonds in accordance with the requirements of Clause G.12(1) of the General Conditions of Contract. Also within 15 (fifteen) calendar days of issue of the Notice of Award, or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, the successful Bidder is required to sign the Contract Agreement and to return it to the Employer for his signature. The Employer will then arrange for the various signatories from the Employer to affix their signatures within the following 15 (fifteen) days.

If the successful Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the second most acceptable Bid. If the second responsible Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the third most acceptable Bid. In such event the Bidders may be requested to extend the validity of the Bids for such further period as may be agreed upon in writing between the Employer and the Bidders concerned.

Where the Bidder is a Joint Enterprise, each member of the partnership or association shall be liable for the Bid submitted.

If for any reason the Bid should be withdrawn before expiry of the said period, the Bid Bond given by one or more members of the partnership or association will be retained by the Employer.

In the case of the second, or third responsible Bidder, the signing of the Contract by all parties shall also take place within 30 (thirty) days from the date of issuance of the Notice of Award to the Bidder who accepts the Award.

After the signing of the Contract and its approval by Japan Bank for International Cooperation (JBIC) the Employer will send a written Notice to Proceed to the Contractor.

The written Notice to Proceed will be issued within thirty (30) days after the date of the approval by JBIC mentioned above, and the Notice will specify the date to be considered as the Commencement Date of the Works which shall be not more than thirty (30) days after issuing the Notice to Proceed by the Employer.

Article 21

Bid Bond

The Bidder shall together with his Bid submit a Bid Bond as security for full compliance with all of the requirements of the Bid. The amount of the Bid Bond shall be Five Hundred Thousand United States Dollars (US\$500,000.00).

A Joint Enterprise either proposed or not yet licensed in Vietnam shall submit the Bid Bond in the name of one or more representatives of the Partnership or Association who are authorized by a Power of Attorney to act as representatives of the Joint Enterprise.

Bidders who are party to a Contractual Business Cooperation Agreement may, in accordance with the proportioning of responsibilities and results of business set out in the Agreement, submit the Bid Bond in the name of one or more of the parties who are duly authorized by Power of Attorney to act as their representatives.

The Bid Bond shall consist of a Bank guarantee issued by a State Bank, Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer. A sample guide is given in Guide Form E of these Instructions to Bidders

The Bid Bond shall be valid for 30 (thirty) days beyond the period of validity of the Bid as given in Article 19 of this document or at least 180 (one hundred and eighty) days from the date of opening of Bids or for such extension of the Bid validity period as may be granted by the Bidder in writing to the Employer or agreed to by mutual consent.

An unsuccessful Bidder's Bid Bond will be discharged or returned as promptly as possible after award of Contract but in any event no later than 30 (thirty) days after the expiration of the period of bid validity as given in Article 19 of this document.

The successful Bidder's Bid Bond will be discharged or returned after the Bidder has furnished the Performance Bond in accordance with Article 23 of this document and all signatures have been affixed to the Contract Agreement.

Article 22

Forfeiture of Bid Bond

In the event of any Bidder withdrawing his Bid or of a successful Bidder failing to prepare and sign a Contract Agreement as required by the General Conditions of Contract, Clause G.11, within the specified time period of 15 (fifteen) days, or failing to furnish a Performance Bond in accordance with the requirements of Clause G.12 of the General Conditions of Contract within 15 (fifteen) days of the issue of the Notice of Award then the sum lodged with the Bid as guarantee of good faith shall be absolutely forfeited to the Employer and the Employer shall be entitled (but not obliged) by notice in writing to withdraw his acceptance of the Bid.

The Employer's acceptance of a Bid, if so withdrawn, shall thereupon be void and as though it had never been given and the Contractor shall have no claim against the Employer whether for damage, specific performance, or otherwise in respect of such acceptance or withdrawal.

Article 23 Performance Bond

In the event of a Bid being accepted by the Employer, the successful Bidder who receives a Notice of Award and acknowledges in writing agreement to enter into a Contract, shall submit a Performance Bond in accordance with the required timing and conditions specified in Clause G.12(1) of the General Conditions of Contract and in accordance with the format of the sample Performance Bond given in Form PB, a copy of which is attached. The Performance Bond shall consist of a bank guarantee issued by a State Bank or a Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer.

Should the successful Bidder fail to comply with the specified timing or conditions for Bond submission, the Employer may withdraw his acceptance of the Bid and forfeit the Bid Bond in accordance with Article 22 of these Instructions to Bidders.

Article 24 Advance Payment Bonds

Within 15 (fifteen) days following the signing of Contract, the successful Bidder shall submit to the Employer in accordance with the requirements of Clause G.12(2) of the General Conditions of Contract, and in the format of Guide Form AB, an Advance Payment Bond in both local and foreign currencies against which the Employer will make available Advance Payments of fifteen percent (15%) of the foreign and local currencies as established in the Contract Agreement. A copy of Guide Form AB - Advance Payment Bond is attached.

The Advance Payment is being made available by the Employer for the proper and timely progressing of the Works by the Contractor, and Bidders are requested to take particular note of the conditions pertaining to the Advance Payment Bond(s), Advance Payment repayments, and the recovery of any outstanding Advance Payment sum in the event of failure by the Contractor to abide by the requirements of Clauses G.12(2) and G.58(2) of the General Conditions of Contract.

Article 25 Form of Power of Attorney

Power(s) of Attorney as required by Article 12 hereof shall follow or be similar to the format shown in Guide Forms PA-1, PA-2, and PA-3 of these Instructions to Bidders. The Guide Form descriptions are intended to illustrate the particular cases that could apply in the use of these documents for establishing Powers of Attorney.

GUIDE FORM PA-1. Could be used by a Sole Enterprise (Vietnamese or Foreign) who is already organised and existing in Vietnam .

GUIDE FORM PA-2. Could be used by a foreign investor who proposes to proceed on the basis of 100% Foreign Owned Capital to establish an Enterprise or to form a Contractual Business Cooperation Agreement in Vietnam.

GUIDE FORM PA-3. Could be used by Joint Venture/Enterprises that either exist or are proposed, in accordance with the Affidavit Agreement for a Joint Enterprise.

Article 26

Taxation

Any special requirements as to the method of dealing with Vietnamese taxes will be given in the Special Specifications.

Article 27

Method Statements

The Bidder shall submit method statements describing in detail the methods by which the Bidder proposes to carry out the work, including details of temporary and permanent works and equipment to be used, for the items listed below. The method statements are to be detailed and are to include narrative descriptions, explanatory diagrams and timing schedules for the various items or phases of work.

1. Traffic Management during construction of bridge and road work
2. Working Schedules ( Ref. Guide Form S ).
3. Cofferdams for pier construction in water.
4. Pre-casting and post-tensioning arrangements for PCI-Girders.
5. Temporary bridges and temporary access and approach roads.
6. PC I-Girder erection methods.
7. Site drilling and investigative methods for soft ground proposed to be used and who/which organisation will carry out the testing.
8. For the treatment of soft soils in identified soft soil areas, the type of equipment, methods proposed and production rates for :
  - removal of soft soil and replacement with sand fill.
  - installation of vertical sand drains and fibre wick drains.
  - sand compaction.
9. Following the requirements of the latest TCVN Standards concerning protection of the environment state clearly the measures you would intend to adopt in carrying out your work in order to mitigate the impact of your activities.
10. Procuring, transporting and placing of Borrow material for embankments.
11. Pavement construction including details of the location and capacity of the asphalt batching plant, laying equipment, daily work capacity, etc.
12. Production, transporting and placing of concrete.



Article 28 Contractors Superintendence

It should be noted by the bidders that the Project Manager for the Contractor is also known as the General Superintendent and as such is the executive representative of the Contractor authorised to receive and fulfil instructions from the Engineer and to supervise and direct the construction of the works. Ref: General Conditions of Contract Clause G15.

As required by the General Conditions of Contract the person submitted in the bid, if approved in writing by the Engineer before the Commencement of Works, is to be constantly on the works and shall give his whole time to the superintendence of the same. This may be different from actual conditions due to the practice of each partner in providing their own Manager, however this practice will not be allowed. There shall be one only General Superintendent responsible for the Works.

DECLARATION OF INTENTION TO BID

To: Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE**

Gentlemen,

We have received Bid Documents for our use in the preparation of a Bid for the construction of the above Package.

We intend to submit our Bid to the above address before the closing date for submission of Bids as given in your Invitation to Bid.

----- \* Signature and stamp mark of Company  
----- 2001  
----- \*  
----- \*\*  
----- \*\*\*

- \* Name of signer of this declaration
- \*\* Position in the Company
- \*\*\* Name of Company

AFFIDAVIT AGREEMENT  
FOR JOINT ENTERPRISE

Considering :

- 1. The issue of the Bid Documents for the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 1 – RED RIVER BRIDGE due for submission to the Ministry of Transport, Projects Management Unit Thang Long on ....., 2001, and
- 2. That the parties to the above Joint\* Enterprise Agreement, comprising:

.....  
and  
.....  
and  
.....

being represented by the Joint Enterprise representative as designated in Article E below, desire to participate jointly in the Bidding and the Execution of this project;

NOW IT HAS BEEN AGREED UPON, AND DECIDED:

- A. To appoint ..... for this project as Sponsoring Member/Leading Enterprise to represent and to act "FOR AND ON BEHALF" of the Joint Enterprise and to sign in its name all documents, including the Bid and the Contract.
- B. That ..... as Sponsoring Member/Leading Enterprise shall hold itself responsible for the Works and the execution of the Contract in case of Award and shall hold the Ministry of Transport, and its authorised executing agency Projects Management Unit Thang Long blameless for all consequences and damages in case of any claim by any third party, forthcoming from the Works and the execution of the Contract.

\* *Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.*

C. That regardless of what is stated in Clause A and B above,

.....  
and  
.....  
and  
.....

have agreed together that in case of Award they are and shall remain jointly and severally liable for their respective and joint obligations pursuant to the Contract.

D. That the interest of each enterprise in the Joint Enterprise will be as follows:

..... (..... per cent)  
..... (..... per cent)  
..... (..... per cent)

and that each enterprise will participate in these same proportions in the expense and in the profit and loss of the Joint Enterprise These partnership proportions will not be modified throughout the whole period of the Contract except with the prior written approval of the Employer and the joint written agreement of the participating enterprises Irrespective of the relative size of the partnership proportions shown above, each of the enterprises, and also the Employer when necessary, shall have the right of full supervision of all aspects of the implementation of this agreement, including the right of full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant, equipment and personnel, subcontract agreements, correspondence, telexes, etc.

E. That the Power to sign for and on behalf of the Joint Enterprise shall vest in the person of .....(name) in his capacity as .....(position) of ..... (company name) subject to prior written approval of the other parties to this Agreement regarding the contents of the documents to be signed and the conditions thereof.

- F. That this Agreement for a Joint Enterprise in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 1 will become operative with immediate effect upon receipt of the Notice of Award issued by the Ministry of Transport, through its authorised executing agency the Projects Management Unit Thang Long.
- G. That this Agreement shall automatically be null and void if the Contract is not awarded to the Joint Enterprise.
- H. That this Agreement for Joint Venture in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 1 has been prepared in ..... copies, of which the first copy will be held by Ministry of Transport, Projects Management Unit Thang Long and the other copies given to the parties to this Agreement. All copies possess equal legal status and strength.

In witness whereof the participating parties have hereto placed their signature and seals at ....., on this ..... day of ..... 200 ....

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

Witnessed by : ..... (company name) .....(signature & seal)

.....(name and position of signatory)

DETAILED PRICE ANALYSIS  
FOR  
COST OF MATERIAL

Item :

Unit :

Cost Element / Unit	Cost (Yen)		Cost (VND)	
	Yen/ Unit	Total Yen	VND/ Unit	Total VND
1. CIF Cost at Port / Quarry from .....				
2. Handling				
3. Transport to site (Km )				
4. Unloading, Storage, etc.				
5. Other Costs (describe)				
Sub-Total				
Overheads and Profit at the rate of .....%				
Total Price at Site				

Notes:- The above prices should include all taxes and duties except Vietnamese VAT.

GUIDE FORM D

Sheet \_\_\_\_\_ of \_\_\_\_\_

**DETAILED UNIT PRICE ANALYSIS**

Pay Item No. : \_\_\_\_\_ Description : \_\_\_\_\_ Total Estimated Quantity as shown  
 Pay Item Unit : \_\_\_\_\_ Site Output : \_\_\_\_\_ in Bid Schedule:

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)	
			Yen/Unit	Total	VND/Unit	Total
A. Equipment ( taken from Schedule of Rates and Prices )						
B. Labour ( taken from Schedule of Rates and Prices )						
C. Materials ( taken from Schedule of Rates and Prices )						
Sub Total						
[Overhead & Profit are already included in the above cost elements ]	-	-	-	-	-	-
Total (per site output)						
Total (per Unit)						

Exchange Rate : One Yen = ..... VND (as advised by the Employer)

	Foreign Currency Comp.(¥)	Local Currency Comp.(VND)	Combined Total (VND)
UNIT PRICE - Use in Bid Schedule			
Note : Quantity required for one unit of Pay Item			

DETAILED UNIT PRICE ANALYSIS

Pay Item No. : \_\_\_\_\_ Description : Aggregate for A.C Total Estimated Quantity as shown  
 Pay Item Unit : per. tonne Site Output : 50 tonne/hour in Bid Schedule:

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)x1000	
			Yen/Unit	Total	VND/Unit	Total
<b>A. Equipment</b> ( taken from Schedule of Rates and Prices )						
- A.M.P 80 t/h	h	1	18,950	18,950	1,200.0	1,200.0
- Wheel loader 100 HP	h	2	2,928	5,856	300.0	600.0
- Steel Roller 8 - 10 t	h	2	800.0	1,600.0	100.0	200.0
- Ph. Tyred Roller 12/20 t	h	1	6,050.0	6,050.0	450.0	450.0
- Asphalt Paver 68 HP	h	1	4,000.0	4,000.0	256.5	256.5
				36,456		2,706.5
<b>B. Labour</b> ( taken from Schedule of Rates and Prices )						
- Supervisor	h	1	600.0	600.0	30.0	30.0
- Operator	h	19	250	4,750.0	16.7	317.3
				5,350		347.3
				41,806		3,053.8
<b>C. Materials</b> ( taken from Schedule of Rates and Prices )						
- Aggregate	tonne	50	1,100	55,000.0	54.0	2,700.0
- Wastage ( estimated for this example as 5% )	tonne	0.05		2,750.0		135.0
- Haulage	tonne	1	11,250	11,250.0	750.0	750.0
				69,000		3,585.0
				110,806		6,638.8
<b>Sub Total</b>						
[ Overhead & Profit are already included in the above cost elements ]						
Total (per site output) 50 tonne/hour				110,806		6,638.8
Total (per Unit) 1 tonne				2,216		132.776

Exchange Rate : One Yen = ..... VND (as advised by the Employer) (Assume for this example One Yen = 110 VND)

UNIT PRICE - Use in Bid Schedule	Foreign Currency Comp.(¥)		Local Currency Comp.(VND)	
	Foreign Currency Comp.(¥)	Local Currency Comp.(VND)	Foreign Currency Comp.(¥)	Local Currency Comp.(VND)
Note : Quantity required for one unit of Pay Item	2,216	132,776		376,536



BANK GUARANTEE FOR BID

(BID BOND)

No. : .....

Whereas Bank \_\_\_\_\_ (Name of Bank) \_\_\_\_\_  
having a registered office located at \_\_\_\_\_ (city) \_\_\_\_\_, with a branch office located at \_\_\_\_\_ (city) \_\_\_\_\_ and  
hereinafter called the "BANK", on the request of \_\_\_\_\_ (Name of Firm / Bidder) \_\_\_\_\_  
\_\_\_\_\_ having a registered address at \_\_\_\_\_ (full  
address) \_\_\_\_\_

\_\_\_\_\_ hereinafter called the  
"BIDDER", for the interest of the Ministry of Transport of the Socialist Republic of  
Vietnam through their authorised executing agency referred to as Projects Management Unit  
Thang Long, hereinafter called the "EMPLOYER", hereby guarantees as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the full amount of US\$500,000.00 (Five Hundred Thousand United States Dollars) if, in the opinion of the EMPLOYER, the BIDDER should fail to fulfil his obligations in accordance with the Instructions to Bidders for the Contract for \_\_\_\_\_ (Name of Project) \_\_\_\_\_ for which bids are to be received by the EMPLOYER on \_\_\_\_\_ at \_\_\_\_\_
2. This Bank Guarantee shall be valid for the full period of \_\_\_\_\_ (\_\_\_\_\_) calendar days from \_\_\_\_\_ (date) \_\_\_\_\_ until \_\_\_\_\_ (date) \_\_\_\_\_
3. In accordance with the provisions of the Instructions to Bidders referred to in item 1, any claim on this Bank Guarantee as a result of the default by the BIDDER shall be made by written application from the EMPLOYER promptly after such default has arisen. The BANK guarantees to pay the full amount of this Bid Bond mentioned in item 1 to the EMPLOYER promptly and within seven (7) working days after having received a written claim from the EMPLOYER.
4. A claim may be served by the EMPLOYER up to thirty (30) calendar days after the Bank Guarantee expiry date mentioned in item 2.

\_\_\_\_\_, \_\_\_\_\_ 200 \_\_\_\_\_

Bank .....

(BIDDER'S NAME AND ADDRESS TO BE  
CLEARLY SHOWN AT TOP OF LETTER)

To :

Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI Viet nam**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE**

Gentlemen,

We submit herewith the original and three copies of our Bid for the above mentioned Contract Package.

We confirm that each of the four attached envelopes contains a full set of correctly completed Bid documents as listed in the "Checklist of Documents to be Submitted".

Yours faithfully,

.....

Authorized Representative

ORIGINAL Bid and three COPIES of Bid

received at ..... hours on .../... 200... by :

.....

Bidding Committee Official

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 - RED RIVER BRIDGE**

**ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
PROJECT MANAGER/GENERAL SUPERINTENDENT**

1 Full name of Project Manager/General Superintendent \_\_\_\_\_  
(Delete title not applicable) \_\_\_\_\_

2. Nationality \_\_\_\_\_

3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Full details of past experience with particular reference to work on similar projects.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

(\* To be inserted by the Contractor

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 – RED RIVER BRIDGE  
ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
(TECHNICAL MANAGER/CO-PROJECT MANAGER/DEPUTY GENERAL SUPERINTENDENT)**

- \* Co-project Manager)
1. Full name of \*Technical Manager) \_\_\_\_\_  
\*Deputy General Superintendent)
  2. Nationality \_\_\_\_\_
  3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  4. Full details of past experience with particular reference to work on similar projects.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_ Signature of Contractor \_\_\_\_\_

\*Delete title not applicable.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE  
CONSTRUCTION EXPERIENCE**

DETAILS OF CONSTRUCTION CONTRACTS OVER THE LAST FIVE YEARS  
AND FOR WORKS IN PROGRESS

*(Use a separate sheet for each contract)*

Number of Contract

---

Name of Contract

---

Name of Employer

---

Employer's Address

---

Nature of works and special features relevant to this contract

---

Contract role (check one)

Sole Contractor       Main Contractor       Partner in Joint Enterprise/Consortium

---

Contract Sum	CURRENCY	SUM
.....	.....	.....
.....	.....	.....

---

Date of commencement of work

---

Date of completion if already finished

---

Progress to date for on going project (%)

---

Construction Period (days)

---

Scope of Work	Bridge work :	..... total metres span
	Road work :	..... kilometre length

---

LIST OF PORTION OF THE WORK PROPOSED  
TO BE SUB CONTRACTED

PAY ITEM NO.	DESCRIPTION OF PAY ITEM	PERCENT OF PAY ITEM TOTAL PRICE (%)	PERCENT OF TOTAL BID SUM (%)

Signature of Contractor \_\_\_\_\_

Date \_\_\_\_\_

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise) duly organized and existing  
under the laws of the SOCIALIST REPUBLIC OF VIETNAM hereby duly authorize and extend  
complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the Enterprise.

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Enterprise seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_

\_\_\_\_\_  
(name of Enterprise and seal)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

Witnessed By

\_\_\_\_\_  
\_\_\_\_\_  
(seal)

\* GUIDE FORM PA-1:

For use by a sole Enterprise (Vietnamese or Foreign) who is  
already organised and existing in Vietnam, to authorise signature.

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise ) of  
\_\_\_\_\_ (name of Country) hereby duly authorize and  
extend complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the above named Enterprise

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under their legal signatures and  
Company seals on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_

\_\_\_\_\_  
(name of company and seal)

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_  
(name)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

\_\_\_\_\_  
(title)

Witnessed by  
\_\_\_\_\_

\_\_\_\_\_  
(seal)

\*\* GUIDE FORM PA-2:

For use by Foreign Investor who proposes to proceed on the basis  
of 100% Foreign Owned Capital to establish an Enterprise or to  
form a Contractual Business Cooperation Agreement.



The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1  
RED RIVER BRIDGE  
POWER OF ATTORNEY**

Know all men by these presents, that I/we \_\_\_\_\_  
\_\_\_\_\_ (name and title of authorised representative)  
of \_\_\_\_\_ (name of first enterprise) appointed  
representative(s) of the said Enterprise duly organised and existing under the laws of the SOCIALIST  
REPUBLIC OF VIETNAM and \_\_\_\_\_ (name and title of  
authorised representative of second enterprise) of \_\_\_\_\_ (name  
of second enterprise) appointed representative(s) of the said Enterprise duly organised and  
existing under the laws of \_\_\_\_\_ (country) hereby duly  
authorize and extend complete POWER OF ATTORNEY to the following named person to sign  
all documents concerning proposals, bid negotiations, contract and other documents as may be  
necessary, for and on behalf of the \_\_\_\_\_  
(name of Joint Enterprise that is either existing or proposed in accordance with the Affidavit  
Agreement)

Name in Full

Signature

\_\_\_\_\_

\_\_\_\_\_

Title \_\_\_\_\_

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Company seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_\_

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_

(name) \_\_\_\_\_ (title) \_\_\_\_\_

Witnessed by

\_\_\_\_\_ (seal)

\*\*\* GUIDE FORM PA-3.

For use by Joint Venture/Enterprises that either exist or are  
proposed in accordance with the Affidavit Agreement for Joint  
Enterprise.



BANK GUARANTEE FOR CONTRACT PERFORMANCE

(PERFORMANCE BOND)

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bank Guarantee to warrant his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :

(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

---

2. If, in the opinion of the EMPLOYER, the CONTRACTOR has failed to meet his obligations under the contract, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.

3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
  
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER has issued the Provisional Handover Certificate as required under the terms of the CONTRACT.

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_

( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

## BOND FOR CONTRACT PERFORMANCE

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bond to guarantee his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, by this Bond, we \_\_\_\_\_ (Name of Bonding or Insurance Company) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ (address) and with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ hereinafter called the "SURETY", on the request of the CONTRACTOR agree that we are held and firmly bound unto the EMPLOYER in the sum of \_\_\_\_\_ ( name of currency and amount ) \_\_\_\_\_ for the payment of which sum we hereby bind ourselves and our successors.

**the CONDITION** of this Bond is such that if the CONTRACTOR shall duly perform and observe all the terms and conditions, provisions, conditions and stipulations of the said CONTRACT on the CONTRACTOR's part to be performed and observed according to the true purport intent and meaning thereof, or if on default by the CONTRACTOR, the SURETY shall satisfy and discharge the damages sustained by the Employer thereby up to the amount of this Bond as written above then this obligation shall be null and void. Otherwise, this Bond shall be and remain in full force and effect and the EMPLOYER may demand immediate and full settlement of the above sum from the SURETY without further discussion or prior notice.

It is understood and agreed that none of the following events shall in any way release the SURETY from our liabilities to the EMPLOYER under this Bond:

- 1) any alteration in the terms of the CONTRACT made by agreement between the EMPLOYER and the CONTRACTOR.
- 2) any change in the extent or nature of the Works as given in the signed CONTRACT.

- 3) any allowance of time by the EMPLOYER under the CONTRACT, or
- 4) any forbearance or forgiveness in respect of any matter or thing concerning the CONTRACT by the EMPLOYER or the Engineer appointed to supervise the WORKS..

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the SURETY by \_\_\_\_\_  
( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

BANK GUARANTEE  
FOR  
( Name of Currency ) ADVANCE PAYMENT

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", has entered into a contract for \_\_\_\_\_ ( the works ) \_\_\_\_\_ with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of their contract the EMPLOYER will make an Advance Payment to the CONTRACTOR to facilitate the construction of the works. Prior to release of this Advance Payment, the CONTRACTOR is required to submit a Bank Guarantee to the EMPLOYER for the full amount of the Advance due to be received by him. The Advance Payment will be recovered by the EMPLOYER making deductions from sums due to the CONTRACTOR under the Monthly Certificates. The Bank Guarantee to be held by the EMPLOYER may therefore later be replaced by an equivalent guarantee for such lower sum as equals or exceeds the Advance Payment still remaining with the CONTRACTOR at that time.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :  
(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

2. If, in the opinion of the EMPLOYER, the CONTRACTOR should wilfully fail to achieve the works progress as mutually agreed under the terms of their contract, or shall have utilized any part of the Advance for purposes other than the above works, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.
3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER confirms in writing that the total amount of the Advance Payment has been recovered by him or until this Guarantee is replaced by such replacement guarantee as is acceptable to the EMPLOYER.

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_

( Signature )

( Name )

( Position )



**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2 : GIA LAM SECTION**

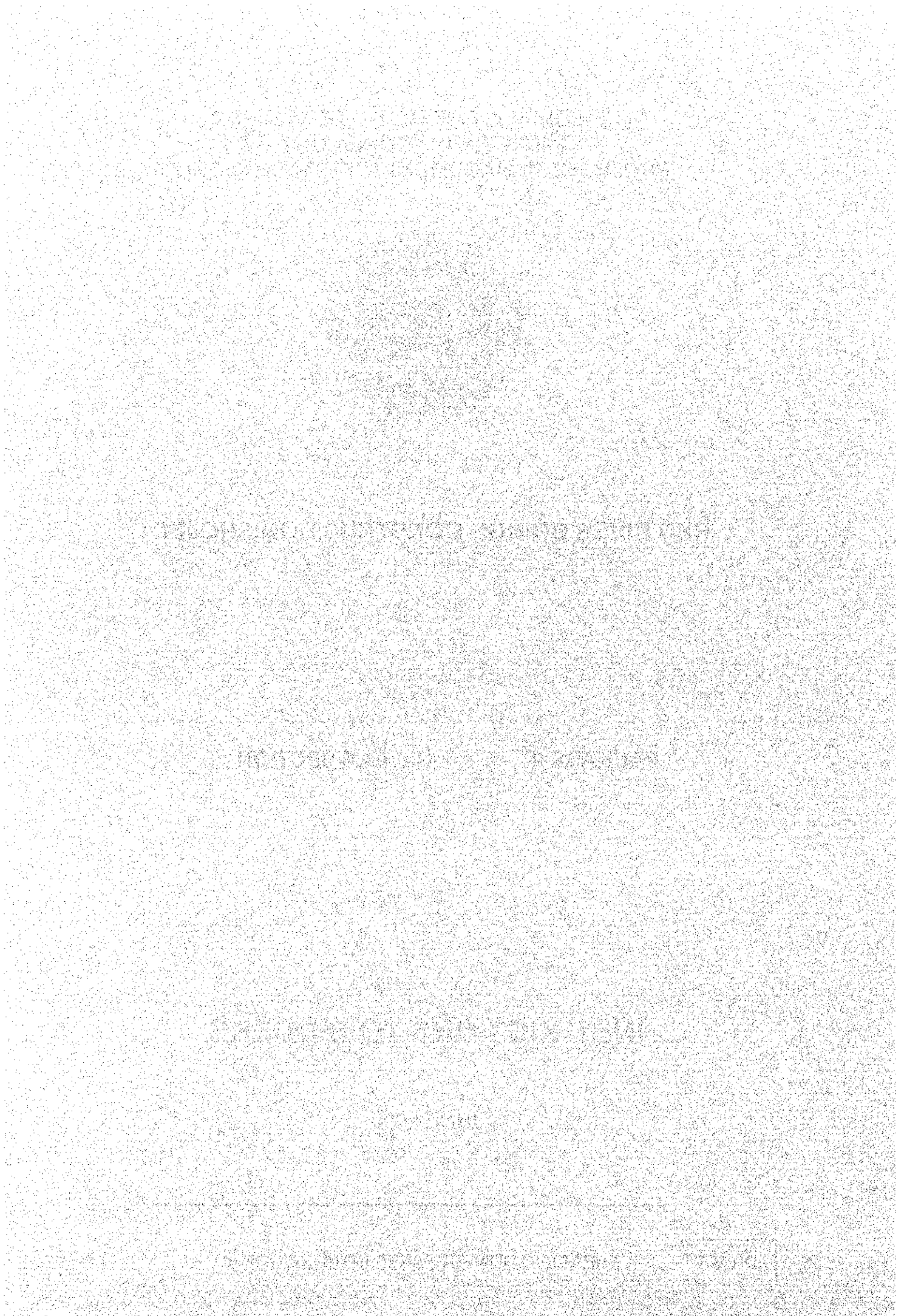
**INSTRUCTIONS TO BIDDERS**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**



## INSTRUCTIONS TO BIDDERS

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## INSTRUCTIONS TO BIDDERS

### PREAMBLE

In accordance with the Prime Ministers Decision No. \_\_\_\_\_ concerning the Red River Bridge Construction Project, Projects Management Unit Thang Long as agent for the Ministry of Transport of the Government of The Socialist Republic of Vietnam intends, under this package, to construct the expressway in Gia Lam section.

The project includes the construction of expressway over a distance of 3.5 km including the construction of one viaduct and three bridges with a total length of approximately 970m and three interchanges. The Project covers also the new construction of frontage road and borders which are provided on both sides or one side of the expressway in the entire stretch.

Main elements of the construction will include:

- Construction of approx. 4,000 sq.m of PC box girder bridge, with cast-in-place concrete piling.
- Construction of approx. 23,300 sq.m of PC I-girder bridge, with cast-in-place concrete piling.
- Construction of approx. 1,200 sq.m of RC hollow slab bridge, with cast-in-place concrete piling.
- Construction of approx. 800,000 cu.m. of borrow embankment.
- Embankment foundation treatment of approx. 32,000 sq.m in soft ground area by 1.0m thickness sand mat and 40 cm diameter vertical sand drain.
- Construction of approx. 1,400 lin.m of vehicular or pedestrian box culvert and large size pipe culvert to maintain existing drainage/irrigation network.
- Construction of approx. 18,500 l.m of road surface and roadside drainage by RC pipes and U-ditch.
- Construction of approx. 114,000 sq.m. of asphalt concrete pavement including subbase course, base, asphalt treated base and asphalt concrete binder and surface courses.
- Erosion control work such as sodding and slope protection by using mortared stone masonry wall or mortared stone surface protection.
- Construction of highway supporting facilities such as guardrails, concrete curb, concrete sidewalk, road markings and signs and fence work.
- Construction of road lighting and signals.

It is anticipated that construction work could commence in \_\_\_\_\_ 2002.

The works will be funded by the Government of the Socialist Republic of Vietnam from the proceeds of a loan arranged from Japan Bank for International Cooperation, hereinafter referred to as "JBIC", towards the cost of Red River Bridge Construction Project. Disbursement of this loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999. No party other than the Government of the Socialist

Republic of Vietnam shall derive any rights from the Loan Agreement or have any claim to the loan proceeds.

The work is being tendered on an International Competitive Bidding basis and participation in the bidding will be open to pre-qualified contractors from all countries and areas. It should be noted that foreign bidders who wish to participate in the bidding will be encouraged to form a Joint Venture commitment with a Vietnamese bidder or agree to use a Vietnamese sub-contractor.

Bidders shall have a sufficient knowledge of the terms and conditions of the above mentioned Loan Agreement including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999 and will bear all costs associated with the preparation and submission of their Bids, and the Employer will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding or the bid evaluation process.

Bids shall be prepared and submitted strictly in accordance with the instructions given in this document and with all prevailing Government of the Socialist Republic of Vietnam rules and regulations regarding taxation, import duties and other matters relevant to successful execution of the Works. It is the responsibility of each Bidder to appraise himself fully of all relevant Government rules and regulations, irrespective of whether or not specific reference to them is made in the Contract Documents.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2  
GIA LAM SECTION**

**INSTRUCTIONS TO BIDDERS**

**Article 1**      Scope of Work

Contractors are invited to submit a bid for Package 2 – Gia Lam section between km 9+302.5 and km 12+831.9.

**Article 2**      Bidding Time Schedule

The sequence of dates for carrying out the bidding for this Contract Section has been programmed as shown in Table No. 1.

**Article 3**      Bidding Documents

The bidding requirements are stated in the Bidding Documents which consist of the following:

- Instructions to Bidders
- Volume I      : General Conditions of Contract
- Volume II     : General Specifications
- Volume III    : Special Specifications
- Volume IV    : Bid, including Appendices to Bid, Bid Schedule and Schedule of Rates and Prices
- Volume V     : Drawings
- Volume VI    : Addendum (if any)
- Volume VII   : Detailed Work Schedule, Plant and Contractors Personnel List
- Form of Contract

**Article 4**      Declaration of Intention to Bid

Prospective Bidders shall, within the time schedule shown in Table No. 1, send by registered mail, or deliver personally against receipt, to the Employer's Bidding Committee a signed "Declaration of Intention to Bid" in accordance with Guide Form A of these Instructions to Bidders, in which they affirm their intention to submit a Bid for this Package.

**TABLE NO. 1**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION**

EVENT	DATE
a Issue of Bid Documents	2001
b Site Visit - prior to Pre-Bid Conference	2001
c Formal Pre-Bid Conference at Hanoi	2001
d Last Date for Bidders to Request Clarification of Bid Documents	2001
e Last Date for Employer to Issue Addenda	2001
f Last Date for Submission of Declaration of Intention to Bid	2001
g Last Date for Submission of Bids 10:00 hrs	2001
h Opening of Bids 10:15 hrs at the Employer's Office	2001
i Evaluation of Bids and Approvals	2001

Note: The aim of the Site Visit and Formal Pre-Bid Conference is to provide bidders with background information on the Employers' requirements for the expressway construction. It is recommended that all prospective bidders should attend.

Article 5

Pre-Bid Information

The Employer will assist the prospective Bidders in clarifying any questions they may raise concerning the Drawings, Specifications and other Bid Documents. This service includes a Formal Pre-Bid Conference to be held approximately forty five (45) days before Bid Opening at a venue to be advised by the Employer, and an official site visit at which Bidders may accompany representatives of the Employer and Engineer.

Bidders are requested to formally submit any questions in writing or by facsimile or telex to reach the office of the Bidding Committee in Hanoi not later than the last date for Bidders to request clarification of the Bid documents as given in Table No. 1 of these Instructions to Bidders.

All formally submitted questions will be formally clarified by the Employer by the issue of Addenda during the Bid Period in accordance with Article 14 of these Instructions to Bidders. Only pre-bid information confirmed in writing in Addenda during the Bid Period will form part of the Contract.

Article 6

Inspection of Bid Documents and Site of the Works

Bidders shall visit and inspect carefully the Site of the Works to be tendered for, and shall study all Contract Documents and guarantee forms prepared for the Contract before submitting a Bid.

The Bidder and any of the Bidder's personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder and the Bidder's personnel and agents will release and indemnify the Employer and the Employer's personnel and agents from and against all liability in respect of personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission would not have arisen.

The Employer will obtain all land or permission for the temporary use of land on which permanent works are to be constructed. but in certain areas the working space may be restricted. If considered necessary by the Employer further details of working space will be given at the Pre-Bid Conference and included in the formal answers to bidders questions.

Before submitting his bid the Bidder should thoroughly acquaint himself with the situation regarding utilities to be protected during the Works and the need to facilitate the work of utility contractors if any during the term of the main Contract.

The submission of a Bid shall be considered prima facie evidence that the Bidder has made such examination of the Site and Contract Documents, and is familiar with, and has allowed for in his Bid, the nature of the Site and its means of access, the character, quality and quantities of the Works to be performed, the availability and quality of materials to be furnished, the availability of labour, accommodation and transport, the difficulties inherent in executing the Works within the specified time including any limitations of local weather conditions, all relevant laws and regulations



of the Government of the Socialist Republic of Vietnam together with all risks, contingencies and other circumstances which may arise, and that he will not in the future express ignorance about any of the conditions pertaining to the execution of the Work, so far as these could be ascertained at the time of Bid Submission

All costs and charges in connection with visits to and examination of the Site and in the preparation of the Bid shall be borne by the Bidders.

Article 7

Preparation of Bid Schedule and Schedule of Rates and Prices

The Bid Schedule and Schedule of Rates and Prices shall be prepared on the forms furnished, or true copies thereof.

All entries in the Bid, Bid Schedule and Schedule of Rates and Prices shall be typewritten or computer printed.

Bid prices shall be determined by the Bidder entirely at his own responsibility and shall, with due regard to his examination of the Site and the Bid Documents as required under Article 6 of these Instructions to Bidders, be suitable for the satisfactory construction, completion and warranty of the Work being tendered.

Bidders are required to carefully study the works required under each pay item as given in the Drawings and Specifications. In particular the Bidder is strongly advised to thoroughly read and understand the "Method of Measurement" and "Basis of Payment" as given against each pay item.

Under no circumstances will the Employer entertain, at any time in the future, a claim for an increase in the Bid prices for reasons of ignorance, error or oversight on the part of the Bidder with respect to any of the conditions pertaining to the execution of the Works.

The Bidder shall enter his Bid Prices in the Bid Schedule forms given in Volume IV, "Bid, Bid Schedule and Schedule of Rates and Prices" or true copies of the same.

The Contract is to be established in a local currency component, Vietnamese Dong, and a foreign currency component, Japanese Yen, with component percentages nominated by the bidder for each unit price. These percentages shall also apply to any adjustment to the bid brought about by discounting.

However, for the purpose of evaluation and comparison of Bids, the prices entered in the Bid Schedule shall be expressed as the local currency equivalent of the combined local and foreign currency components of the Bid Prices. The exchange rate used for this calculation shall be the official selling rate of exchange between the foreign currency and the local currency, as quoted by the Vietcom Bank, ruling 30 days prior to the opening of the Bid. The Employer will formally notify Bidders of this exchange rate.

The Bid Schedule shall therefore be completed by the Bidder in accordance with the following requirements:

- (a) Unit Prices and Total Prices for each Pay Item or Section of the Bid Schedule and the Schedule of Rates and Prices shall be expressed in the currency of Vietnamese Dong and Japanese Yen.
- (b) Unit Prices shall only be entered against those Pay Items in the Bid Schedule for which quantities have been provided.
- (c) Lump Sum prices shall only be entered in the total bid price column of the Bid Schedule where such a price is called for.
- (d) The Total Price for each Unit Price Pay Item shall be entered in the columns provided for that purpose in the Bid Schedule by calculating the product of the respective unit prices and the estimated quantities. The Total Prices for each Section shall be computed and transferred to the Bid Summary and the sum of the Total Bid Prices for each Section of the Bid Schedule shall be calculated and entered in the appropriate space in the Bid Summary. The totals so obtained are the LOCAL CURRENCY component, and the FOREIGN CURRENCY component of the Net Bid Sum. The Bidder shall add to the LOCAL CURRENCY component that percentage that he calculates is required to cover his net obligation for Value Added Tax (VAT) payable in Vietnam. The LOCAL CURRENCY equivalent of the TOTAL BID SUM is thus derived and shall be stated by the Bidder in the appropriate spaces provided in the Bid and in the Bid Summary.
- (e) When determining Unit Prices, intending Bidders should note the following applicable conditions:
  - (i) The Unit Prices shall include all Vietnamese duties, taxes and other levies payable by the Contractor under the Contract except for VAT. The net allowance for VAT shall be expressed as a percentage, which will be added to the local currency component of the Bid, as shown in the Form of Bid document.
  - (ii) The amounts payable in respect of certain Pay Items may be subject to adjustment, in accordance with Clause G.70 of the General Conditions of Contract, on account of fluctuations during the performance of the Contract in the cost of labor, fuel, materials and equipment (escalation/ de-escalation).
  - (iii) The Unit Prices for each Pay Item shall be the rate used to calculate the amounts to be paid to the Contractor in the Monthly Certificates and the Final Certificate, subject to the provisions of the various Clauses in the General Conditions of Contract.
  - (iv) Payments to the Contractor shall be made in accordance with Clause G.58 of the General Conditions of Contract in both local and foreign currencies as determined by the breakdown of the unit prices in the Contract Agreement.

- (f) All Bidders will have been given a copy of the Bid Schedule and Schedule of Rates and Prices on a computer floppy. The Bidders should enter their rates and prices on this disk and return it to the Employer together with the other Bid documents. This is for the convenience of the Employer and if there is any discrepancy between the prices submitted on paper and those given on the floppy disk, then the information given on the papers will be binding and the computer data will be corrected accordingly.

Article 8

Interpretation of Quantities in Bid Schedule

The quantities entered for each Pay Item in the Bid Schedule are estimates only and are prepared for the comparison of Bids and Award of Contract. Payment will be made only for the certified quantities of work

for each Pay Item actually performed in accordance with the Contract Documents. The scheduled Pay Item quantities of work to be executed may be increased or decreased as provided for in Clauses G.51 and G.52 of the General Conditions of Contract.

Article 9

Use of Local Contractors, Sub-contractors, Goods and Services

Successful bidders will be encouraged, in accordance with Vietnamese Regulations promulgated in conjunction with Decree No.43/CP, to undertake to form a joint venture with a Vietnamese Contractor or to use local Sub-contractors for construction and installation and purchase of materials and equipment able to be domestically produced or processed in Vietnam. However, in accordance with Clause G.04 of the General Conditions of Contract, intending Bidders should note that the total value of work which may be sub-let shall not exceed 50 (fifty) percent of the value of the Contract.

Article 10

Price Escalation/De-escalation

Price adjustment (escalation/de-escalation) will be applicable.

Article 11

Partnership or Association of Enterprises

Enterprises\* now proposing to bid shall have passed the pre-qualification (screening) executed by the Employer, have satisfied the conditions for business practicing certificate or license within Vietnam or in the bidders home country and be technically and financially able as stated elsewhere in the tender documents.

Bids may be received from;

- i) Enterprises of voluntarily created joint ventures and joint operations forming a partnership or association in one of the following forms:
  - a) A Joint Venture Enterprise which means an enterprise established in Vietnam on the basis of a joint venture contract signed by one or more Vietnamese parties\*\* together with one or more foreign parties\*\*\* in order to invest and carry on business in Vietnam.

\* Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.

\*\* Vietnamese party shall mean one or more Vietnamese legal economic entities.

\*\*\* Foreign party shall mean one or more foreign individuals or legal economic entities.

A Joint Venture Enterprise shall be established in the form of a limited liability company and shall be a legal entity in accordance with the provisions of the law in Vietnam. (i.e. each joint venture party shall be responsible to the other party and to the joint venture enterprise to the extent of its contributed capital to the company.)

- b) A Joint Operation formed by existing Vietnamese Enterprises without the direct investment of foreign capital.
- c) A Contractual Business Cooperation Agreement initiated by a foreign investor and signed by two or more parties which stipulates the responsibilities of and the sharing of business results between the parties, for the purposes of commencing business investment in Vietnam without creating legal entity.
- ii) An Enterprise With 100% Foreign Owned Capital defined as an limited liability company owned and established in Vietnam by a foreign investor who self manages the enterprise and takes full responsibility for the results of its business.

All Joint Ventures, Operations and Individual Enterprises are required to be pre-qualified. In the case of a Joint Venture, Joint Operation or a Consortium of several established Joint Enterprises - hereinafter referred to as a Joint Enterprise - this is a prerequisite even in the case where the parties to a Joint Enterprise are individually pre-qualified.

In the event that the successful Bidder is a Joint Enterprise, the Employer requires that the parties to the Joint Enterprise accept joint and several liability for all obligations under the Contract.

The Joint Enterprise shall therefore submit with the Bid a copy of the agreement indicating the percentage of capital contribution recorded or to be recorded in the company charter, the authorized signatory or signatories, the acceptance of joint and several liability for all obligations under the Bid and the Contract, and other pertinent features of the Joint Enterprise. If a Joint Enterprise has not been finalized then an Affidavit Agreement for Joint Enterprise as given in Guide Form B of these Instructions to Bidders shall be completed and submitted with the Bid.

The structure of a Joint Enterprise shall not be modified, except with prior approval of the Employer, at any time following pre-qualification or following submission of Bids or throughout the whole period of the Contract. Otherwise the Employer shall be entitled:

- 1) to disqualify the Bid and effect forfeiture of the Bid Bond;
- 2) to invoke the provisions of Clause G.63 of the General Conditions of Contract concerning the default of the Contractor.

In the case of the Employer granting approval for such modification, the Joint and Several Liability provisions herein described shall still apply and in no case will a participating party be allowed to reduce the level of his participation to zero.

Irrespective of the details of the agreed percentage of capital contribution of the parties in a Joint Enterprise, any of the parties together with the Employer, when necessary, shall have the right of full supervision of all aspects of the implementation of the contribution agreement, including full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant and equipment and personnel, telexes, subcontract agreements, correspondence, etc.

## Article 12

### Signatures

The signatures required for the Bid Documents shall be as follows:

- (a) Where the Bidder is a sole Enterprise, Joint Enterprise or Consortium (hereinafter called an Joint Enterprise) that is already licensed in Vietnam, then the legal authorized representative of the Enterprise shall sign.

A Power of Attorney which has been witnessed, or a duly certified copy of it, granting authority to sign shall be enclosed with the Bid.

In this respect the legal authorized representative of the Joint Enterprise shall be restricted to any person stated in the company registration as being a member of the board of directors or to any manager or branch manager of the Enterprise

- (b) Where various Bidders have formed or have agreed to form a Joint Enterprise in accordance with the requirements of Article 11 of this document, every Partner of the Joint Enterprise shall sign the Joint Enterprise Agreement or the Affidavit - Agreement for Joint Enterprise (Guide Form B) either personally or through their legal representative, so that all will be jointly and severally responsible for the Bid submitted.

Where one or more parties to the Joint Enterprise have signed the Agreement or Affidavit-Agreement in the name of an Enterprise, a Power of Attorney which has been witnessed, or a duly certified copy of it, empowering him, her or them to sign for the Enterprise must be enclosed with the Bid.

All other Contract Documents, including the Bid, will be signed by the designated representative as nominated on the Agreement or Affidavit - Agreement and this authorization shall be evidenced by submitting with the Bid a Power of Attorney which has been witnessed and which has been signed by the legally authorized signatories of all of the parties.

## Article 13

### Notice to Foreign Contractors

It should be clearly understood that, should the need arise, any party who participates in whatever manner in the Bid consents to be sued in any court or tribunal of competent jurisdiction within the Socialist Republic of Vietnam on any question or matter arising from the documents, award, and implementation of the project. For this purpose any

designated representative of the said party(ies) present in the territory of the Socialist Republic of Vietnam shall be authorized to receive process summons on behalf of the said party(ies) notwithstanding any restriction or limitation imposed by the said Contractor upon its designated representatives.

Article 14 Addenda Issued during Bid Period

Addenda to Bid Documents may be issued up to the last date for Employer to issue Addenda as given in Table No. 1 of these Instructions to Bidders for the purpose of clarifying the Bid Documents or to reflect modifications in the design or Contract terms. If Bidders are in doubt as to the true meaning of any part of the Bid Documents they should request clarification by notifying the Employer in writing prior to the last date for Bidders to request clarification of the Bid Documents as given in Table No. 1 of these Instructions to Bidders.

Any such clarification of the Bid Documents by the Employer will only be made by the formal issue of Addenda which will form part of the Bid Documents. Each Addendum so issued will be sent to all prospective Bidders to whom Bid Documents have been issued and will be binding upon them.

Article 15 Preparation of Bids

The Bid must be submitted under a covering letter and shall contain the documents mentioned hereunder all of which are essential. Guide Form F for the covering letter is given in these Instructions to Bidders.

All documents shall be written in English.

No alternative bids will be accepted.

- a.
  - i) If the Bidder is an existing Joint Enterprise which has been licensed as such in Vietnam or has formed a new Joint Enterprise, a duly certified copy of the Joint Enterprise Agreement between the various parties.
  - ii) If the Bidder is a proposed Joint Enterprise, the Affidavit-Agreement between parties, given in Guide Form B of these Instructions to Bidders, which has been completed and signed by all parties and shall be binding among them if awarded the Contract.
- b. If the bid is to be established on the basis of a Business Cooperation Contract the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. The Power(s) of Attorney as required in Article 12 above.
- d. Bidders latest balance sheet, list of owners, management organization, together with any revisions. In case of Joint Venture/ Operation the foregoing are required for each of the parties to the Agreement.
- e. Foreigners' labour permit (where applicable) in accordance the Labour Code.

- f. Tax registration number. In case of a Joint Enterprise each partner's tax registration number.
- g. Bank reference. In case of Joint Enterprise each of the parties bank references. In case of a foreign bank reference a recommendation letter is required from the Vietcom Bank, Vietnam.
- h. The Bid Bond according to Article 21 below and using the format given in the sample Guide Form E of these Instructions to Bidders.
- i. The Bid duly filled in, dated, stamped, and signed by the Bidder and Appendix to the Bid, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".
- j. The Bid Schedule and Schedule of Rates and Prices filled in, signed where required, and initialed on each page by the Bidder, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices". In accordance with Article 7 (f) of these Instructions the Bidders should also return a floppy disk copy of this data for use by the Employer.
- k. A Works Progress Schedule using Guide Form G in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List" as a guide, and completed in accordance with Clauses in the Contract Documents relating to the time for completion of the Works.
- l. Detailed Price Analyses for the Breakdown of the Cost of Materials for the Items listed in the Schedule of Rates and Prices Section C : Materials on Site, using the format shown in Guide Form C of these Instructions to Bidders.
- m. Detailed Price Analyses showing the complete breakdown of the prices from the elements involved (labour, equipment, materials) for the following Pay Items using the format shown in Guide Form D of these Instructions to Bidders:
- All Pay Items in Section I - General, of the Bid Schedule
  - All Pay Items in Section 4.0-Earthworks
  - Pay Items 5.01(1) and (5) - Structure Excavation
  - All Pay Items in Section 10-Concrete Structures.
- Detailed Price Analysis of additional items may requested during the period of Bid Evaluation. Following Notice of Award the successful Bidder will be required to submit Detailed Price Analyses for all Pay Items.
- n. Method Statements as required under Article 27 of this document.
- o. An itemized list of Construction Plant, including sub-contractor's plant, giving the types, capacities and quantities of plant which the Bidder intends to use for the execution of the Contract work. Form H in Volume VII "Detailed Works Schedule, Plant and Contractors' Personnel List" should be used as a guide and a clear distinction made between equipment already owned, the equipment which is intended to be purchased or hired and sub contractor plant. (The equipment nominated in this list as already owned must be in good working order

and available for inspection, if considered necessary by the Employer, at the location indicated).

- p. Details of construction experience over the last five years giving names of contracts, names of employers, contract roles, scope of works, and contract sums, using the format shown in Guide Form L in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".
- q. A site staff organization chart and a list of the senior staff the Bidder intends to employ for the execution of the Works and who will actually be present on Site, showing the number of years of experience in similar construction works of each such staff member, using as a guide Form I in Volume VII, "Detailed Works Schedule, Plant and Contractors Personnel List". Full details of careers and works carried out shall be provided for the Project Manager (General Superintendent) and Technical Manager (Deputy General Superintendent) using Guide Forms J and K in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".

Candidates in the list of senior staff submitted with the Bid must correspond with the candidates listed in the Pre-qualification Questionnaire the requirements of which are reproduced as follows.

- Project Manager (General Superintendent)
  - Technical Manager (Deputy General Superintendent)
  - Site Supervisor(s)
  - Chief of Asphalt Mixing Plants.
  - Geotechnical Specialist Engineer.
- ◆ Project Manager should have at least 20 years of total experience in highway and bridge works and not less than 10 years of experience and 3 projects handled as Project Manager in similar projects;
  - ◆ Technical Manager should have at least 15 years of total experience in highway and bridge works and not less than 7 years of experience and 2 projects handled as Technical Manager in similar projects;
  - ◆ Site Supervisor should have at least 10 years of total experience in highway and bridge work and not less than 5 years of experience as Technical Manager in similar projects.
  - ◆ Chief of Asphalt Mixing Plants should have at least 10 years of total experience in asphalt road work and not less than 5 years of experience as chief of an asphalt mixing plant in similar projects;
  - ◆ Senior Geotechnical Specialist should have at least 10 years of total experience in the analysis of soft ground improvement methods using sand drainage systems as a means of consolidation
- r. List of the portions of the Works proposed to be sub- contracted, according to Guide Form M of these Instructions to Bidders.



- s. If a Bidder wishes to modify his bid price after completion of the bid schedule and the formal bid document, then this will be known as a Balancing Item. Notice of the Balancing Item should be given by way of a letter (to be hand delivered) which should confirm the total amount of the Balancing Item; whether it is an addition or subtraction to the Net Bid Sum.; and the manner that the Balancing Item is to be applied to the submitted bid prices. In the absence of such complete information the Employer will be at liberty to apply the balancing item in whatever manner he deems appropriate. The letter giving notice of the balancing item should be signed and witnessed by the same persons as signed the main bid. The letter should be placed in a sealed envelope, which should then be handed to the Bidding Committee immediately before the opening of the main bidding documents. After the bid opening has started, no further submissions will be accepted.

For guidance in the preparation of Detailed Unit Price Analysis required in item "m" above the main materials and equipment requirements are provided in Guide Form D-1 (Example Only). These requirements are to be utilized as a guide only for the preparation of Detailed Unit Price Analysis and Bidders are to determine their own material proportions and equipment and labour requirements.

Intending Bidders are to note that the Unit Price Analysis details which are submitted in accordance with this Article will be used by the Employer as an aid to bid evaluation and may also be used as a reference for determining new or revised unit prices should the need for such new or revised prices be required during the Contract Period.

The above Bid Documents shall be bound to form the following books:

Book I

- a. (i) Joint Enterprise Agreement (if applicable)  
(ii) Joint Enterprise Affidavit-Agreement (if applicable)
- b. Business Cooperation Contract - the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. Power(s) of Attorney
- d. Latest Balance Sheet(s), List of Owners, Management Organization(s) etc.
- e. Labour Permit(s) (if appropriate)
- f. Tax Registration Number(s) (if appropriate)
- g. Bank Reference(s)
- h. Bid Bond

Book II

- i. Bid and Appendix to Bid

- j. Bid Schedule and Schedule of Rates and Prices (together with a floppy disk containing the same data.)
- s. Letter with details of the Balancing Item (if appropriate)

Book III

- k. Works Progress Schedule
- l. Detailed Price Analyses for Materials
- m. Detailed Price Analysis of Pay Items
- n. Method Statements

Book IV

- o. List of Construction Plant
- p. Details of Construction Experience
- q. Site Staff Organization Chart and List of Senior Staff
- r. List of Works proposed to be sub-contracted

Article 16

Submission of Bids

The Bidder shall use, and submit with his Bid, the Form "Checklist of Documents to be Submitted", given in the front of Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".

1. The Bid and copies as described later shall be submitted each in a closed and sealed buff-coloured envelope, all enclosed in an outer envelope of the same colour.
2. The outer envelope must be sealed, must not be transparent and must not carry any indication of the identity of the Bidder. Both outer and inner envelopes shall be addressed to the Employer's Bidding Committee and marked as follows:

To:

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HANOI Vietnam

DOCUMENTS FOR  
RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 2

GIA LAM SECTION

DO NOT OPEN BEFORE 10:15 hrs

on.....2001 at HANOI

Only the inner envelopes, which contain the Bid, shall bear the name and address of the Bidder, to enable the Bid to be returned unopened in case it is declared "late" or otherwise disqualified.

If the inner and the outer envelopes are not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening and rejection of the Bid.

The Bid envelopes shall be hand delivered to the Bidding Committee and must be received not later than the deadline indicated in Table 1 of these Instructions to Bidders.

All pages in the Bid Envelopes must be initialed by the authorized signatory. No submission of initialed "Instructions to Bidders" and Volumes I, II, III, V and VI is required with the Bid, however these documents are required to be submitted by the successful Bidder after the notification of Award.

The complete Bid shall be without alterations, inter-lineations or erasures, except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

The original copy and three photocopies of all Bid Documents as required on the "Checklist of Documents to be Submitted" are required to be submitted. These four sets of Bid Documents shall be sealed in separate envelopes, with the envelope containing the original set and each of the original books being clearly marked "ORIGINAL" and each of the other three envelopes and books therein being clearly marked "COPY".

In the case of any discrepancy between the contents of the four sets of documents, the set marked "ORIGINAL" shall govern. The four envelopes of Bid Documents shall be submitted in the before mentioned outer envelope with a covering letter of transmittal, using Guide Form F of these Instructions to Bidders.

The covering letter shall be submitted separately from, but at the same time as, the envelope containing the Bid Documents. The purpose of the covering letter is to provide the name and address of the Bidder and to provide an official record of the time and date of transmittal to the Employer of the completed Bid Documents. If the Bidder has not yet a legal residence in Vietnam, a postal address in Hanoi must be provided to which all correspondence or communications will be directed.

The Bidder will be given a signed copy of the covering letter as his record of receipt of the Bid by the Employer.

## Article 17

### Opening of Bids

#### a) Opening of Bids

The opening of Bids will take place at the time and date fixed in Table No. 1 in these Instructions to Bidders by the Bidding Committee duly appointed by the Employer. The Bidders or their authorized representatives, may attend the opening of the Bids, if they so desire, and all Bidders or their representatives who are present at the opening shall sign a register evidencing their attendance. Two of the attendant Bidders or their representatives will be nominated to witness that the results of the Bid Opening are recorded correctly by the Bidding Committee.

Each Bid Envelope will be opened in turn and the Bidder's name, the presence or absence of the requisite Bid Bond, price of the Bid, and such other details as the Employer, at its discretion, may consider appropriate will be announced and recorded. In addition, as each Bid envelope is opened in turn, all pages of the original and copies of the Bid, Bid Schedule and the Schedule of Rates and Prices of Volume IV shall be countersigned by one member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

b) Preliminary Examination of Bids

During the Bid opening ceremony, the Bid Documents will be checked for general compliance with the requirements of the Bid. In particular the Bidding Committee will check and ascertain that all of the documents comprising the Bid as nominated in Article 15 of these Instructions to Bidders are included and have been correctly completed. Where Bid Documents are required to be signed the Bidding Committee will ascertain that all such documents bear the signature of the authorized signatory.

The Bidding Committee will also check that the price in the bid is clearly stated in figures and words, and that the amount written in figures is the same as the amount written in words. At the time of opening of Bids a Bid will be declared not substantially responsive to the Bidding Documents for the following reasons:

- a. if all documents comprising the Bid as required in Article 15 of these Instructions to Bidders are not included.
- b. if the Bid enclosing envelope is not marked only as required in Article 16 of these Instructions to Bidders.
- c. if the Bid is received after the time limit for submission of Bids.
- d. if the Bid price is not written in figures and in words.
- e. if the amount of the Bid price written in figures is not the same as the amount written in words.
- f. if the Bid documents have been sent to a member of the Bidding Committee or other official.

If a Bid is not dated and signed, the Bid can be made responsive to the Bidding Documents if these items are fulfilled at the time of opening of Bids.

If all of the foregoing requirements have been met in full and the Bid includes no reservations of any kind whatsoever, the Bid will be judged to be fully responsive to the Bidding Documents.

Any Bid determined by the Bidding Committee at the time of opening of Bids as not being substantially responsive to the Bidding Documents will be rejected by the Bidding Committee and may not subsequently be made responsive by the Bidder by correction of the non conformity.

The results of the preliminary examination of the Bids shall be recorded in a Process Verbal of the Bid Opening which shall be signed by each member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

Article 18

Evaluation of Bids

No information relating to the examination, clarification and evaluation of Bids, or to recommendations concerning Award, shall be communicated to any persons not officially concerned with these procedures.

The Bids received will be evaluated on the basis of their responsiveness to the Bidding Documents, on the basis of administrative, contractual and technical evaluations, and on the VND equivalent of the total Bid Sum.

The administrative, contractual and technical evaluations will be carried out first and provided these comply with all administrative, contractual and technical requirements and specifications the price evaluation will proceed.

In case of discrepancy being discovered between the total Bid Sum shown in the Bid and that obtained by adding the products of the listed quantities and the Unit Prices, the Unit Prices as quoted shall not be altered, but errors found in the said products, or in their addition, shall be corrected. Such corrections may result in the change of the total Bid Sum. In such case, the Bidder shall be given the option either of accepting the corrected total Bid Sum or of withdrawing his Bid in which latter case the Bid Bond will be forfeited under the provision of Article 22 of these Instructions to Bidders.

The Employer reserves the right, for whatsoever reason, to reject any or all Bids, to waive technicalities, to advertise for new Bids, or to proceed to do work otherwise, without the necessity of furnishing each Bidder with a statement giving the reason or reasons for the Employer's action. In the event that it becomes necessary for the Employer to invoke this right, the Employer will return all Bid Bonds without forfeiture.

After the submission of the Bid, any further clarification by the Employer of the Contract Documents or by the Bidder of his Bid will be formalized by a letter from one party and a reply letter from the other party, and these letters of agreement will then form a legally binding part of any Contract subsequently entered into.

During evaluation Bids may be considered irregular, and if not adequately clarified to the satisfaction of the Bidding Committee, may be rejected or disqualified for, but not limited to, the following reasons :

- a. if the Bid is not submitted on the forms furnished or true copies thereof, or if any of the forms as required under the provisions of these Instructions to Bidders are missing from the Bid;
- b. if there are any unauthorized additions, conditional or alternate Bids or irregularities of any kind which tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning;

- c. if the Bidder adds any provisions reserving the right to accept or reject an Award;
- d. if more than one Bid for the same work is submitted by an single Enterprise, a Firm, Corporation, Joint Enterprise or Consortium under the same or different name(s);
- e. if there is evidence of collusion between Bidders (Identical Bids would indicate collusion and the Employer reserves the right to reject any such Bids and, if necessary, to call for new Bids excluding the identical Bidders);
- f. if Bids are submitted in which the Unit Prices in the Bid Schedule and/or Schedule of Rates and Prices do not follow those included in the Detailed Unit Price Analyses;
- g. if the Bid is substantially unbalanced as a result of unreasonable weighting of certain Unit Prices;
- h. if the Bid Bond is not valid or is valid for less than the period established in Article 21 herein.
- i. if the respective proportions of contributed capital to the Joint Venture or Consortium have been modified without the prior written approval of the Employer.
- j. if the Bid Documents have been signed by a person other than one of the authorized signatories as defined under Article 12 of these Instructions to Bidders.

If, after the completion of evaluation and ranking of responsive Bids, any Pay Item Price has been found to be disproportionately high in the lowest qualified Bidder's Bid and the Bidder is unable to provide adequate justification in support of the quoted price, the Bidding Committee in consultation with the Bidder may agree on an alternative lower price that is acceptable to both parties and such agreed and lower price will be used for the payment of all work completed in excess of the quantity stated in the original Bid Schedule. If such agreement cannot be obtained, the Bid may be disqualified and the ranking of responsive Bids revised accordingly

#### Article 19

##### Validity of Bids

The Bid shall remain valid up to at least 150 ( one hundred and fifty ) calendar days after the date of opening of Bids. In exceptional circumstances prior to expiry of the original Bid validity period, the Employer may request the Bidder for a specified extension in the period of validity.

The request and the responses thereto shall be made in writing or by facsimile or telex. A Bidder may refuse the request without forfeiting his Bid Bond. A Bidder agreeing to the request will not be required nor permitted to modify his Bid, but will be required to extend the validity of his Bid Bond correspondingly.

If any Bidder withdraws his Bid before the validity period expires or if any Bidder refuses or fails to sign the Contract when requested by the Employer to do so, then the amount of the Bid Bond will be forfeited.

Article 20

Award and Signing of Contract

Within 120 (one hundred and twenty) days after the Opening of Bids the Employer will issue a Notice of Award to the successful Bidder together with a Draft of the Proposed Contract. The Bidder who receives the Notice of Award shall within 7 (seven) days of the date of issue of the Notice of Award notify the Employer in writing whether the Bidder is willing to carry out the Works and whether the draft Contract given by the Employer is acceptable.

Within 15 (fifteen) calendar days after the date of issue of the Notice of Award or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, and before signing the Contract, the successful Bidder is required to submit Performance Bonds in accordance with the requirements of Clause G.12(1) of the General Conditions of Contract. Also within 15 (fifteen) calendar days of issue of the Notice of Award, or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, the successful Bidder is required to sign the Contract Agreement and to return it to the Employer for his signature. The Employer will then arrange for the various signatories from the Employer to affix their signatures within the following 15 (fifteen) days.

If the successful Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the second most acceptable Bid. If the second responsible Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the third most acceptable Bid. In such event the Bidders may be requested to extend the validity of the Bids for such further period as may be agreed upon in writing between the Employer and the Bidders concerned.

Where the Bidder is a Joint Enterprise, each member of the partnership or association shall be liable for the Bid submitted.

If for any reason the Bid should be withdrawn before expiry of the said period, the Bid Bond given by one or more members of the partnership or association will be retained by the Employer.

In the case of the second, or third responsible Bidder, the signing of the Contract by all parties shall also take place within 30 (thirty) days from the date of issuance of the Notice of Award to the Bidder who accepts the Award.

After the signing of the Contract and its approval by Japan Bank for International Cooperation (JBIC) the Employer will send a written Notice to Proceed to the Contractor.

The written Notice to Proceed will be issued within thirty (30) days after the date of the approval by JBIC mentioned above, and the Notice will specify the date to be considered as the Commencement Date of the Works which shall be not more than thirty (30) days after issuing the Notice to Proceed by the Employer.

Article 21

Bid Bond

The Bidder shall together with his Bid submit a Bid Bond as security for full compliance with all of the requirements of the Bid. The amount of the Bid Bond shall be Five Hundred Thousand United States Dollars (US\$500,000.00).

A Joint Enterprise either proposed or not yet licensed in Vietnam shall submit the Bid Bond in the name of one or more representatives of the Partnership or Association who are authorized by a Power of Attorney to act as representatives of the Joint Enterprise.

Bidders who are party to a Contractual Business Cooperation Agreement may, in accordance with the proportioning of responsibilities and results of business set out in the Agreement, submit the Bid Bond in the name of one or more of the parties who are duly authorized by Power of Attorney to act as their representatives.

The Bid Bond shall consist of a Bank guarantee issued by a State Bank, Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer. A sample guide is given in Guide Form E of these Instructions to Bidders

The Bid Bond shall be valid for 30 (thirty) days beyond the period of validity of the Bid as given in Article 19 of this document or at least 180 (one hundred and eighty) days from the date of opening of Bids or for such extension of the Bid validity period as may be granted by the Bidder in writing to the Employer or agreed to by mutual consent.

An unsuccessful Bidder's Bid Bond will be discharged or returned as promptly as possible after award of Contract but in any event no later than 30 (thirty) days after the expiration of the period of bid validity as given in Article 19 of this document.

The successful Bidder's Bid Bond will be discharged or returned after the Bidder has furnished the Performance Bond in accordance with Article 23 of this document and all signatures have been affixed to the Contract Agreement.

Article 22

Forfeiture of Bid Bond

In the event of any Bidder withdrawing his Bid or of a successful Bidder failing to prepare and sign a Contract Agreement as required by the General Conditions of Contract, Clause G.11, within the specified time period of 15 (fifteen) days, or failing to furnish a Performance Bond in accordance with the requirements of Clause G.12 of the General Conditions of Contract within 15 (fifteen) days of the issue of the Notice of Award then the sum lodged with the Bid as guarantee of good faith shall be absolutely forfeited to the Employer and the Employer shall be entitled (but not obliged) by notice in writing to withdraw his acceptance of the Bid.

The Employer's acceptance of a Bid, if so withdrawn, shall thereupon be void and as though it had never been given and the Contractor shall have no claim against the Employer whether for damage, specific performance, or otherwise in respect of such acceptance or withdrawal.



Article 23 Performance Bond

In the event of a Bid being accepted by the Employer, the successful Bidder who receives a Notice of Award and acknowledges in writing agreement to enter into a Contract, shall submit a Performance Bond in accordance with the required timing and conditions specified in Clause G.12(1) of the General Conditions of Contract and in accordance with the format of the sample Performance Bond given in Form PB, a copy of which is attached. The Performance Bond shall consist of a bank guarantee issued by a State Bank or a Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer.

Should the successful Bidder fail to comply with the specified timing or conditions for Bond submission, the Employer may withdraw his acceptance of the Bid and forfeit the Bid Bond in accordance with Article 22 of these Instructions to Bidders.

Article 24 Advance Payment Bonds

Within 15 (fifteen) days following the signing of Contract, the successful Bidder shall submit to the Employer in accordance with the requirements of Clause G.12(2) of the General Conditions of Contract, and in the format of Guide Form AB, an Advance Payment Bond in both local and foreign currencies against which the Employer will make available Advance Payments of fifteen percent (15%) of the foreign and local currencies as established in the Contract Agreement. A copy of Guide Form AB - Advance Payment Bond is attached.

The Advance Payment is being made available by the Employer for the proper and timely progressing of the Works by the Contractor, and Bidders are requested to take particular note of the conditions pertaining to the Advance Payment Bond(s), Advance Payment repayments, and the recovery of any outstanding Advance Payment sum in the event of failure by the Contractor to abide by the requirements of Clauses G.12(2) and G.58(2) of the General Conditions of Contract.

Article 25 Form of Power of Attorney

Power(s) of Attorney as required by Article 12 hereof shall follow or be similar to the format shown in Guide Forms PA-1, PA-2, and PA-3 of these Instructions to Bidders. The Guide Form descriptions are intended to illustrate the particular cases that could apply in the use of these documents for establishing Powers of Attorney.

GUIDE FORM PA-1. Could be used by a Sole Enterprise (Vietnamese or Foreign) who is already organised and existing in Vietnam .

GUIDE FORM PA-2. Could be used by a foreign investor who proposes to proceed on the basis of 100% Foreign Owned Capital to establish an Enterprise or to form a Contractual Business Cooperation Agreement in Vietnam.

GUIDE FORM PA-3. Could be used by Joint Venture/Enterprises that either exist or are proposed, in accordance with the Affidavit Agreement for a Joint Enterprise.

Article 26

Taxation

Any special requirements as to the method of dealing with Vietnamese taxes will be given in the Special Specifications.

Article 27

Method Statements

The Bidder shall submit method statements describing in detail the methods by which the Bidder proposes to carry out the work, including details of temporary and permanent works and equipment to be used, for the items listed below. The method statements are to be detailed and are to include narrative descriptions, explanatory diagrams and timing schedules for the various items or phases of work.

1. Traffic Management during construction of bridge and road work
2. Working Schedules ( Ref. Guide Form S ).
3. Cofferdams for pier construction in water.
4. Pre-casting and post-tensioning arrangements for PCI-Girders.
5. Temporary bridges and temporary access and approach roads.
6. PC I-Girder erection methods.
7. Site drilling and investigative methods for soft ground proposed to be used and who/which organisation will carry out the testing.
8. For the treatment of soft soils in identified soft soil areas, the type of equipment, methods proposed and production rates for :
  - removal of soft soil and replacement with sand fill.
  - installation of vertical sand drains and fibre wick drains.
  - sand compaction.
9. Following the requirements of the latest TCVN Standards concerning protection of the environment state clearly the measures you would intend to adopt in carrying out your work in order to mitigate the impact of your activities.
10. Procuring, transporting and placing of Borrow material for embankments.
11. Pavement construction including details of the location and capacity of the asphalt batching plant, laying equipment, daily work capacity, etc.
12. Production, transporting and placing of concrete.

Article 28 Contractors Superintendence.

It should be noted by the bidders that the Project Manager for the Contractor is also known as the General Superintendent and as such is the executive representative of the Contractor authorised to receive and fulfil instructions from the Engineer and to supervise and direct the construction of the works. Ref: General Conditions of Contract Clause G15.

As required by the General Conditions of Contract the person submitted in the bid, if approved in writing by the Engineer before the Commencement of Works, is to be constantly on the works and shall give his whole time to the superintendence of the same. This may be different from actual conditions due to the practice of each partner in providing their own Manager, however this practice will not be allowed. There shall be one only General Superintendent responsible for the Works.

DECLARATION OF INTENTION TO BID

To: Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION**

Gentlemen,

We have received Bid Documents for our use in the preparation of a Bid for the construction of the above Package.

We intend to submit our Bid to the above address before the closing date for submission of Bids as given in your Invitation to Bid.

----- \* Signature and stamp mark of Company  
----- 2001  
----- \*  
----- \*\*  
----- \*\*\*

- \* Name of signer of this declaration
- \*\* Position in the Company
- \*\*\* Name of Company

AFFIDAVIT AGREEMENT  
FOR JOINT ENTERPRISE

Considering :

1. The issue of the Bid Documents for the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 2 - GIA LAM SECTION due for submission to the Ministry of Transport, Projects Management Unit Thang Long on ....., 2001, and

2. That the parties to the above Joint\* Enterprise Agreement, comprising:

.....  
and  
.....  
and  
.....

being represented by the Joint Enterprise representative as designated in Article E below, desire to participate jointly in the Bidding and the Execution of this project;

NOW IT HAS BEEN AGREED UPON, AND DECIDED:

A. To appoint ..... for this project as Sponsoring Member/Leading Enterprise to represent and to act "FOR AND ON BEHALF" of the Joint Enterprise and to sign in its name all documents, including the Bid and the Contract.

B. That ..... as Sponsoring Member/Leading Enterprise shall hold itself responsible for the Works and the execution of the Contract in case of Award and shall hold the Ministry of Transport, and its authorised executing agency Projects Management Unit Thang Long blameless for all consequences and damages in case of any claim by any third party, forthcoming from the Works and the execution of the Contract.

\* *Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.*

C. That regardless of what is stated in Clause A and B above,

.....  
and  
.....  
and  
.....

have agreed together that in case of Award they are and shall remain jointly and severally liable for their respective and joint obligations pursuant to the Contract.

D. That the interest of each enterprise in the Joint Enterprise will be as follows:

..... (..... per cent)  
..... (..... per cent)  
..... (..... per cent)

and that each enterprise will participate in these same proportions in the expense and in the profit and loss of the Joint Enterprise These partnership proportions will not be modified throughout the whole period of the Contract except with the prior written approval of the Employer and the joint written agreement of the participating enterprises Irrespective of the relative size of the partnership proportions shown above, each of the enterprises, and also the Employer when necessary, shall have the right of full supervision of all aspects of the implementation of this agreement, including the right of full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant, equipment and personnel, subcontract agreements, correspondence, telexes, etc.

E. That the Power to sign for and on behalf of the Joint Enterprise shall vest in the person of .....(name) in his capacity as .....(position) of ..... (company name) subject to prior written approval of the other parties to this Agreement regarding the contents of the documents to be signed and the conditions thereof.

- F. That this Agreement for a Joint Enterprise in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 2 will become operative with immediate effect upon receipt of the Notice of Award issued by the Ministry of Transport, through its authorised executing agency the Projects Management Unit Thang Long.
- G. That this Agreement shall automatically be null and void if the Contract is not awarded to the Joint Enterprise.
- H. That this Agreement for Joint Venture in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 2 has been prepared in ..... copies, of which the first copy will be held by Ministry of Transport, Projects Management Unit Thang Long and the other copies given to the parties to this Agreement. All copies possess equal legal status and strength.

In witness whereof the participating parties have hereto placed their signature and seals at ....., on this ..... day of ..... 200 ....

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

Witnessed by : ..... (company name) .....(signature & seal)

.....(name and position of signatory)

DETAILED PRICE ANALYSIS  
FOR  
COST OF MATERIAL

Item :

Unit :

Cost Element / Unit	Cost (Yen)		Cost (VND)	
	Yen/ Unit	Total Yen	VND/ Unit	Total VND
1. CIF Cost at Port / Quarry from .....				
2. Handling				
3. Transport to site (Km )				
4. Unloading, Storage, etc.				
5. Other Costs (describe)				
Sub-Total				
Overheads and Profit at the rate of .....%				
Total Price at Site				

Notes:- The above prices should include all taxes and duties except Vietnamese VAT.



DETAILED UNIT PRICE ANALYSIS

Pay Item No. : \_\_\_\_\_  
 Pay Item Unit : \_\_\_\_\_

Description : \_\_\_\_\_  
 Site Output : \_\_\_\_\_

Total Estimated Quantity as shown  
 in Bid Schedule: \_\_\_\_\_

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)	
			Yen/Unit	Total	VND/Unit	Total
A. Equipment ( taken from Schedule of Rates and Prices )						
B. Labour ( taken from Schedule of Rates and Prices )						
C. Materials ( taken from Schedule of Rates and Prices )						
Sub Total						
[Overhead & Profit are already included in the above cost elements ]	-	-	-	-	-	-
Total (per site output)						
Total (per Unit)						

Exchange Rate : One Yen = ..... VND (as advised by the Employer)

UNIT PRICE - Use in Bid Schedule	Foreign Currency Comp.(¥)	Local Currency Comp.(VND)	Combined Total (VND)
Note : Quantity required for one unit of Pay Item			

DETAILED UNIT PRICE ANALYSIS

Pay Item No. : \_\_\_\_\_ Description : Aggregate for A.C Total Estimated Quantity as shown  
 Pay Item Unit : per. tonne Site Output : 50 tonne/hour in Bid Schedule:

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)x1000
			Yen/Unit	Total	
<b>A. Equipment</b> ( taken from Schedule of Rates and Prices )					
- A.M.P 80 t/h	h	1	18,950	18,950	1,200.0
- Wheel loader 100 HP	h	2	2,928	5,856	300.0
- Steel Roller 8 - 10 t	h	2	800.0	1,600.0	100.0
- Pn. Tyred Roller 12/20 t	h	1	6,050.0	6,050.0	450.0
- Asphalt Paver 68 HP	h	1	4,000.0	4,000.0	256.5
			36,456		2,706.5
<b>B. Labour</b> ( taken from Schedule of Rates and Prices )					
- Supervisor	h	1	600.0	600.0	30.0
- Operator	h	19	250	4,750.0	16.7
			5,350		347.3
			41,806		3,053.8
<b>C. Materials</b> ( taken from Schedule of Rates and Prices )					
- Aggregate	tonne	50	1,100	55,000.0	54.0
- Wastage ( estimated for this example as 5% )	tonne	0.05		2,750.0	135.0
- Haulage	tonne	1	11,250	11,250.0	750.0
			69,000		3,585.0
<b>Total Material</b>			110,806		6,638.8
<b>Sub Total</b>					
[ Overhead & Profit are already included in the above cost elements ]					
Total (per site output) 50 tonne/hour				110,806	6,638.8
Total (per Unit) 1 tonne				2,216	132.776

Exchange Rate : One Yen = ..... VND (as advised by the Employer) ( Assume for this example One Yen = 110 VND)

UNIT PRICE - Use in Bid Schedule	Foreign Currency Comp.(¥)		Local Currency Comp.(VND)	Combined Total (VND)
	Foreign Currency Comp.(¥)	Local Currency Comp.(¥)		
Note : Quantity required for one unit of Pay Item	2,216	132,776	376,536	

BANK GUARANTEE FOR BID

(BID BOND)

No. : .....

Whereas Bank \_\_\_\_\_ (Name of Bank) \_\_\_\_\_  
having a registered office located at \_\_\_\_\_ (city) \_\_\_\_\_, with a branch office located at \_\_\_\_\_ (city) \_\_\_\_\_ and  
hereinafter called the "BANK", on the request of \_\_\_\_\_ (Name of Firm / Bidder) \_\_\_\_\_  
\_\_\_\_\_ having a registered address at \_\_\_\_\_ (full  
address) \_\_\_\_\_

\_\_\_\_\_ hereinafter called the  
"BIDDER", for the interest of the Ministry of Transport of the Socialist Republic of  
Vietnam through their authorised executing agency referred to as Projects Management Unit  
Thang Long, hereinafter called the "EMPLOYER", hereby guarantees as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the full amount of US\$500,000.00 (Five Hundred Thousand United States Dollars) if, in the opinion of the EMPLOYER, the BIDDER should fail to fulfil his obligations in accordance with the Instructions to Bidders for the Contract for \_\_\_\_\_ (Name of Project) \_\_\_\_\_ for which bids are to be received by the EMPLOYER on \_\_\_\_\_ at \_\_\_\_\_
2. This Bank Guarantee shall be valid for the full period of \_\_\_\_\_ ( \_\_\_\_\_ ) calendar days from \_\_\_\_\_ (date) \_\_\_\_\_ until \_\_\_\_\_ (date) \_\_\_\_\_
3. In accordance with the provisions of the Instructions to Bidders referred to in item 1, any claim on this Bank Guarantee as a result of the default by the BIDDER shall be made by written application from the EMPLOYER promptly after such default has arisen. The BANK guarantees to pay the full amount of this Bid Bond mentioned in item 1 to the EMPLOYER promptly and within seven (7) working days after having received a written claim from the EMPLOYER.
4. A claim may be served by the EMPLOYER up to thirty (30) calendar days after the Bank Guarantee expiry date mentioned in item 2.

\_\_\_\_\_, \_\_\_\_\_ 200 \_\_\_\_\_

Bank .....

(BIDDER'S NAME AND ADDRESS TO BE CLEARLY SHOWN AT TOP OF LETTER)

To :

Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI** Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION**

Gentlemen,

We submit herewith the original and three copies of our Bid for the above mentioned Contract Package.

We confirm that each of the four attached envelopes contains a full set of correctly completed Bid documents as listed in the "Checklist of Documents to be Submitted".

Yours faithfully,

.....

Authorized Representative

ORIGINAL Bid and three COPIES of Bid

received at ..... hours on .../... 200... by :

.....

Bidding Committee Official

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 - GIA LAM SECTION**

**ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
PROJECT MANAGER/GENERAL SUPERINTENDENT**

1. Full name of Project Manager/General Superintendent \_\_\_\_\_  
(Delete title not applicable) \_\_\_\_\_

2. Nationality \_\_\_\_\_

3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_

\_\_\_\_\_

4. Full details of past experience with particular reference to work on similar projects.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

(\*) To be inserted by the Contractor

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 - GIA LAM SECTION  
ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
(TECHNICAL MANAGER/CO-PROJECT MANAGER/DEPUTY GENERAL SUPERINTENDENT)**

- \* Co-project Manager)
1. Full name of \*Technical Manager) \_\_\_\_\_  
\*Deputy General Superintendent)
  2. Nationality \_\_\_\_\_
  3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  4. Full details of past experience with particular reference to work on similar projects.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

\*Delete title not applicable.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION  
CONSTRUCTION EXPERIENCE**

DETAILS OF CONSTRUCTION CONTRACTS OVER THE LAST FIVE YEARS  
AND FOR WORKS IN PROGRESS

*(Use a separate sheet for each contract)*

Number of Contract

---

Name of Contract

---

Name of Employer

---

Employer's Address

---

Nature of works and special features relevant to this contract

---

Contract role (check one)

Sole Contractor       Main Contractor       Partner in Joint Enterprise/Consortium

---

Contract Sum	CURRENCY	SUM
.....		.....
.....		.....

---

Date of commencement of work

---

Date of completion if already finished

---

Progress to date for on going project (%)

---

Construction Period (days)

---

Scope of Work	Bridge work :	..... total metres span
	Road work :	..... kilometre length

---

LIST OF PORTION OF THE WORK PROPOSED  
TO BE SUB CONTRACTED

PAY ITEM NO.	DESCRIPTION OF PAY ITEM	PERCENT OF PAY ITEM TOTAL PRICE (%)	PERCENT OF TOTAL BID SUM (%)

Signature of Contractor \_\_\_\_\_

Date \_\_\_\_\_



**GUIDE FORM PA-1**

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI** Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise) duly organized and existing  
under the laws of the SOCIALIST REPUBLIC OF VIETNAM hereby duly authorize and extend  
complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the Enterprise.

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Enterprise seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_

\_\_\_\_\_  
(name of Enterprise and seal)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

Witnessed By

\_\_\_\_\_  
\_\_\_\_\_  
(seal)

\* GUIDE FORM PA-1:

For use by a sole Enterprise (Vietnamese or Foreign) who is  
already organised and existing in Vietnam, to authorise signature.

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise ) of  
\_\_\_\_\_ (name of Country) hereby duly authorize and  
extend complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the above named Enterprise

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under their legal signatures and  
Company seals on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_

\_\_\_\_\_  
(name of company and seal)

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_  
(name)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

\_\_\_\_\_  
(title)

Witnessed by

\_\_\_\_\_  
\_\_\_\_\_  
(seal)

\*\* GUIDE FORM PA-2:

For use by Foreign Investor who proposes to proceed on the basis  
of 100% Foreign Owned Capital to establish an Enterprise or to  
form a Contractual Business Cooperation Agreement.

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI Viet nam**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2  
GIA LAM SECTION  
POWER OF ATTORNEY**

Know all men by these presents, that I/we \_\_\_\_\_  
\_\_\_\_\_ (name and title of authorised representative)

of \_\_\_\_\_ (name of first enterprise) appointed  
representative(s) of the said Enterprise duly organised and existing under the laws of the SOCIALIST  
REPUBLIC OF VIETNAM and \_\_\_\_\_ (name and title of  
authorised representative of second enterprise) of \_\_\_\_\_ (name  
of second enterprise) appointed representative(s) of the said Enterprise duly organised and  
existing under the laws of \_\_\_\_\_ (country) hereby duly  
authorize and extend complete POWER OF ATTORNEY to the following named person to sign  
all documents concerning proposals, bid negotiations, contract and other documents as may be  
necessary, for and on behalf of the \_\_\_\_\_  
(name of Joint Enterprise that is either existing or proposed in accordance with the Affidavit  
Agreement)

Name in Full

Signature

\_\_\_\_\_

\_\_\_\_\_

Title \_\_\_\_\_

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Company seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_\_

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_

(name) \_\_\_\_\_ (title) \_\_\_\_\_

Witnessed by

\_\_\_\_\_ (seal)

\*\*\* GUIDE FORM PA-3.

For use by Joint Venture/Enterprises that either exist or are  
proposed in accordance with the Affidavit Agreement for Joint  
Enterprise.

**DECLARATION FORM R1 FOR NOTIFICATION OF ILLEGAL PRACTICES**

<b>CONFIDENTIAL</b>	
<b>R1</b>	<b>Tendering Procedure</b>

To : The General Director  
 Projects Management Unit Thang Long  
 Ministry of Transport  
 Thong Trung, Dich Vong Ward, Cau Giay District,  
 HANOI Viet nam

**DECLARATION**

I, the below mentioned :

Name : \_\_\_\_\_ Company : \_\_\_\_\_  
 Occupation : \_\_\_\_\_

truthfully state in good conscience that in the Prequalification/Tendering of the following Government contract:

Name of Contract : \_\_\_\_\_

Directorate/Project : \_\_\_\_\_

a number of illegal events have occurred as shown in the table on this declaration form.

PHASE		PROCEDURAL STEPS	ILLEGAL PAYMENT REQUEST		
			TOTAL	REQUESTED BY	NAME OF HIGH GOVERNMENT OFFICIAL USED
Pre-qualification		1. Obtaining Documents 2. Submitting Documents 3. Evaluation			
Tendering	Bid Submission	4. Invitation to Bid 5. Issue of Documents 6. Clarification 7. Submission of Bids			
	Bid Evaluation	8. Opening of Bids 9. Bid Evaluation 10. Negotiation 11. Recommendation of Winners 12. Final Evaluation 13. Selection of Winners			
	Contract Preparation	14. Clarification 15. Signing of Contract 16. Submission of Performance Bond			
Other		217. 18.			

- Notes :
- You must sign this declaration for it to be considered valid
  - Please submit the original copy and keep a 2nd copy for your own file
  - When you submit this declaration ask for a receipt from the official who receives it

I have written this Declaration form most conscientiously, truthfully, with responsibility and not with any malicious intent to bring disgrace upon anybody, and I agree to bear all consequences in the event that this declaration proves to be false.

Signed in ..... this .....day of .....200 .....

(Signature)

BANK GUARANTEE FOR CONTRACT PERFORMANCE

(PERFORMANCE BOND)

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bank Guarantee to warrant his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :

(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

\_\_\_\_\_

2. If, in the opinion of the EMPLOYER, the CONTRACTOR has failed to meet his obligations under the contract, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.

3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
  
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER has issued the Provisional Handover Certificate as required under the terms of the CONTRACT.

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_

( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

## BOND FOR CONTRACT PERFORMANCE

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bond to guarantee his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, by this Bond, we \_\_\_\_\_ (Name of Bonding or Insurance Company) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ (address) and with a branch office located at \_\_\_\_\_ (address) hereinafter called the "SURETY", on the request of the CONTRACTOR agree that we are held and firmly bound unto the EMPLOYER in the sum of \_\_\_\_\_ ( name of currency and amount ) \_\_\_\_\_ for the payment of which sum we hereby bind ourselves and our successors.

**the CONDITION** of this Bond is such that if the CONTRACTOR shall duly perform and observe all the terms and conditions, provisions, conditions and stipulations of the said CONTRACT on the CONTRACTOR's part to be performed and observed according to the true purport intent and meaning thereof, or if on default by the CONTRACTOR, the SURETY shall satisfy and discharge the damages sustained by the Employer thereby up to the amount of this Bond as written above then this obligation shall be null and void. Otherwise, this Bond shall be and remain in full force and effect and the EMPLOYER may demand immediate and full settlement of the above sum from the SURETY without further discussion or prior notice.

It is understood and agreed that none of the following events shall in any way release the SURETY from our liabilities to the EMPLOYER under this Bond:

- 1) any alteration in the terms of the CONTRACT made by agreement between the EMPLOYER and the CONTRACTOR.
- 2) any change in the extent or nature of the Works as given in the signed CONTRACT.

- 3) any allowance of time by the EMPLOYER under the CONTRACT, or
- 4) any forbearance or forgiveness in respect of any matter or thing concerning the CONTRACT by the EMPLOYER or the Engineer appointed to supervise the WORKS..

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the SURETY by \_\_\_\_\_  
( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )



## BANK GUARANTEE

FOR

( Name of Currency ) ADVANCE PAYMENT

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", has entered into a contract for \_\_\_\_\_ ( the works ) \_\_\_\_\_ with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of their contract the EMPLOYER will make an Advance Payment to the CONTRACTOR to facilitate the construction of the works. Prior to release of this Advance Payment, the CONTRACTOR is required to submit a Bank Guarantee to the EMPLOYER for the full amount of the Advance due to be received by him. The Advance Payment will be recovered by the EMPLOYER making deductions from sums due to the CONTRACTOR under the Monthly Certificates. The Bank Guarantee to be held by the EMPLOYER may therefore later be replaced by an equivalent guarantee for such lower sum as equals or exceeds the Advance Payment still remaining with the CONTRACTOR at that time.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :  
(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

2. If, in the opinion of the EMPLOYER, the CONTRACTOR should wilfully fail to achieve the works progress as mutually agreed under the terms of their contract, or shall have utilized any part of the Advance for purposes other than the above works, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.
3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER confirms in writing that the total amount of the Advance Payment has been recovered by him or until this Guarantee is replaced by such replacement guarantee as is acceptable to the EMPLOYER.

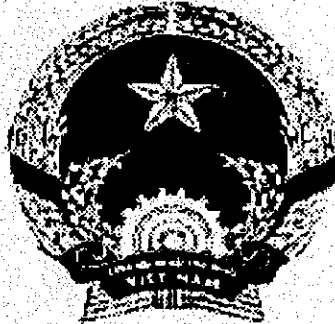
Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_  
( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3 : THANH TRI SECTION**

**INSTRUCTIONS TO BIDDERS**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**



**INSTRUCTIONS TO BIDDERS**  
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## INSTRUCTIONS TO BIDDERS

### PREAMBLE

In accordance with the Prime Ministers Decision No. \_\_\_\_\_ concerning the Red River Bridge Construction Project, Projects Management Unit Thang Long as agent for the Ministry of Transport of the Government of The Socialist Republic of Vietnam intends, under this package, to construct the expressway in Thanh Tri section.

The project includes the construction of expressway over a distance of 6.2 km including the construction of one viaduct and three bridges with a total length of approximately 770m and three interchanges. The Project covers also the new construction of frontage road and borders which are provided on both sides or one side of the expressway in the entire stretch.

Main elements of the construction will include:

- Construction of approx. 2,300 sq.m of PC box girder bridge, with cast-in-place concrete piling.
- Construction of approx. 25,300 sq.m of PC I-girder bridge, with cast-in-place concrete piling.
- Construction of approx. 5,300 sq.m of RC hollow slab bridge, with cast-in-place concrete piling.
- Construction of approx. 1,200,000 cu.m of borrow embankment.
- Embankment foundation treatment of approx. \_\_\_\_\_ sq.m in soft ground area by 1.0m thickness sand mat and 40 cm diameter vertical sand drain.
- Construction of approx. 450 lin.m of RC box culvert for passage of vehicles and pedestrians or maintenance of existing drainage.
- Construction of approx. 950 lin.m of large size RC pipe culvert to maintain existing drainage or irrigation network.
- Construction of approx. 25,300 l.m of road surface and roadside drainage by RC U-ditch.
- Construction of approx. 183,000 sq.m of asphalt concrete pavement including subbase course, base, asphalt treated base and asphalt concrete binder and surface courses.
- Erosion control work such as sodding and slope protection by using mortared stone masonry wall or mortared stone surface protection.
- Construction of a barrier type toll gate with control building.
- Construction of highway supporting facilities such as guardrails, concrete curb, concrete sidewalk, road markings and signs and fence work.
- Construction of road lighting and signals.

It is anticipated that construction work could commence in \_\_\_\_\_ 2002.

The works will be funded by the Government of the Socialist Republic of Vietnam from the proceeds of a loan arranged from Japan Bank for International Cooperation, hereinafter referred to as "JBIC", towards the cost of Red River Bridge Construction Project.

Disbursement of this loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999. No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any claim to the loan proceeds.

The work is being tendered on an International Competitive Bidding basis and participation in the bidding will be open to pre-qualified contractors from all countries and areas. It should be noted that foreign bidders who wish to participate in the bidding will be encouraged to form a Joint Venture commitment with a Vietnamese bidder or agree to use a Vietnamese sub-contractor.

Bidders shall have a sufficient knowledge of the terms and conditions of the above mentioned Loan Agreement including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999 and will bear all costs associated with the preparation and submission of their Bids, and the Employer will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding or the bid evaluation process.

Bids shall be prepared and submitted strictly in accordance with the instructions given in this document and with all prevailing Government of the Socialist Republic of Vietnam rules and regulations regarding taxation, import duties and other matters relevant to successful execution of the Works. It is the responsibility of each Bidder to appraise himself fully of all relevant Government rules and regulations, irrespective of whether or not specific reference to them is made in the Contract Documents.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3  
THANH TRI SECTION**

**INSTRUCTIONS TO BIDDERS**

Article 1 Scope of Work

Contractors are invited to submit a bid for Package 3 – Thanh Tri section between km 0+000 and km 6+218.5.

Article 2 Bidding Time Schedule

The sequence of dates for carrying out the bidding for this Contract Section has been programmed as shown in Table No. 1.

Article 3 Bidding Documents

The bidding requirements are stated in the Bidding Documents which consist of the following:

- Instructions to Bidders
- Volume I : General Conditions of Contract
- Volume II : General Specifications
- Volume III : Special Specifications
- Volume IV : Bid, including Appendices to Bid, Bid Schedule and Schedule of Rates and Prices
- Volume V : Drawings
- Volume VI : Addendum (if any)
- Volume VII : Detailed Work Schedule, Plant and Contractors Personnel List
- Form of Contract

Article 4 Declaration of Intention to Bid

Prospective Bidders shall, within the time schedule shown in Table No. 1, send by registered mail, or deliver personally against receipt, to the Employer's Bidding Committee a signed "Declaration of Intention to Bid" in accordance with Guide Form A of these Instructions to Bidders, in which they affirm their intention to submit a Bid for this Package.



**TABLE NO. 1**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3  
THANH TRI SECTION**

---

	<b>EVENT</b>	<b>DATE</b>
a	Issue of Bid Documents	_____ 2001
b	Site Visit - prior to Pre-Bid Conference	_____ 2001
c	Formal Pre-Bid Conference at Hanoi	_____ 2001
d	Last Date for Bidders to Request Clarification of Bid Documents	_____ 2001
e	Last Date for Employer to Issue Addenda	_____ 2001
f	Last Date for Submission of Declaration of Intention to Bid	_____ 2001
g	Last Date for Submission of Bids 10:00 hrs	_____ 2001
h	Opening of Bids 10:15 hrs at the Employer's Office	_____ 2001
i	Evaluation of Bids and Approvals	_____ 2001

---

Note: The aim of the Site Visit and Formal Pre-Bid Conference is to provide bidders with background information on the Employers' requirements for the expressway construction. It is recommended that all prospective bidders should attend.

Article 5

Pre-Bid Information

The Employer will assist the prospective Bidders in clarifying any questions they may raise concerning the Drawings, Specifications and other Bid Documents. This service includes a Formal Pre-Bid Conference to be held approximately forty five (45) days before Bid Opening at a venue to be advised by the Employer, and an official site visit at which Bidders may accompany representatives of the Employer and Engineer.

Bidders are requested to formally submit any questions in writing or by facsimile or telex to reach the office of the Bidding Committee in Hanoi not later than the last date for Bidders to request clarification of the Bid documents as given in Table No. 1 of these Instructions to Bidders.

All formally submitted questions will be formally clarified by the Employer by the issue of Addenda during the Bid Period in accordance with Article 14 of these Instructions to Bidders. Only pre-bid information confirmed in writing in Addenda during the Bid Period will form part of the Contract.

Article 6

Inspection of Bid Documents and Site of the Works

Bidders shall visit and inspect carefully the Site of the Works to be tendered for, and shall study all Contract Documents and guarantee forms prepared for the Contract before submitting a Bid.

The Bidder and any of the Bidder's personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder and the Bidder's personnel and agents will release and indemnify the Employer and the Employer's personnel and agents from and against all liability in respect of personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission would not have arisen.

The Employer will obtain all land or permission for the temporary use of land on which permanent works are to be constructed. but in certain areas the working space may be restricted. If considered necessary by the Employer further details of working space will be given at the Pre-Bid Conference and included in the formal answers to bidders questions.

Before submitting his bid the Bidder should thoroughly acquaint himself with the situation regarding utilities to be protected during the Works and the need to facilitate the work of utility contractors if any during the term of the main Contract.

The submission of a Bid shall be considered prima facie evidence that the Bidder has made such examination of the Site and Contract Documents, and is familiar with, and has allowed for in his Bid, the nature of the Site and its means of access, the character, quality and quantities of the Works to be performed, the availability and quality of materials to be furnished, the availability of labour, accommodation and transport, the difficulties inherent in executing the Works within the specified time including any limitations of local weather conditions, all relevant laws and regulations

of the Government of the Socialist Republic of Vietnam together with all risks, contingencies and other circumstances which may arise, and that he will not in the future express ignorance about any of the conditions pertaining to the execution of the Work, so far as these could be ascertained at the time of Bid Submission

All costs and charges in connection with visits to and examination of the Site and in the preparation of the Bid shall be borne by the Bidders.

Article 7

Preparation of Bid Schedule and Schedule of Rates and Prices

The Bid Schedule and Schedule of Rates and Prices shall be prepared on the forms furnished, or true copies thereof.

All entries in the Bid, Bid Schedule and Schedule of Rates and Prices shall be typewritten or computer printed.

Bid prices shall be determined by the Bidder entirely at his own responsibility and shall, with due regard to his examination of the Site and the Bid Documents as required under Article 6 of these Instructions to Bidders, be suitable for the satisfactory construction, completion and warranty of the Work being tendered.

Bidders are required to carefully study the works required under each pay item as given in the Drawings and Specifications. In particular the Bidder is strongly advised to thoroughly read and understand the "Method of Measurement" and "Basis of Payment" as given against each pay item.

Under no circumstances will the Employer entertain, at any time in the future, a claim for an increase in the Bid prices for reasons of ignorance, error or oversight on the part of the Bidder with respect to any of the conditions pertaining to the execution of the Works.

The Bidder shall enter his Bid Prices in the Bid Schedule forms given in Volume IV, "Bid, Bid Schedule and Schedule of Rates and Prices" or true copies of the same.

The Contract is to be established in a local currency component, Vietnamese Dong, and a foreign currency component, Japanese Yen, with component percentages nominated by the bidder for each unit price. These percentages shall also apply to any adjustment to the bid brought about by discounting.

However, for the purpose of evaluation and comparison of Bids, the prices entered in the Bid Schedule shall be expressed as the local currency equivalent of the combined local and foreign currency components of the Bid Prices. The exchange rate used for this calculation shall be the official selling rate of exchange between the foreign currency and the local currency, as quoted by the Vietcom Bank, ruling 30 days prior to the opening of the Bid. The Employer will formally notify Bidders of this exchange rate.

The Bid Schedule shall therefore be completed by the Bidder in accordance with the following requirements:

- (a) Unit Prices and Total Prices for each Pay Item or Section of the Bid Schedule and the Schedule of Rates and Prices shall be expressed in the currency of Vietnamese Dong and Japanese Yen.
- (b) Unit Prices shall only be entered against those Pay Items in the Bid Schedule for which quantities have been provided.
- (c) Lump Sum prices shall only be entered in the total bid price column of the Bid Schedule where such a price is called for.
- (d) The Total Price for each Unit Price Pay Item shall be entered in the columns provided for that purpose in the Bid Schedule by calculating the product of the respective unit prices and the estimated quantities. The Total Prices for each Section shall be computed and transferred to the Bid Summary and the sum of the Total Bid Prices for each Section of the Bid Schedule shall be calculated and entered in the appropriate space in the Bid Summary. The totals so obtained are the LOCAL CURRENCY component, and the FOREIGN CURRENCY component of the Net Bid Sum. The Bidder shall add to the LOCAL CURRENCY component that percentage that he calculates is required to cover his net obligation for Value Added Tax (VAT) payable in Vietnam. The LOCAL CURRENCY equivalent of the TOTAL BID SUM is thus derived and shall be stated by the Bidder in the appropriate spaces provided in the Bid and in the Bid Summary.
- (e) When determining Unit Prices, intending Bidders should note the following applicable conditions:
  - (i) The Unit Prices shall include all Vietnamese duties, taxes and other levies payable by the Contractor under the Contract except for VAT. The net allowance for VAT shall be expressed as a percentage, which will be added to the local currency component of the Bid, as shown in the Form of Bid document.
  - (ii) The amounts payable in respect of certain Pay Items may be subject to adjustment, in accordance with Clause G.70 of the General Conditions of Contract, on account of fluctuations during the performance of the Contract in the cost of labor, fuel, materials and equipment (escalation/ de-escalation).
  - (iii) The Unit Prices for each Pay Item shall be the rate used to calculate the amounts to be paid to the Contractor in the Monthly Certificates and the Final Certificate, subject to the provisions of the various Clauses in the General Conditions of Contract.
  - (iv) Payments to the Contractor shall be made in accordance with Clause G.58 of the General Conditions of Contract in both local and foreign currencies as determined by the breakdown of the unit prices in the Contract Agreement.

- (f) All Bidders will have been given a copy of the Bid Schedule and Schedule of Rates and Prices on a computer floppy. The Bidders should enter their rates and prices on this disk and return it to the Employer together with the other Bid documents. This is for the convenience of the Employer and if there is any discrepancy between the prices submitted on paper and those given on the floppy disk, then the information given on the papers will be binding and the computer data will be corrected accordingly.

Article 8 Interpretation of Quantities in Bid Schedule

The quantities entered for each Pay Item in the Bid Schedule are estimates only and are prepared for the comparison of Bids and Award of Contract. Payment will be made only for the certified quantities of work

for each Pay Item actually performed in accordance with the Contract Documents. The scheduled Pay Item quantities of work to be executed may be increased or decreased as provided for in Clauses G.51 and G.52 of the General Conditions of Contract.

Article 9 Use of Local Contractors, Sub-contractors, Goods and Services

Successful bidders will be encouraged, in accordance with Vietnamese Regulations promulgated in conjunction with Decree No.43/CP, to undertake to form a joint venture with a Vietnamese Contractor or to use local Sub-contractors for construction and installation and purchase of materials and equipment able to be domestically produced or processed in Vietnam. However, in accordance with Clause G.04 of the General Conditions of Contract, intending Bidders should note that the total value of work which may be sub-let shall not exceed 50 (fifty) percent of the value of the Contract.

Article 10 Price Escalation/De-escalation

Price adjustment (escalation/de-escalation) will be applicable.

Article 11 Partnership or Association of Enterprises

Enterprises\* now proposing to bid shall have passed the pre-qualification (screening) executed by the Employer, have satisfied the conditions for business practicing certificate or license within Vietnam or in the bidders home country and be technically and financially able as stated elsewhere in the tender documents.

Bids may be received from;

- i) Enterprises of voluntarily created joint ventures and joint operations forming a partnership or association in one of the following forms:
  - a) A Joint Venture Enterprise which means an enterprise established in Vietnam on the basis of a joint venture contract signed by one or more Vietnamese parties\*\* together with one or more foreign parties\*\*\* in order to invest and carry on business in Vietnam.

\* Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.

\*\* Vietnamese party shall mean one or more Vietnamese legal economic entities.

\*\*\* Foreign party shall mean one or more foreign individuals or legal economic entities.

A Joint Venture Enterprise shall be established in the form of a limited liability company and shall be a legal entity in accordance with the provisions of the law in Vietnam. (i.e. each joint venture party shall be responsible to the other party and to the joint venture enterprise to the extent of its contributed capital to the company.)

- b) A Joint Operation formed by existing Vietnamese Enterprises without the direct investment of foreign capital.
  - c) A Contractual Business Cooperation Agreement initiated by a foreign investor and signed by two or more parties which stipulates the responsibilities of and the sharing of business results between the parties, for the purposes of commencing business investment in Vietnam without creating legal entity.
- ii) An Enterprise With 100% Foreign Owned Capital defined as an limited liability company owned and established in Vietnam by a foreign investor who self manages the enterprise and takes full responsibility for the results of its business.

All Joint Ventures, Operations and Individual Enterprises are required to be pre-qualified. In the case of a Joint Venture, Joint Operation or a Consortium of several established Joint Enterprises - hereinafter referred to as a Joint Enterprise - this is a prerequisite even in the case where the parties to a Joint Enterprise are individually pre-qualified.

In the event that the successful Bidder is a Joint Enterprise, the Employer requires that the parties to the Joint Enterprise accept joint and several liability for all obligations under the Contract.

The Joint Enterprise shall therefore submit with the Bid a copy of the agreement indicating the percentage of capital contribution recorded or to be recorded in the company charter, the authorized signatory or signatories, the acceptance of joint and several liability for all obligations under the Bid and the Contract, and other pertinent features of the Joint Enterprise. If a Joint Enterprise has not been finalized then an Affidavit Agreement for Joint Enterprise as given in Guide Form B of these Instructions to Bidders shall be completed and submitted with the Bid.

The structure of a Joint Enterprise shall not be modified, except with prior approval of the Employer, at any time following pre-qualification or following submission of Bids or throughout the whole period of the Contract. Otherwise the Employer shall be entitled:

- 1) to disqualify the Bid and effect forfeiture of the Bid Bond;
- 2) to invoke the provisions of Clause G.63 of the General Conditions of Contract concerning the default of the Contractor.

In the case of the Employer granting approval for such modification, the Joint and Several Liability provisions herein described shall still apply and in no case will a participating party be allowed to reduce the level of his participation to zero.

Irrespective of the details of the agreed percentage of capital contribution of the parties in a Joint Enterprise, any of the parties together with the Employer, when necessary, shall have the right of full supervision of all aspects of the implementation of the contribution agreement, including full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant and equipment and personnel, telexes, subcontract agreements, correspondence, etc.

Article 12

Signatures

The signatures required for the Bid Documents shall be as follows:

- (a) Where the Bidder is a sole Enterprise, Joint Enterprise or Consortium (hereinafter called an Joint Enterprise) that is already licensed in Vietnam, then the legal authorized representative of the Enterprise shall sign.

A Power of Attorney which has been witnessed, or a duly certified copy of it, granting authority to sign shall be enclosed with the Bid.

In this respect the legal authorized representative of the Joint Enterprise shall be restricted to any person stated in the company registration as being a member of the board of directors or to any manager or branch manager of the Enterprise

- (b) Where various Bidders have formed or have agreed to form a Joint Enterprise in accordance with the requirements of Article 11 of this document, every Partner of the Joint Enterprise shall sign the Joint Enterprise Agreement or the Affidavit - Agreement for Joint Enterprise (Guide Form B) either personally or through their legal representative, so that all will be jointly and severally responsible for the Bid submitted.

Where one or more parties to the Joint Enterprise have signed the Agreement or Affidavit-Agreement in the name of an Enterprise, a Power of Attorney which has been witnessed, or a duly certified copy of it, empowering him, her or them to sign for the Enterprise must be enclosed with the Bid.

All other Contract Documents, including the Bid, will be signed by the designated representative as nominated on the Agreement or Affidavit - Agreement and this authorization shall be evidenced by submitting with the Bid a Power of Attorney which has been witnessed and which has been signed by the legally authorized signatories of all of the parties.

Article 13

Notice to Foreign Contractors

It should be clearly understood that, should the need arise, any party who participates in whatever manner in the Bid consents to be sued in any court or tribunal of competent jurisdiction within the Socialist Republic of Vietnam on any question or matter arising from the documents, award, and implementation of the project. For this purpose any

designated representative of the said party(ies) present in the territory of the Socialist Republic of Vietnam shall be authorized to receive process summons on behalf of the said party(ies) notwithstanding any restriction or limitation imposed by the said Contractor upon its designated representatives.

Article 14 Addenda Issued during Bid Period

Addenda to Bid Documents may be issued up to the last date for Employer to issue Addenda as given in Table No. 1 of these Instructions to Bidders for the purpose of clarifying the Bid Documents or to reflect modifications in the design or Contract terms. If Bidders are in doubt as to the true meaning of any part of the Bid Documents they should request clarification by notifying the Employer in writing prior to the last date for Bidders to request clarification of the Bid Documents as given in Table No. 1 of these Instructions to Bidders.

Any such clarification of the Bid Documents by the Employer will only be made by the formal issue of Addenda which will form part of the Bid Documents. Each Addendum so issued will be sent to all prospective Bidders to whom Bid Documents have been issued and will be binding upon them.

Article 15 Preparation of Bids

The Bid must be submitted under a covering letter and shall contain the documents mentioned hereunder all of which are essential. Guide Form F for the covering letter is given in these Instructions to Bidders.

All documents shall be written in English.

No alternative bids will be accepted.

- a.
  - i) If the Bidder is an existing Joint Enterprise which has been licensed as such in Vietnam or has formed a new Joint Enterprise, a duly certified copy of the Joint Enterprise Agreement between the various parties.
  - ii) If the Bidder is a proposed Joint Enterprise, the Affidavit-Agreement between parties, given in Guide Form B of these Instructions to Bidders, which has been completed and signed by all parties and shall be binding among them if awarded the Contract.
- b. If the bid is to be established on the basis of a Business Cooperation Contract the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. The Power(s) of Attorney as required in Article 12 above.
- d. Bidders latest balance sheet, list of owners, management organization, together with any revisions. In case of Joint Venture/ Operation the foregoing are required for each of the parties to the Agreement.
- e. Foreigners' labour permit (where applicable) in accordance the Labour Code.



- f. Tax registration number. In case of a Joint Enterprise each partner's tax registration number.
- g. Bank reference. In case of Joint Enterprise each of the parties bank references. In case of a foreign bank reference a recommendation letter is required from the Vietcom Bank, Vietnam.
- h. The Bid Bond according to Article 21 below and using the format given in the sample Guide Form E of these Instructions to Bidders.
- i. The Bid duly filled in, dated, stamped, and signed by the Bidder and Appendix to the Bid, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".
- j. The Bid Schedule and Schedule of Rates and Prices filled in, signed where required, and initialed on each page by the Bidder, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices". In accordance with Article 7 (f) of these Instructions the Bidders should also return a floppy disk copy of this data for use by the Employer.
- k. A Works Progress Schedule using Guide Form G in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List" as a guide, and completed in accordance with Clauses in the Contract Documents relating to the time for completion of the Works.
- l. Detailed Price Analyses for the Breakdown of the Cost of Materials for the Items listed in the Schedule of Rates and Prices Section C : Materials on Site, using the format shown in Guide Form C of these Instructions to Bidders.
- m. Detailed Price Analyses showing the complete breakdown of the prices from the elements involved (labour, equipment, materials) for the following Pay Items using the format shown in Guide Form D of these Instructions to Bidders:
- All Pay Items in Section I - General, of the Bid Schedule
  - All Pay Items in Section 4.0-Earthworks
  - Pay Items 5.01(1) and (5) - Structure Excavation
  - All Pay Items in Section 10-Concrete Structures.
- Detailed Price Analysis of additional items may requested during the period of Bid Evaluation. Following Notice of Award the successful Bidder will be required to submit Detailed Price Analyses for all Pay Items.
- n. Method Statements as required under Article 27 of this document.
- o. An itemized list of Construction Plant, including sub-contractor's plant, giving the types, capacities and quantities of plant which the Bidder intends to use for the execution of the Contract work. Form H in Volume VII "Detailed Works Schedule, Plant and Contractors' Personnel List" should be used as a guide and a clear distinction made between equipment already owned, the equipment which is intended to be purchased or hired and sub contractor plant. (The equipment nominated in this list as already owned must be in good working order

and available for inspection, if considered necessary by the Employer, at the location indicated).

- p. Details of construction experience over the last five years giving names of contracts, names of employers, contract roles, scope of works, and contract sums, using the format shown in Guide Form L in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".
- q. A site staff organization chart and a list of the senior staff the Bidder intends to employ for the execution of the Works and who will actually be present on Site, showing the number of years of experience in similar construction works of each such staff member, using as a guide Form I in Volume VII, "Detailed Works Schedule, Plant and Contractors Personnel List". Full details of careers and works carried out shall be provided for the Project Manager (General Superintendent) and Technical Manager (Deputy General Superintendent) using Guide Forms J and K in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".

Candidates in the list of senior staff submitted with the Bid must correspond with the candidates listed in the Pre-qualification Questionnaire the requirements of which are reproduced as follows.

- Project Manager (General Superintendent)
  - Technical Manager (Deputy General Superintendent)
  - Site Supervisor(s)
  - Chief of Asphalt Mixing Plants.
  - Geotechnical Specialist Engineer.
- ◆ Project Manager should have at least 20 years of total experience in highway and bridge works and not less than 10 years of experience and 3 projects handled as Project Manager in similar projects;
  - ◆ Technical Manager should have at least 15 years of total experience in highway and bridge works and not less than 7 years of experience and 2 projects handled as Technical Manager in similar projects;
  - ◆ Site Supervisor should have at least 10 years of total experience in highway and bridge work and not less than 5 years of experience as Technical Manager in similar projects.
  - ◆ Chief of Asphalt Mixing Plants should have at least 10 years of total experience in asphalt road work and not less than 5 years of experience as chief of an asphalt mixing plant in similar projects;
  - ◆ Senior Geotechnical Specialist should have at least 10 years of total experience in the analysis of soft ground improvement methods using sand drainage systems as a means of consolidation
- r. List of the portions of the Works proposed to be sub- contracted, according to Guide Form M of these Instructions to Bidders.

- s. If a Bidder wishes to modify his bid price after completion of the bid schedule and the formal bid document, then this will be known as a Balancing Item. Notice of the Balancing Item should be given by way of a letter (to be hand delivered) which should confirm the total amount of the Balancing Item; whether it is an addition or subtraction to the Net Bid Sum.; and the manner that the Balancing Item is to be applied to the submitted bid prices. In the absence of such complete information the Employer will be at liberty to apply the balancing item in whatever manner he deems appropriate. The letter giving notice of the balancing item should be signed and witnessed by the same persons as signed the main bid. The letter should be placed in a sealed envelope, which should then be handed to the Bidding Committee immediately before the opening of the main bidding documents. After the bid opening has started, no further submissions will be accepted.

For guidance in the preparation of Detailed Unit Price Analysis required in item "m" above the main materials and equipment requirements are provided in Guide Form D-1 (Example Only). These requirements are to be utilized as a guide only for the preparation of Detailed Unit Price Analysis and Bidders are to determine their own material proportions and equipment and labour requirements.

Intending Bidders are to note that the Unit Price Analysis details which are submitted in accordance with this Article will be used by the Employer as an aid to bid evaluation and may also be used as a reference for determining new or revised unit prices should the need for such new or revised prices be required during the Contract Period.

The above Bid Documents shall be bound to form the following books:

Book I

- a. (i) Joint Enterprise Agreement (if applicable)
- (ii) Joint Enterprise Affidavit-Agreement (if applicable)
- b. Business Cooperation Contract - the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. Power(s) of Attorney
- d. Latest Balance Sheet(s), List of Owners, Management Organization(s) etc.
- e. Labour Permit(s) (if appropriate)
- f. Tax Registration Number(s) (if appropriate)
- g. Bank Reference(s)
- h. Bid Bond

Book II

- i. Bid and Appendix to Bid

- j. Bid Schedule and Schedule of Rates and Prices (together with a floppy disk containing the same data.)
- s. Letter with details of the Balancing Item (if appropriate)

Book III

- k. Works Progress Schedule
- l. Detailed Price Analyses for Materials
- m. Detailed Price Analysis of Pay Items
- n. Method Statements

Book IV

- o. List of Construction Plant
- p. Details of Construction Experience
- q. Site Staff Organization Chart and List of Senior Staff
- r. List of Works proposed to be sub-contracted

Article 16

Submission of Bids

The Bidder shall use, and submit with his Bid, the Form "Checklist of Documents to be Submitted", given in the front of Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".

1. The Bid and copies as described later shall be submitted each in a closed and sealed buff-coloured envelope, all enclosed in an outer envelope of the same colour.
2. The outer envelope must be sealed, must not be transparent and must not carry any indication of the identity of the Bidder. Both outer and inner envelopes shall be addressed to the Employer's Bidding Committee and marked as follows:

To:

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HANOI Vietnam

DOCUMENTS FOR  
RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 3

THANH TRI SECTION

DO NOT OPEN BEFORE 10:15 hrs

on.....2001 at HANOI

Only the inner envelopes, which contain the Bid, shall bear the name and address of the Bidder, to enable the Bid to be returned unopened in case it is declared "late" or otherwise disqualified.

If the inner and the outer envelopes are not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening and rejection of the Bid.

The Bid envelopes shall be hand delivered to the Bidding Committee and must be received not later than the deadline indicated in Table 1 of these Instructions to Bidders.

All pages in the Bid Envelopes must be initialed by the authorized signatory. No submission of initialed "Instructions to Bidders" and Volumes I, II, III, V and VI is required with the Bid, however these documents are required to be submitted by the successful Bidder after the notification of Award.

The complete Bid shall be without alterations, inter-lineations or erasures, except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

The original copy and three photocopies of all Bid Documents as required on the "Checklist of Documents to be Submitted" are required to be submitted. These four sets of Bid Documents shall be sealed in separate envelopes, with the envelope containing the original set and each of the original books being clearly marked "ORIGINAL" and each of the other three envelopes and books therein being clearly marked "COPY".

In the case of any discrepancy between the contents of the four sets of documents, the set marked "ORIGINAL" shall govern. The four envelopes of Bid Documents shall be submitted in the before mentioned outer envelope with a covering letter of transmittal, using Guide Form F of these Instructions to Bidders.

The covering letter shall be submitted separately from, but at the same time as, the envelope containing the Bid Documents. The purpose of the covering letter is to provide the name and address of the Bidder and to provide an official record of the time and date of transmittal to the Employer of the completed Bid Documents. If the Bidder has not yet a legal residence in Vietnam, a postal address in Hanoi must be provided to which all correspondence or communications will be directed.

The Bidder will be given a signed copy of the covering letter as his record of receipt of the Bid by the Employer.

## Article 17

### Opening of Bids

#### a) Opening of Bids

The opening of Bids will take place at the time and date fixed in Table No. 1 in these Instructions to Bidders by the Bidding Committee duly appointed by the Employer. The Bidders or their authorized representatives, may attend the opening of the Bids, if they so desire, and all Bidders or their representatives who are present at the opening shall sign a register evidencing their attendance. Two of the attendant Bidders or their representatives will be nominated to witness that the results of the Bid Opening are recorded correctly by the Bidding Committee.

Each Bid Envelope will be opened in turn and the Bidder's name, the presence or absence of the requisite Bid Bond, price of the Bid, and such other details as the Employer, at its discretion, may consider appropriate will be announced and recorded. In addition, as each Bid envelope is opened in turn, all pages of the original and copies of the Bid, Bid Schedule and the Schedule of Rates and Prices of Volume IV shall be countersigned by one member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

b) Preliminary Examination of Bids

During the Bid opening ceremony, the Bid Documents will be checked for general compliance with the requirements of the Bid. In particular the Bidding Committee will check and ascertain that all of the documents comprising the Bid as nominated in Article 15 of these Instructions to Bidders are included and have been correctly completed. Where Bid Documents are required to be signed the Bidding Committee will ascertain that all such documents bear the signature of the authorized signatory.

The Bidding Committee will also check that the price in the bid is clearly stated in figures and words, and that the amount written in figures is the same as the amount written in words. At the time of opening of Bids a Bid will be declared not substantially responsive to the Bidding Documents for the following reasons:

- a. if all documents comprising the Bid as required in Article 15 of these Instructions to Bidders are not included.
- b. if the Bid enclosing envelope is not marked only as required in Article 16 of these Instructions to Bidders.
- c. if the Bid is received after the time limit for submission of Bids.
- d. if the Bid price is not written in figures and in words.
- e. if the amount of the Bid price written in figures is not the same as the amount written in words.
- f. if the Bid documents have been sent to a member of the Bidding Committee or other official.

If a Bid is not dated and signed, the Bid can be made responsive to the Bidding Documents if these items are fulfilled at the time of opening of Bids.

If all of the foregoing requirements have been met in full and the Bid includes no reservations of any kind whatsoever, the Bid will be judged to be fully responsive to the Bidding Documents.

Any Bid determined by the Bidding Committee at the time of opening of Bids as not being substantially responsive to the Bidding Documents will be rejected by the Bidding Committee and may not subsequently be made responsive by the Bidder by correction of the non conformity.

The results of the preliminary examination of the Bids shall be recorded in a Process Verbal of the Bid Opening which shall be signed by each member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

Article 18

Evaluation of Bids

No information relating to the examination, clarification and evaluation of Bids, or to recommendations concerning Award, shall be communicated to any persons not officially concerned with these procedures.

The Bids received will be evaluated on the basis of their responsiveness to the Bidding Documents, on the basis of administrative, contractual and technical evaluations, and on the VND equivalent of the total Bid Sum.

The administrative, contractual and technical evaluations will be carried out first and provided these comply with all administrative, contractual and technical requirements and specifications the price evaluation will proceed.

In case of discrepancy being discovered between the total Bid Sum shown in the Bid and that obtained by adding the products of the listed quantities and the Unit Prices, the Unit Prices as quoted shall not be altered, but errors found in the said products, or in their addition, shall be corrected. Such corrections may result in the change of the total Bid Sum. In such case, the Bidder shall be given the option either of accepting the corrected total Bid Sum or of withdrawing his Bid in which latter case the Bid Bond will be forfeited under the provision of Article 22 of these Instructions to Bidders.

The Employer reserves the right, for whatsoever reason, to reject any or all Bids, to waive technicalities, to advertise for new Bids, or to proceed to do work otherwise, without the necessity of furnishing each Bidder with a statement giving the reason or reasons for the Employer's action. In the event that it becomes necessary for the Employer to invoke this right, the Employer will return all Bid Bonds without forfeiture.

After the submission of the Bid, any further clarification by the Employer of the Contract Documents or by the Bidder of his Bid will be formalized by a letter from one party and a reply letter from the other party, and these letters of agreement will then form a legally binding part of any Contract subsequently entered into.

During evaluation Bids may be considered irregular, and if not adequately clarified to the satisfaction of the Bidding Committee, may be rejected or disqualified for, but not limited to, the following reasons :

- a. if the Bid is not submitted on the forms furnished or true copies thereof, or if any of the forms as required under the provisions of these Instructions to Bidders are missing from the Bid;
- b. if there are any unauthorized additions, conditional or alternate Bids or irregularities of any kind which tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning;

- c. if the Bidder adds any provisions reserving the right to accept or reject an Award;
- d. if more than one Bid for the same work is submitted by an single Enterprise, a Firm, Corporation, Joint Enterprise or Consortium under the same or different name(s);
- e. if there is evidence of collusion between Bidders (Identical Bids would indicate collusion and the Employer reserves the right to reject any such Bids and, if necessary, to call for new Bids excluding the identical Bidders);
- f. if Bids are submitted in which the Unit Prices in the Bid Schedule and/or Schedule of Rates and Prices do not follow those included in the Detailed Unit Price Analyses;
- g. if the Bid is substantially unbalanced as a result of unreasonable weighting of certain Unit Prices;
- h. if the Bid Bond is not valid or is valid for less than the period established in Article 21 herein.
- i. if the respective proportions of contributed capital to the Joint Venture or Consortium have been modified without the prior written approval of the Employer.
- j. if the Bid Documents have been signed by a person other than one of the authorized signatories as defined under Article 12 of these Instructions to Bidders.

If, after the completion of evaluation and ranking of responsive Bids, any Pay Item Price has been found to be disproportionately high in the lowest qualified Bidder's Bid and the Bidder is unable to provide adequate justification in support of the quoted price, the Bidding Committee in consultation with the Bidder may agree on an alternative lower price that is acceptable to both parties and such agreed and lower price will be used for the payment of all work completed in excess of the quantity stated in the original Bid Schedule. If such agreement cannot be obtained, the Bid may be disqualified and the ranking of responsive Bids revised accordingly

#### Article 19

##### Validity of Bids

The Bid shall remain valid up to at least 150 ( one hundred and fifty ) calendar days after the date of opening of Bids. In exceptional circumstances prior to expiry of the original Bid validity period, the Employer may request the Bidder for a specified extension in the period of validity.

The request and the responses thereto shall be made in writing or by facsimile or telex. A Bidder may refuse the request without forfeiting his Bid Bond. A Bidder agreeing to the request will not be required nor permitted to modify his Bid, but will be required to extend the validity of his Bid Bond correspondingly.

If any Bidder withdraws his Bid before the validity period expires or if any Bidder refuses or fails to sign the Contract when requested by the Employer to do so, then the amount of the Bid Bond will be forfeited.



Article 20

Award and Signing of Contract

Within 120 (one hundred and twenty) days after the Opening of Bids the Employer will issue a Notice of Award to the successful Bidder together with a Draft of the Proposed Contract. The Bidder who receives the Notice of Award shall within 7 (seven) days of the date of issue of the Notice of Award notify the Employer in writing whether the Bidder is willing to carry out the Works and whether the draft Contract given by the Employer is acceptable.

Within 15 (fifteen) calendar days after the date of issue of the Notice of Award or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, and before signing the Contract, the successful Bidder is required to submit Performance Bonds in accordance with the requirements of Clause G.12(1) of the General Conditions of Contract. Also within 15 (fifteen) calendar days of issue of the Notice of Award, or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, the successful Bidder is required to sign the Contract Agreement and to return it to the Employer for his signature. The Employer will then arrange for the various signatories from the Employer to affix their signatures within the following 15 (fifteen) days.

If the successful Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the second most acceptable Bid. If the second responsible Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the third most acceptable Bid. In such event the Bidders may be requested to extend the validity of the Bids for such further period as may be agreed upon in writing between the Employer and the Bidders concerned.

Where the Bidder is a Joint Enterprise, each member of the partnership or association shall be liable for the Bid submitted.

If for any reason the Bid should be withdrawn before expiry of the said period, the Bid Bond given by one or more members of the partnership or association will be retained by the Employer.

In the case of the second, or third responsible Bidder, the signing of the Contract by all parties shall also take place within 30 (thirty) days from the date of issuance of the Notice of Award to the Bidder who accepts the Award.

After the signing of the Contract and its approval by Japan Bank for International Cooperation (JBIC) the Employer will send a written Notice to Proceed to the Contractor.

The written Notice to Proceed will be issued within thirty (30) days after the date of the approval by JBIC mentioned above, and the Notice will specify the date to be considered as the Commencement Date of the Works which shall be not more than thirty (30) days after issuing the Notice to Proceed by the Employer.

Article 21

Bid Bond

The Bidder shall together with his Bid submit a Bid Bond as security for full compliance with all of the requirements of the Bid. The amount of the Bid Bond shall be Five Hundred Thousand United States Dollars (US\$500,000.00).

A Joint Enterprise either proposed or not yet licensed in Vietnam shall submit the Bid Bond in the name of one or more representatives of the Partnership or Association who are authorized by a Power of Attorney to act as representatives of the Joint Enterprise.

Bidders who are party to a Contractual Business Cooperation Agreement may, in accordance with the proportioning of responsibilities and results of business set out in the Agreement, submit the Bid Bond in the name of one or more of the parties who are duly authorized by Power of Attorney to act as their representatives.

The Bid Bond shall consist of a Bank guarantee issued by a State Bank, Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer. A sample guide is given in Guide Form E of these Instructions to Bidders

The Bid Bond shall be valid for 30 (thirty) days beyond the period of validity of the Bid as given in Article 19 of this document or at least 180 (one hundred and eighty) days from the date of opening of Bids or for such extension of the Bid validity period as may be granted by the Bidder in writing to the Employer or agreed to by mutual consent.

An unsuccessful Bidder's Bid Bond will be discharged or returned as promptly as possible after award of Contract but in any event no later than 30 (thirty) days after the expiration of the period of bid validity as given in Article 19 of this document.

The successful Bidder's Bid Bond will be discharged or returned after the Bidder has furnished the Performance Bond in accordance with Article 23 of this document and all signatures have been affixed to the Contract Agreement.

Article 22

Forfeiture of Bid Bond

In the event of any Bidder withdrawing his Bid or of a successful Bidder failing to prepare and sign a Contract Agreement as required by the General Conditions of Contract, Clause G.11, within the specified time period of 15 (fifteen) days, or failing to furnish a Performance Bond in accordance with the requirements of Clause G.12 of the General Conditions of Contract within 15 (fifteen) days of the issue of the Notice of Award then the sum lodged with the Bid as guarantee of good faith shall be absolutely forfeited to the Employer and the Employer shall be entitled (but not obliged) by notice in writing to withdraw his acceptance of the Bid.

The Employer's acceptance of a Bid, if so withdrawn, shall thereupon be void and as though it had never been given and the Contractor shall have no claim against the Employer whether for damage, specific performance, or otherwise in respect of such acceptance or withdrawal.

Article 23

Performance Bond

In the event of a Bid being accepted by the Employer, the successful Bidder who receives a Notice of Award and acknowledges in writing agreement to enter into a Contract, shall submit a Performance Bond in accordance with the required timing and conditions specified in Clause G.12(1) of the General Conditions of Contract and in accordance with the format of the sample Performance Bond given in Form PB, a copy of which is attached. The Performance Bond shall consist of a bank guarantee issued by a State Bank or a Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer.

Should the successful Bidder fail to comply with the specified timing or conditions for Bond submission, the Employer may withdraw his acceptance of the Bid and forfeit the Bid Bond in accordance with Article 22 of these Instructions to Bidders.

Article 24

Advance Payment Bonds

Within 15 (fifteen) days following the signing of Contract, the successful Bidder shall submit to the Employer in accordance with the requirements of Clause G.12(2) of the General Conditions of Contract, and in the format of Guide Form AB, an Advance Payment Bond in both local and foreign currencies against which the Employer will make available Advance Payments of fifteen percent (15%) of the foreign and local currencies as established in the Contract Agreement. A copy of Guide Form AB - Advance Payment Bond is attached.

The Advance Payment is being made available by the Employer for the proper and timely progressing of the Works by the Contractor, and Bidders are requested to take particular note of the conditions pertaining to the Advance Payment Bond(s), Advance Payment repayments, and the recovery of any outstanding Advance Payment sum in the event of failure by the Contractor to abide by the requirements of Clauses G.12(2) and G.58(2) of the General Conditions of Contract.

Article 25

Form of Power of Attorney

Power(s) of Attorney as required by Article 12 hereof shall follow or be similar to the format shown in Guide Forms PA-1, PA-2, and PA-3 of these Instructions to Bidders. The Guide Form descriptions are intended to illustrate the particular cases that could apply in the use of these documents for establishing Powers of Attorney.

GUIDE FORM PA-1. Could be used by a Sole Enterprise (Vietnamese or Foreign) who is already organised and existing in Vietnam .

GUIDE FORM PA-2. Could be used by a foreign investor who proposes to proceed on the basis of 100% Foreign Owned Capital to establish an Enterprise or to form a Contractual Business Cooperation Agreement in Vietnam.

GUIDE FORM PA-3. Could be used by Joint Venture/Enterprises that either exist or are proposed, in accordance with the Affidavit Agreement for a Joint Enterprise.

Article 26 Taxation

Any special requirements as to the method of dealing with Vietnamese taxes will be given in the Special Specifications.

Article 27 Method Statements

The Bidder shall submit method statements describing in detail the methods by which the Bidder proposes to carry out the work, including details of temporary and permanent works and equipment to be used, for the items listed below. The method statements are to be detailed and are to include narrative descriptions, explanatory diagrams and timing schedules for the various items or phases of work.

1. Traffic Management during construction of bridge and road work
2. Working Schedules ( Ref. Guide Form S ).
3. Cofferdams for pier construction in water.
4. Pre-casting and post-tensioning arrangements for PCI-Girders.
5. Temporary bridges and temporary access and approach roads.
6. PC I-Girder erection methods.
7. Site drilling and investigative methods for soft ground proposed to be used and who/which organisation will carry out the testing.
8. For the treatment of soft soils in identified soft soil areas, the type of equipment, methods proposed and production rates for :
  - removal of soft soil and replacement with sand fill.
  - installation of vertical sand drains and fibre wick drains.
  - sand compaction.
9. Following the requirements of the latest TCVN Standards concerning protection of the environment state clearly the measures you would intend to adopt in carrying out your work in order to mitigate the impact of your activities.
10. Procuring, transporting and placing of Borrow material for embankments.
11. Pavement construction including details of the location and capacity of the asphalt batching plant, laying equipment, daily work capacity, etc.
12. Production, transporting and placing of concrete.

Article 28 Contractors Superintendence.

It should be noted by the bidders that the Project Manager for the Contractor is also known as the General Superintendent and as such is the executive representative of the Contractor authorised to receive and fulfil instructions from the Engineer and to supervise and direct the construction of the works. Ref: General Conditions of Contract Clause G15.

As required by the General Conditions of Contract the person submitted in the bid, if approved in writing by the Engineer before the Commencement of Works, is to be constantly on the works and shall give his whole time to the superintendence of the same. This may be different from actual conditions due to the practice of each partner in providing their own Manager, however this practice will not be allowed. There shall be one only General Superintendent responsible for the Works.

DECLARATION OF INTENTION TO BID

To: Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3  
THANH TRI SECTION**

Gentlemen,

We have received Bid Documents for our use in the preparation of a Bid for the construction of the above Package.

We intend to submit our Bid to the above address before the closing date for submission of Bids as given in your Invitation to Bid.

----- \* Signature and stamp mark of Company  
----- 2001  
----- \*  
----- \*\*  
----- \*\*\*

- \* Name of signer of this declaration
- \*\* Position in the Company
- \*\*\* Name of Company

AFFIDAVIT AGREEMENT  
FOR JOINT ENTERPRISE

Considering :

1. The issue of the Bid Documents for the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 3 – THANH TRI SECTION due for submission to the Ministry of Transport, Projects Management Unit Thang Long on ....., 2001, and
2. That the parties to the above Joint\* Enterprise Agreement, comprising:

.....  
and  
.....  
and  
.....

being represented by the Joint Enterprise representative as designated in Article E below, desire to participate jointly in the Bidding and the Execution of this project;

NOW IT HAS BEEN AGREED UPON, AND DECIDED:

- A. To appoint ..... for this project as Sponsoring Member/Leading Enterprise to represent and to act "FOR AND ON BEHALF" of the Joint Enterprise and to sign in its name all documents, including the Bid and the Contract.
- B. That ..... as Sponsoring Member/Leading Enterprise shall hold itself responsible for the Works and the execution of the Contract in case of Award and shall hold the Ministry of Transport, and its authorised executing agency Projects Management Unit Thang Long blameless for all consequences and damages in case of any claim by any third party, forthcoming from the Works and the execution of the Contract.

\* *Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.*

C. That regardless of what is stated in Clause A and B above,

.....  
and  
.....  
and  
.....

have agreed together that in case of Award they are and shall remain jointly and severally liable for their respective and joint obligations pursuant to the Contract.

D. That the interest of each enterprise in the Joint Enterprise will be as follows:

..... (..... per cent)  
..... (..... per cent)  
..... (..... per cent)

and that each enterprise will participate in these same proportions in the expense and in the profit and loss of the Joint Enterprise These partnership proportions will not be modified throughout the whole period of the Contract except with the prior written approval of the Employer and the joint written agreement of the participating enterprises Irrespective of the relative size of the partnership proportions shown above, each of the enterprises, and also the Employer when necessary, shall have the right of full supervision of all aspects of the implementation of this agreement, including the right of full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant, equipment and personnel, subcontract agreements, correspondence, telexes, etc.

E. That the Power to sign for and on behalf of the Joint Enterprise shall vest in the person of .....(name) in his capacity as .....(position) of ..... (company name) subject to prior written approval of the other parties to this Agreement regarding the contents of the documents to be signed and the conditions thereof.



- F. That this Agreement for a Joint Enterprise in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 3 will become operative with immediate effect upon receipt of the Notice of Award issued by the Ministry of Transport, through its authorised executing agency the Projects Management Unit Thang Long.
- G. That this Agreement shall automatically be null and void if the Contract is not awarded to the Joint Enterprise.
- H. That this Agreement for Joint Venture in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 3 has been prepared in ..... copies, of which the first copy will be held by Ministry of Transport, Projects Management Unit Thang Long and the other copies given to the parties to this Agreement. All copies possess equal legal status and strength.

In witness whereof the participating parties have hereto placed their signature and seals at ....., on this ..... day of ..... 200 ....

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

Witnessed by : ..... (company name) .....(signature & seal)

.....(name and position of signatory)

DETAILED PRICE ANALYSIS  
FOR  
COST OF MATERIAL

Item :

Unit :

Cost Element / Unit	Cost (Yen)		Cost (VND)	
	Yen/ Unit	Total Yen	VND/ Unit	Total VND
1. CIF Cost at Port / Quarry from .....				
2. Handling				
3. Transport to site (Km )				
4. Unloading, Storage, etc.				
5. Other Costs (describe)				
Sub-Total				
Overheads and Profit at the rate of .....%				
Total Price at Site				

Notes:- The above prices should include all taxes and duties except Vietnamese VAT.

GUIDE FORM D

Sheet \_\_\_\_\_ of \_\_\_\_\_

**DETAILED UNIT PRICE ANALYSIS**

Pay Item No. : \_\_\_\_\_ Description : \_\_\_\_\_ Total Estimated Quantity as shown  
 Pay Item Unit : \_\_\_\_\_ Site Output : \_\_\_\_\_ in Bid Schedule:

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)	
			Yen/Unit	Total	VND/Unit	Total
A. Equipment ( taken from Schedule of Rates and Prices )						
B. Labour ( taken from Schedule of Rates and Prices )						
C. Materials ( taken from Schedule of Rates and Prices )						
Sub Total						
[Overhead & Profit are already included in the above cost elements ]	-	-	-	-	-	-
Total (per site output)						
Total (per Unit)						

Exchange Rate : One Yen = ..... VND (as advised by the Employer)

UNIT PRICE - Use in Bid Schedule	Foreign Currency Comp.(¥)	Local Currency Comp.(VND)	Combined Total (VND)
Note : Quantity required for one unit of Pay Item			

DETAILED UNIT PRICE ANALYSIS

Pay Item No. : \_\_\_\_\_ Total Estimated Quantity as shown  
 Pay Item Unit : per. tonne Aggregate for A.C : \_\_\_\_\_ in Bid Schedule:  
 Site Output : 50 tonne/hour

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)x1000	
			Yen/Unit	Total	VND/Unit	Total
<b>A. Equipment</b> ( taken from Schedule of Rates and Prices )						
- A.M.P 80 t/h	h	1	18,950	18,950	1,200.0	1,200.0
- Wheel loader 100 HP	h	2	2,928	5,856	300.0	600.0
- Steel Roller 8 - 10 t	h	2	800.0	1,600.0	100.0	200.0
- Pn. Tyred Roller 12/20 t	h	1	6,050.0	6,050.0	450.0	450.0
- Asphalt Paver 68 HP	h	1	4,000.0	4,000.0	256.5	256.5
				36,456		2,706.5
<b>B. Labour</b> ( taken from Schedule of Rates and Prices )						
- Supervisor	h	1	600.0	600.0	30.0	30.0
- Operator	h	19	250	4,750.0	16.7	317.3
				5,350		347.3
				41,806		3,053.8
<b>C. Materials</b> ( taken from Schedule of Rates and Prices )						
- Aggregate	tonne	50	1,100	55,000.0	54.0	2,700.0
- Wastage ( estimated for this example as 5% )	tonne	0.05		2,750.0		135.0
- Haulage	tonne	1	11,250	11,250.0	750.0	750.0
				69,000		3,585.0
				110,806		6,638.8
<b>Sub Total</b>						
[ Overhead & Profit are already included in the above cost elements ]						
Total (per site output) 50 tonne/hour				110,806		6,638.8
Total (per Unit) 1 tonne				2,216		132.776

Exchange Rate : One Yen = ..... VND (as advised by the Employer) (Assume for this example One Yen = 110 VND)

UNIT PRICE - Use in Bid Schedule	Local Currency Comp.(VND)	Combined Total (VND)
Note : Quantity required for one unit of Pay Item	2,216	376,536
	132,776	

BANK GUARANTEE FOR BID

(BID BOND)

No. : .....

Whereas Bank \_\_\_\_\_ (Name of Bank) \_\_\_\_\_  
having a registered office located at \_\_\_\_\_ (city) \_\_\_\_\_, with a branch office located at \_\_\_\_\_ (city) \_\_\_\_\_ and  
hereinafter called the "BANK", on the request of \_\_\_\_\_ (Name of Firm / Bidder) \_\_\_\_\_  
\_\_\_\_\_ having a registered address at \_\_\_\_\_ (full  
address) \_\_\_\_\_

\_\_\_\_\_ hereinafter called the  
"BIDDER", for the interest of the Ministry of Transport of the Socialist Republic of  
Vietnam through their authorised executing agency referred to as Projects Management Unit  
Thang Long, hereinafter called the "EMPLOYER", hereby guarantees as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the full amount of US\$500,000.00 (Five Hundred Thousand United States Dollars) if, in the opinion of the EMPLOYER, the BIDDER should fail to fulfil his obligations in accordance with the Instructions to Bidders for the Contract for \_\_\_\_\_ (Name of Project) \_\_\_\_\_ for which bids are to be received by the EMPLOYER on \_\_\_\_\_ at \_\_\_\_\_
2. This Bank Guarantee shall be valid for the full period of \_\_\_\_\_ ( \_\_\_\_\_ ) calendar days from \_\_\_\_\_ (date) \_\_\_\_\_ until \_\_\_\_\_ (date) \_\_\_\_\_
3. In accordance with the provisions of the Instructions to Bidders referred to in item 1, any claim on this Bank Guarantee as a result of the default by the BIDDER shall be made by written application from the EMPLOYER promptly after such default has arisen. The BANK guarantees to pay the full amount of this Bid Bond mentioned in item 1 to the EMPLOYER promptly and within seven (7) working days after having received a written claim from the EMPLOYER.
4. A claim may be served by the EMPLOYER up to thirty (30) calendar days after the Bank Guarantee expiry date mentioned in item 2.

\_\_\_\_\_, \_\_\_\_\_ 200 \_\_\_\_\_

Bank .....

(BIDDER'S NAME AND ADDRESS TO BE CLEARLY SHOWN AT TOP OF LETTER)

To :

Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI** Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3  
THANH TRI SECTION**

Gentlemen,

We submit herewith the original and three copies of our Bid for the above mentioned Contract Package.

We confirm that each of the four attached envelopes contains a full set of correctly completed Bid documents as listed in the "Checklist of Documents to be Submitted".

Yours faithfully,

.....

Authorized Representative

ORIGINAL Bid and three COPIES of Bid

received at ..... hours on .../... 200... by :

.....

Bidding Committee Official

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 - THANH TRI SECTION**

**ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
PROJECT MANAGER/GENERAL SUPERINTENDENT**

1 Full name of Project Manager/General Superintendent \_\_\_\_\_  
(Delete title not applicable) \_\_\_\_\_

2. Nationality \_\_\_\_\_

3. Full details of qualifications \_\_\_\_\_

(giving dates, places, etc.) \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Full details of past experience with particular reference to work on similar projects.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

(\*) To be inserted by the Contractor

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION  
ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
(TECHNICAL MANAGER/CO-PROJECT MANAGER/DEPUTY GENERAL SUPERINTENDENT)**

- \* Co-project Manager)
1. Full name of \*Technical Manager) \_\_\_\_\_  
\*Deputy General Superintendent) \_\_\_\_\_
  2. Nationality \_\_\_\_\_
  3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  4. Full details of past experience with particular reference to work on similar projects.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

\*Delete title not applicable.



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3  
THANH TRI SECTION  
CONSTRUCTION EXPERIENCE**

DETAILS OF CONSTRUCTION CONTRACTS OVER THE LAST FIVE YEARS  
AND FOR WORKS IN PROGRESS

*(Use a separate sheet for each contract)*

Number of Contract

---

Name of Contract

---

Name of Employer

---

Employer's Address

---

Nature of works and special features relevant to this contract

---

Contract role (check one)

Sole Contractor       Main Contractor       Partner in Joint Enterprise/Consortium

---

Contract Sum	CURRENCY	SUM
.....	.....	.....
.....	.....	.....

---

Date of commencement of work

---

Date of completion if already finished

---

Progress to date for on going project (%)

---

Construction Period (days)

---

Scope of Work	Bridge work :	.....	total metres span
	Road work :	.....	kilometre length

---

LIST OF PORTION OF THE WORK PROPOSED  
TO BE SUB CONTRACTED

PAY ITEM NO.	DESCRIPTION OF PAY ITEM	PERCENT OF PAY ITEM TOTAL PRICE (%)	PERCENT OF TOTAL BID SUM (%)

Signature of Contractor \_\_\_\_\_

Date \_\_\_\_\_



The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI** Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3  
THANH TRI SECTION  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise ) of  
\_\_\_\_\_ (name of Country) hereby duly authorize and  
extend complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the above named Enterprise

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under their legal signatures and  
Company seals on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_\_

\_\_\_\_\_  
(name of company and seal)

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_  
(name)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

\_\_\_\_\_  
(title)

Witnessed by

\_\_\_\_\_  
\_\_\_\_\_  
(seal)

**\*\* GUIDE FORM PA-2:**

For use by Foreign Investor who proposes to proceed on the basis  
of 100% Foreign Owned Capital to establish an Enterprise or to  
form a Contractual Business Cooperation Agreement.

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI Viet nam**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3  
THANH TRI SECTION  
POWER OF ATTORNEY**

Know all men by these presents, that I/we \_\_\_\_\_  
\_\_\_\_\_ (name and title of authorised representative)

of \_\_\_\_\_ (name of first enterprise) appointed  
representative(s) of the said Enterprise duly organised and existing under the laws of the SOCIALIST  
REPUBLIC OF VIETNAM and \_\_\_\_\_ (name and title of  
authorised representative of second enterprise) of \_\_\_\_\_ (name  
of second enterprise) appointed representative(s) of the said Enterprise duly organised and  
existing under the laws of \_\_\_\_\_ (country) hereby duly  
authorize and extend complete POWER OF ATTORNEY to the following named person to sign  
all documents concerning proposals, bid negotiations, contract and other documents as may be  
necessary, for and on behalf of the \_\_\_\_\_  
(name of Joint Enterprise that is either existing or proposed in accordance with the Affidavit  
Agreement)

Name in Full

Signature

\_\_\_\_\_

\_\_\_\_\_

Title \_\_\_\_\_

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Company seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_\_

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_

(name) \_\_\_\_\_ (title) \_\_\_\_\_

Witnessed by

\_\_\_\_\_ (seal)

\*\*\* GUIDE FORM PA-3.

For use by Joint Venture/Enterprises that either exist or are  
proposed in accordance with the Affidavit Agreement for Joint  
Enterprise.

**DECLARATION FORM R1 FOR NOTIFICATION OF ILLEGAL PRACTICES**

<b>CONFIDENTIAL</b>	
<b>R1</b>	<b>Tendering Procedure</b>

To : The General Director  
 Projects Management Unit Thang Long  
 Ministry of Transport  
 Thong Trung, Dich Vong Ward, Cau Giay District,  
 HANOI Viet nam

**DECLARATION**

I, the below mentioned :

Name : \_\_\_\_\_ Company : \_\_\_\_\_  
 Occupation : \_\_\_\_\_

truthfully state in good conscience that in the Prequalification/Tendering of the following Government contract:

Name of Contract : \_\_\_\_\_  
 Directorate/Project : \_\_\_\_\_

a number of illegal events have occurred as shown in the table on this declaration form.

PHASE		PROCEDURAL STEPS	ILLEGAL PAYMENT REQUEST		
			TOTAL	REQUESTED BY	NAME OF HIGH GOVERNMENT OFFICIAL USED
Pre-qualification		1. Obtaining Documents 2. Submitting Documents 3. Evaluation			
Tendering	Bid Submission	4. Invitation to Bid 5. Issue of Documents 6. Clarification 7. Submission of Bids			
	Bid Evaluation	8. Opening of Bids 9. Bid Evaluation 10. Negotiation 11. Recommendation of Winners 12. Final Evaluation 13. Selection of Winners			
	Contract Preparation	14. Clarification 15. Signing of Contract 16. Submission of Performance Bond			
Other		17. 18.			

- Notes :
- You must sign this declaration for it to be considered valid
  - Please submit the original copy and keep a 2nd copy for your own file
  - When you submit this declaration ask for a receipt from the official who receives it

I have written this Declaration form most conscientiously, truthfully, with responsibility and not with any malicious intent to bring disgrace upon anybody, and I agree to bear all consequences in the event that this declaration proves to be false.

Signed in ..... this .....day of .....200 .....

\_\_\_\_\_  
 (Signature)

## BANK GUARANTEE FOR CONTRACT PERFORMANCE

## (PERFORMANCE BOND)

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bank Guarantee to warrant his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :

(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

---

2. If, in the opinion of the EMPLOYER, the CONTRACTOR has failed to meet his obligations under the contract, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.

3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
  
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER has issued the Provisional Handover Certificate as required under the terms of the CONTRACT.

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_

( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )



## BOND FOR CONTRACT PERFORMANCE

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bond to guarantee his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, by this Bond, we \_\_\_\_\_ (Name of Bonding or Insurance Company) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ (address) and with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ hereinafter called the "SURETY", on the request of the CONTRACTOR agree that we are held and firmly bound unto the EMPLOYER in the sum of \_\_\_\_\_ ( name of currency and amount ) \_\_\_\_\_ for the payment of which sum we hereby bind ourselves and our successors.

**the CONDITION** of this Bond is such that if the CONTRACTOR shall duly perform and observe all the terms and conditions, provisions, conditions and stipulations of the said CONTRACT on the CONTRACTOR's part to be performed and observed according to the true purport intent and meaning thereof, or if on default by the CONTRACTOR, the SURETY shall satisfy and discharge the damages sustained by the Employer thereby up to the amount of this Bond as written above then this obligation shall be null and void. Otherwise, this Bond shall be and remain in full force and effect and the EMPLOYER may demand immediate and full settlement of the above sum from the SURETY without further discussion or prior notice.

It is understood and agreed that none of the following events shall in any way release the SURETY from our liabilities to the EMPLOYER under this Bond:

- 1) any alteration in the terms of the CONTRACT made by agreement between the EMPLOYER and the CONTRACTOR.
- 2) any change in the extent or nature of the Works as given in the signed CONTRACT.

- 3) any allowance of time by the EMPLOYER under the CONTRACT, or
- 4) any forbearance or forgiveness in respect of any matter or thing concerning the CONTRACT by the EMPLOYER or the Engineer appointed to supervise the WORKS..

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the SURETY by \_\_\_\_\_  
( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

BANK GUARANTEE

FOR

( Name of Currency ) ADVANCE PAYMENT

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", has entered into a contract for \_\_\_\_\_ ( the works ) \_\_\_\_\_ with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of their contract the EMPLOYER will make an Advance Payment to the CONTRACTOR to facilitate the construction of the works. Prior to release of this Advance Payment, the CONTRACTOR is required to submit a Bank Guarantee to the EMPLOYER for the full amount of the Advance due to be received by him. The Advance Payment will be recovered by the EMPLOYER making deductions from sums due to the CONTRACTOR under the Monthly Certificates. The Bank Guarantee to be held by the EMPLOYER may therefore later be replaced by an equivalent guarantee for such lower sum as equals or exceeds the Advance Payment still remaining with the CONTRACTOR at that time.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :  
(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

2. If, in the opinion of the EMPLOYER, the CONTRACTOR should wilfully fail to achieve the works progress as mutually agreed under the terms of their contract, or shall have utilized any part of the Advance for purposes other than the above works, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.
3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER confirms in writing that the total amount of the Advance Payment has been recovered by him or until this Guarantee is replaced by such replacement guarantee as is acceptable to the EMPLOYER.

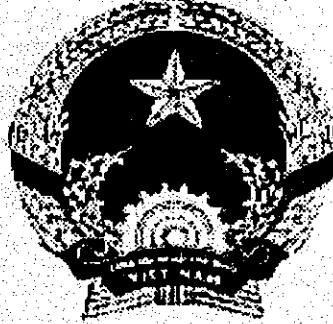
Dated this \_\_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_  
( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

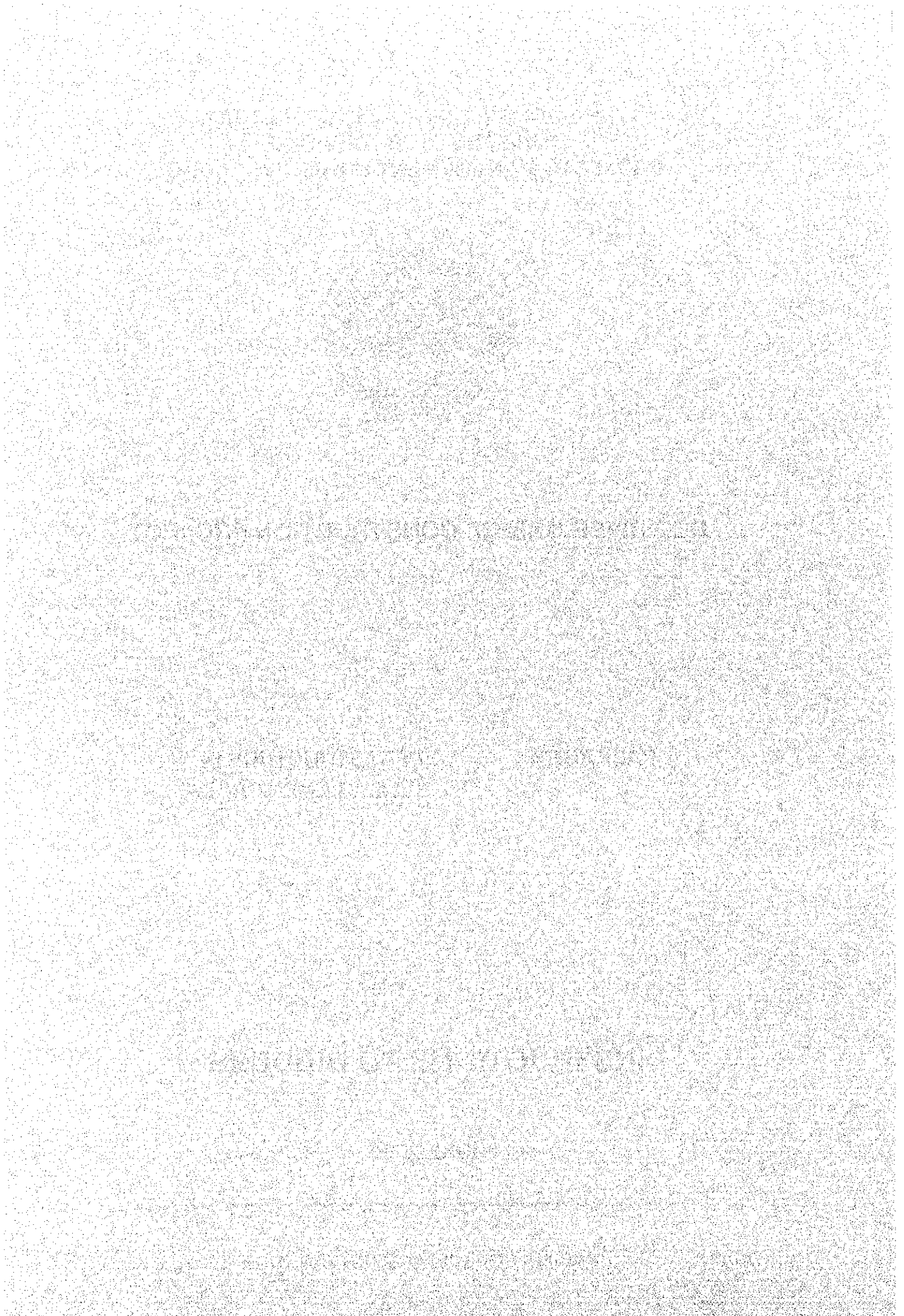
**INSTRUCTIONS TO BIDDERS**

**JUNE 2000**

---

**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**



**INSTRUCTIONS TO BIDDERS**

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**GUIDE FORMS**

Guide Form A	-	Declaration of Intention to Bid
Guide Form B	-	Affidavit Agreement for Joint-Enterprise
Guide Form C	-	Detailed Price Analysis for Cost of Material
Guide Form D	-	Detailed Unit Price Analysis
Guide Form E	-	Form of Bid Bond
Guide Form F	-	Bid Submittal Letter
Guide Form J	-	Details General Superintendent
Guide Form K	-	Details Deputy General Superintendent
Guide Form L	-	Details of Construction Contracts
Guide Form M	-	Work Proposed to be Sub-Contracted
Guide Form PA1	-	Form of Power of Attorney
Guide Form PA2	-	Form of Power of Attorney
Guide Form PA3	-	Form of Power of Attorney
Guide Form R1	-	Notification of Illegal Practices
Guide Form PB-1	-	Bank Guarantee for Contract Performance
Guide Form PB-2	-	Bond for Contract Performance
Guide Form AB-1	-	Bank Guarantee for Advance Payment

## INSTRUCTIONS TO BIDDERS

### PREAMBLE

In accordance with the Prime Ministers Decision No. \_\_\_\_\_ concerning the Red River Bridge Construction Project, Projects Management Unit Thang Long as agent for the Ministry of Transport of the Government of The Socialist Republic of Vietnam intends, under this package, to construct the Red River Bridge.

Main features of the construction of the Infrastructure in Resettlement Area will include:

- There are six locations of resettlement area as indicated in the drawing

Thanh Tri district: Locations of resettlement sites are in Hoang Liet, Yen So, Tran Phu and Linh Nam communes.

Gia Lam district: Locations of resettlement sites are in Cu Khoi, Thach Ban communes.

Location	X1	X2	X3	X4	X5	X6	Total
Area of each site m <sup>2</sup>	39,000	33,000	17,000	8,000	10,000	13,000	120,000

- Construction items of each resettlement area are as follows:
  - Access Road
  - Filling Work
  - Traffic Road inside the site
  - Electric Supply
  - Water Supply
  - Drainage System and
  - Other indicated in the drawings.



It is anticipated that construction work could commence in \_\_\_\_\_ 2002.

The works will be funded by the Government of the Socialist Republic of Vietnam from the proceeds of a loan arranged from Japan Bank for International Cooperation, hereinafter referred to as "JBIC", towards the cost of Red River Bridge Construction Project. Disbursement of this loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999. No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any claim to the loan proceeds.

The work is being tendered on a Local Competitive Bidding basis and participation in the bidding will be open to pre-qualified Vietnamese contractors.

Bidders shall have a sufficient knowledge of the terms and conditions of the above mentioned Loan Agreement including the "Guidelines for Procurement under JBIC ODA Loans" dated October, 1999 and will bear all costs associated with the preparation and submission of their Bids, and the Employer will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding or the bid evaluation process.

Bids shall be prepared and submitted strictly in accordance with the instructions given in this document and with all prevailing Government of the Socialist Republic of Vietnam rules and regulations regarding taxation, import duties and other matters relevant to successful execution of the Works. It is the responsibility of each Bidder to appraise himself fully of all relevant Government rules and regulations, irrespective of whether or not specific reference to them is made in the Contract Documents.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**  
**INSTRUCTIONS TO BIDDERS**

Article 1 Scope of Work

Contractors are invited to submit a bid for Package 4 – Infrastructure in Resettlement Area.

Article 2 Bidding Time Schedule

The sequence of dates for carrying out the bidding for this Contract Section has been programmed as shown in Table No. 1.

Article 3 Bidding Documents

The bidding requirements are stated in the Bidding Documents which consist of the following:

- Instructions to Bidders
- Volume I : General Conditions of Contract
- Volume II : General Specifications
- Volume III : Special Specifications
- Volume IV : Bid, including Appendices to Bid, Bid Schedule and Schedule of Rates and Prices
- Volume V : Drawings
- Volume VI : Addendum (if any)
- Volume VII : Detailed Work Schedule, Plant and Contractors Personnel List
- Form of Contract

Article 4 Declaration of Intention to Bid

Prospective Bidders shall, within the time schedule shown in Table No. 1, send by registered mail, or deliver personally against receipt, to the Employer's Bidding Committee a signed "Declaration of Intention to Bid" in accordance with Guide Form A of these Instructions to Bidders, in which they affirm their intention to submit a Bid for this Package.

**TABLE NO. 1**  
**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

EVENT	DATE
a Issue of Bid Documents	2001
b Site Visit - prior to Pre-Bid Conference	2001
c Formal Pre-Bid Conference at Hanoi	2001
d Last Date for Bidders to Request Clarification of Bid Documents	2001
e Last Date for Employer to Issue Addenda	2001
f Last Date for Submission of Declaration of Intention to Bid	2001
g Last Date for Submission of Bids 10:00 hrs	2001
h Opening of Bids 10:15 hrs at the Employer's Office	2001
i Evaluation of Bids and Approvals	2001

Note: The aim of the Site Visit and Formal Pre-Bid Conference is to provide bidders with background information on the Employers' requirements for the expressway construction. It is recommended that all prospective bidders should attend.

Article 5

Pre-Bid Information

The Employer will assist the prospective Bidders in clarifying any questions they may raise concerning the Drawings, Specifications and other Bid Documents. This service includes a Formal Pre-Bid Conference to be held approximately forty five (45) days before Bid Opening at a venue to be advised by the Employer, and an official site visit at which Bidders may accompany representatives of the Employer and Engineer.

Bidders are requested to formally submit any questions in writing or by facsimile or telex to reach the office of the Bidding Committee in Hanoi not later than the last date for Bidders to request clarification of the Bid documents as given in Table No. 1 of these Instructions to Bidders.

All formally submitted questions will be formally clarified by the Employer by the issue of Addenda during the Bid Period in accordance with Article 14 of these Instructions to Bidders. Only pre-bid information confirmed in writing in Addenda during the Bid Period will form part of the Contract.

Article 6

Inspection of Bid Documents and Site of the Works

Bidders shall visit and inspect carefully the Site of the Works to be tendered for, and shall study all Contract Documents and guarantee forms prepared for the Contract before submitting a Bid.

The Bidder and any of the Bidder's personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such inspection, but only upon the express condition that the Bidder and the Bidder's personnel and agents will release and indemnify the Employer and the Employer's personnel and agents from and against all liability in respect of personal injury (whether fatal or otherwise), loss of or damage to property and any other loss, damage, costs and expenses however caused, which but for the exercise of such permission would not have arisen.

The Employer will obtain all land or permission for the temporary use of land on which permanent works are to be constructed, but in certain areas the working space may be restricted. If considered necessary by the Employer further details of working space will be given at the Pre-Bid Conference and included in the formal answers to bidders questions.

Before submitting his bid the Bidder should thoroughly acquaint himself with the situation regarding utilities to be protected during the Works and the need to facilitate the work of utility contractors if any during the term of the main Contract.

The submission of a Bid shall be considered prima facie evidence that the Bidder has made such examination of the Site and Contract Documents, and is familiar with, and has allowed for in his Bid, the nature of the Site and its means of access, the character, quality and quantities of the Works to be performed, the availability and quality of materials to be furnished, the availability of labour, accommodation and transport, the difficulties inherent in executing the Works within the specified time including any limitations of local weather conditions, all relevant laws and regulations

of the Government of the Socialist Republic of Vietnam together with all risks, contingencies and other circumstances which may arise, and that he will not in the future express ignorance about any of the conditions pertaining to the execution of the Work, so far as these could be ascertained at the time of Bid Submission

All costs and charges in connection with visits to and examination of the Site and in the preparation of the Bid shall be borne by the Bidders.

Article 7

Preparation of Bid Schedule and Schedule of Rates and Prices

The Bid Schedule and Schedule of Rates and Prices shall be prepared on the forms furnished, or true copies thereof.

All entries in the Bid, Bid Schedule and Schedule of Rates and Prices shall be typewritten or computer printed.

Bid prices shall be determined by the Bidder entirely at his own responsibility and shall, with due regard to his examination of the Site and the Bid Documents as required under Article 6 of these Instructions to Bidders, be suitable for the satisfactory construction, completion and warranty of the Work being tendered.

Bidders are required to carefully study the works required under each pay item as given in the Drawings and Specifications. In particular the Bidder is strongly advised to thoroughly read and understand the "Method of Measurement" and "Basis of Payment" as given against each pay item.

Under no circumstances will the Employer entertain, at any time in the future, a claim for an increase in the Bid prices for reasons of ignorance, error or oversight on the part of the Bidder with respect to any of the conditions pertaining to the execution of the Works.

The Bidder shall enter his Bid Prices in the Bid Schedule forms given in Volume IV, "Bid, Bid Schedule and Schedule of Rates and Prices" or true copies of the same.

The Contract is to be established in a local currency component, Vietnamese Dong, and a foreign currency component, Japanese Yen, with component percentages nominated by the bidder for each unit price. These percentages shall also apply to any adjustment to the bid brought about by discounting.

However, for the purpose of evaluation and comparison of Bids, the prices entered in the Bid Schedule shall be expressed as the local currency equivalent of the combined local and foreign currency components of the Bid Prices. The exchange rate used for this calculation shall be the official selling rate of exchange between the foreign currency and the local currency, as quoted by the Vietcom Bank, ruling 30 days prior to the opening of the Bid. The Employer will formally notify Bidders of this exchange rate.

The Bid Schedule shall therefore be completed by the Bidder in accordance with the following requirements:

- (a) Unit Prices and Total Prices for each Pay Item or Section of the Bid Schedule and the Schedule of Rates and Prices shall be expressed in the currency of Vietnamese Dong and Japanese Yen.
- (b) Unit Prices shall only be entered against those Pay Items in the Bid Schedule for which quantities have been provided.
- (c) Lump Sum prices shall only be entered in the total bid price column of the Bid Schedule where such a price is called for.
- (d) The Total Price for each Unit Price Pay Item shall be entered in the columns provided for that purpose in the Bid Schedule by calculating the product of the respective unit prices and the estimated quantities. The Total Prices for each Section shall be computed and transferred to the Bid Summary and the sum of the Total Bid Prices for each Section of the Bid Schedule shall be calculated and entered in the appropriate space in the Bid Summary. The totals so obtained are the LOCAL CURRENCY component, and the FOREIGN CURRENCY component of the Net Bid Sum. The Bidder shall add to the LOCAL CURRENCY component that percentage that he calculates is required to cover his net obligation for Value Added Tax (VAT) payable in Vietnam. The LOCAL CURRENCY equivalent of the TOTAL BID SUM is thus derived and shall be stated by the Bidder in the appropriate spaces provided in the Bid and in the Bid Summary.
- (e) When determining Unit Prices, intending Bidders should note the following applicable conditions:
  - (i) The Unit Prices shall include all Vietnamese duties, taxes and other levies payable by the Contractor under the Contract except for VAT. The net allowance for VAT shall be expressed as a percentage, which will be added to the local currency component of the Bid, as shown in the Form of Bid document.
  - (ii) The amounts payable in respect of certain Pay Items may be subject to adjustment, in accordance with Clause G.70 of the General Conditions of Contract, on account of fluctuations during the performance of the Contract in the cost of labor, fuel, materials and equipment (escalation/ de-escalation).
  - (iii) The Unit Prices for each Pay Item shall be the rate used to calculate the amounts to be paid to the Contractor in the Monthly Certificates and the Final Certificate, subject to the provisions of the various Clauses in the General Conditions of Contract.
  - (iv) Payments to the Contractor shall be made in accordance with Clause G.58 of the General Conditions of Contract in both local and foreign currencies as determined by the breakdown of the unit prices in the Contract Agreement.

- (f) All Bidders will have been given a copy of the Bid Schedule and Schedule of Rates and Prices on a computer floppy. The Bidders should enter their rates and prices on this disk and return it to the Employer together with the other Bid documents. This is for the convenience of the Employer and if there is any discrepancy between the prices submitted on paper and those given on the floppy disk, then the information given on the papers will be binding and the computer data will be corrected accordingly.

Article 8

Interpretation of Quantities in Bid Schedule

The quantities entered for each Pay Item in the Bid Schedule are estimates only and are prepared for the comparison of Bids and Award of Contract. Payment will be made only for the certified quantities of work for each Pay Item actually performed in accordance with the Contract Documents. The scheduled Pay Item quantities of work to be executed may be increased or decreased as provided for in Clauses G.51 and G.52 of the General Conditions of Contract.

Article 9

Use of Local Contractors, Sub-contractors, Goods and Services

Successful bidders will be encouraged, in accordance with Vietnamese Regulations promulgated in conjunction with Decree No.43/CP, to undertake to form a joint venture with a Vietnamese Contractor or to use local Sub-contractors for construction and installation and purchase of materials and equipment able to be domestically produced or processed in Vietnam. However, in accordance with Clause G.04 of the General Conditions of Contract, intending Bidders should note that the total value of work which may be sub-let shall not exceed 50 (fifty) percent of the value of the Contract.

Article 10

Price Escalation/De-escalation

Price adjustment (escalation/de-escalation) will be applicable.

Article 11

Partnership or Association of Enterprises

Enterprises\* now proposing to bid shall have passed the pre-qualification (screening) executed by the Employer, have satisfied the conditions for business practicing certificate or license within Vietnam or in the bidders home country and be technically and financially able as stated elsewhere in the tender documents.

Bids may be received from;

- i) Enterprises of voluntarily created joint ventures and joint operations forming a partnership or association in one of the following forms:
  - a) A Joint Venture Enterprise which means an enterprise established in Vietnam on the basis of a joint venture contract signed by one or more Vietnamese parties\*\* together with one or more foreign parties\*\*\* in order to invest and carry on business in Vietnam.

\* Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.

\*\* Vietnamese party shall mean one or more Vietnamese legal economic entities.

\*\*\* Foreign party shall mean one or more foreign individuals or legal economic entities.

A Joint Venture Enterprise shall be established in the form of a limited liability company and shall be a legal entity in accordance with the provisions of the law in Vietnam. (i.e. each joint venture party shall be responsible to the other party and to the joint venture enterprise to the extent of its contributed capital to the company.)

- b) A Joint Operation formed by existing Vietnamese Enterprises without the direct investment of foreign capital.
  - c) A Contractual Business Cooperation Agreement initiated by a foreign investor and signed by two or more parties which stipulates the responsibilities of and the sharing of business results between the parties, for the purposes of commencing business investment in Vietnam without creating legal entity.
- ii) An Enterprise With 100% Foreign Owned Capital defined as an limited liability company owned and established in Vietnam by a foreign investor who self manages the enterprise and takes full responsibility for the results of its business.

All Joint Ventures, Operations and Individual Enterprises are required to be pre-qualified. In the case of a Joint Venture, Joint Operation or a Consortium of several established Joint Enterprises - hereinafter referred to as a Joint Enterprise - this is a prerequisite even in the case where the parties to a Joint Enterprise are individually pre-qualified.

In the event that the successful Bidder is a Joint Enterprise, the Employer requires that the parties to the Joint Enterprise accept joint and several liability for all obligations under the Contract.

The Joint Enterprise shall therefore submit with the Bid a copy of the agreement indicating the percentage of capital contribution recorded or to be recorded in the company charter; the authorized signatory or signatories, the acceptance of joint and several liability for all obligations under the Bid and the Contract, and other pertinent features of the Joint Enterprise. If a Joint Enterprise has not been finalized then an Affidavit Agreement for Joint Enterprise as given in Guide Form B of these Instructions to Bidders shall be completed and submitted with the Bid.

The structure of a Joint Enterprise shall not be modified, except with prior approval of the Employer, at any time following pre-qualification or following submission of Bids or throughout the whole period of the Contract. Otherwise the Employer shall be entitled:

- 1) to disqualify the Bid and effect forfeiture of the Bid Bond;
- 2) to invoke the provisions of Clause G.63 of the General Conditions of Contract concerning the default of the Contractor.

In the case of the Employer granting approval for such modification, the Joint and Several Liability provisions herein described shall still apply and in no case will a participating party be allowed to reduce the level of his participation to zero.



Irrespective of the details of the agreed percentage of capital contribution of the parties in a Joint Enterprise, any of the parties together with the Employer, when necessary, shall have the right of full supervision of all aspects of the implementation of the contribution agreement, including full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant and equipment and personnel, telexes, subcontract agreements, correspondence, etc.

Article 12

Signatures

The signatures required for the Bid Documents shall be as follows:

- (a) Where the Bidder is a sole Enterprise, Joint Enterprise or Consortium (hereinafter called an Joint Enterprise) that is already licensed in Vietnam, then the legal authorized representative of the Enterprise shall sign.

A Power of Attorney which has been witnessed, or a duly certified copy of it, granting authority to sign shall be enclosed with the Bid.

In this respect the legal authorized representative of the Joint Enterprise shall be restricted to any person stated in the company registration as being a member of the board of directors or to any manager or branch manager of the Enterprise

- (b) Where various Bidders have formed or have agreed to form a Joint Enterprise in accordance with the requirements of Article 11 of this document, every Partner of the Joint Enterprise shall sign the Joint Enterprise Agreement or the Affidavit - Agreement for Joint Enterprise (Guide Form B) either personally or through their legal representative, so that all will be jointly and severally responsible for the Bid submitted.

Where one or more parties to the Joint Enterprise have signed the Agreement or Affidavit-Agreement in the name of an Enterprise, a Power of Attorney which has been witnessed, or a duly certified copy of it, empowering him, her or them to sign for the Enterprise must be enclosed with the Bid.

All other Contract Documents, including the Bid, will be signed by the designated representative as nominated on the Agreement or Affidavit - Agreement and this authorization shall be evidenced by submitting with the Bid a Power of Attorney which has been witnessed and which has been signed by the legally authorized signatories of all of the parties.

Article 13

Not Applicable

Article 14 Addenda Issued during Bid Period

Addenda to Bid Documents may be issued up to the last date for Employer to issue Addenda as given in Table No. 1 of these Instructions to Bidders for the purpose of clarifying the Bid Documents or to reflect modifications in the design or Contract terms. If Bidders are in doubt as to the true meaning of any part of the Bid Documents they should request clarification by notifying the Employer in writing prior to the last date for Bidders to request clarification of the Bid Documents as given in Table No. 1 of these Instructions to Bidders.

Any such clarification of the Bid Documents by the Employer will only be made by the formal issue of Addenda which will form part of the Bid Documents. Each Addendum so issued will be sent to all prospective Bidders to whom Bid Documents have been issued and will be binding upon them.

Article 15 Preparation of Bids

The Bid must be submitted under a covering letter and shall contain the documents mentioned hereunder all of which are essential. Guide Form F for the covering letter is given in these Instructions to Bidders.

All documents shall be written in English.

No alternative bids will be accepted.

- a.
  - i) If the Bidder is an existing Joint Enterprise which has been licensed as such in Vietnam or has formed a new Joint Enterprise, a duly certified copy of the Joint Enterprise Agreement between the various parties.
  - ii) If the Bidder is a proposed Joint Enterprise, the Affidavit-Agreement between parties, given in Guide Form B of these Instructions to Bidders, which has been completed and signed by all parties and shall be binding among them if awarded the Contract.
- b. If the bid is to be established on the basis of a Business Cooperation Contract the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. The Power(s) of Attorney as required in Article 12 above.
- d. Bidders latest balance sheet, list of owners, management organization, together with any revisions. In case of Joint Venture/ Operation the foregoing are required for each of the parties to the Agreement.
- e. Foreigners' labour permit (where applicable) in accordance the Labour Code.
- f. Tax registration number. In case of a Joint Enterprise each partner's tax registration number.

- g. Bank reference. In case of Joint Enterprise each of the parties bank references. In case of a foreign bank reference a recommendation letter is required from the Vietcom Bank, Vietnam.
- h. The Bid Bond according to Article 21 below and using the format given in the sample Guide Form E of these Instructions to Bidders.
- i. The Bid duly filled in, dated, stamped, and signed by the Bidder and Appendix to the Bid, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".
- j. The Bid Schedule and Schedule of Rates and Prices filled in, signed where required, and initialed on each page by the Bidder, per Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices". In accordance with Article 7 (f) of these Instructions the Bidders should also return a floppy disk copy of this data for use by the Employer.
- k. A Works Progress Schedule using Guide Form G in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List" as a guide, and completed in accordance with Clauses in the Contract Documents relating to the time for completion of the Works.
- l. Detailed Price Analyses for the Breakdown of the Cost of Materials for the Items listed in the Schedule of Rates and Prices Section C : Materials on Site, using the format shown in Guide Form C of these Instructions to Bidders.
- m. Detailed Price Analyses showing the complete breakdown of the prices from the elements involved (labour, equipment, materials) for the following Pay Items using the format shown in Guide Form D of these Instructions to Bidders:
- All Pay Items in Section I - General, of the Bid Schedule
  - All Pay Items in Section 4.0-Earthworks
  - Pay Items 5.01(1) and (5) - Structure Excavation
  - All Pay Items in Section 10-Concrete Structures.
- Detailed Price Analysis of additional items may requested during the period of Bid Evaluation. Following Notice of Award the successful Bidder will be required to submit Detailed Price Analyses for all Pay Items.
- n. Method Statements as required under Article 27 of this document.
- o. An itemized list of Construction Plant, including sub-contractor's plant, giving the types, capacities and quantities of plant which the Bidder intends to use for the execution of the Contract work. Form H in Volume VII "Detailed Works Schedule, Plant and Contractors' Personnel List" should be used as a guide and a clear distinction made between equipment already owned, the equipment which is intended to be purchased or hired and sub contractor plant. (The equipment nominated in this list as already owned must be in good working order and available for inspection, if considered necessary by the Employer, at the location indicated).

p. Details of construction experience over the last five years giving names of contracts, names of employers, contract roles, scope of works, and contract sums, using the format shown in Guide Form L in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".

q. A site staff organization chart and a list of the senior staff the Bidder intends to employ for the execution of the Works and who will actually be present on Site, showing the number of years of experience in similar construction works of each such staff member, using as a guide Form I in Volume VII, "Detailed Works Schedule, Plant and Contractors Personnel List". Full details of careers and works carried out shall be provided for the Project Manager (General Superintendent) and Technical Manager (Deputy General Superintendent) using Guide Forms J and K in Volume VII "Detailed Works Schedule, Plant and Contractors Personnel List".

Candidates in the list of senior staff submitted with the Bid must correspond with the candidates listed in the Pre-qualification Questionnaire the requirements of which are reproduced as follows.

- Project Manager (General Superintendent)
- Technical Manager (Deputy General Superintendent)
- Site Supervisor(s)
- Chief of Asphalt Mixing Plants.
- Geotechnical Specialist Engineer.

- ◆ Project Manager should have at least 20 years of total experience in highway and bridge works and not less than 10 years of experience and 3 projects handled as Project Manager in similar projects;
- ◆ Technical Manager should have at least 15 years of total experience in highway and bridge works and not less than 7 years of experience and 2 projects handled as Technical Manager in similar projects;
- ◆ Site Supervisor should have at least 10 years of total experience in highway and bridge work and not less than 5 years of experience as Technical Manager in similar projects.
- ◆ Chief of Asphalt Mixing Plants should have at least 10 years of total experience in asphalt road work and not less than 5 years of experience as chief of an asphalt mixing plant in similar projects;
- ◆ Senior Geotechnical Specialist should have at least 10 years of total experience in the analysis of soft ground improvement methods using sand drainage systems as a means of consolidation

r. List of the portions of the Works proposed to be sub- contracted, according to Guide Form M of these Instructions to Bidders.

s. If a Bidder wishes to modify his bid price after completion of the bid schedule and the formal bid document, then this will be known as a Balancing Item. Notice of the Balancing Item should be given by

way of a letter (to be hand delivered) which should confirm the total amount of the Balancing Item; whether it is an addition or subtraction to the Net Bid Sum.; and the manner that the Balancing Item is to be applied to the submitted bid prices. In the absence of such complete information the Employer will be at liberty to apply the balancing item in whatever manner he deems appropriate. The letter giving notice of the balancing item should be signed and witnessed by the same persons as signed the main bid. The letter should be placed in a sealed envelope, which should then be handed to the Bidding Committee immediately before the opening of the main bidding documents. After the bid opening has started, no further submissions will be accepted.

For guidance in the preparation of Detailed Unit Price Analysis required in item "m" above the main materials and equipment requirements are provided in Guide Form D-1 (Example Only). These requirements are to be utilized as a guide only for the preparation of Detailed Unit Price Analysis and Bidders are to determine their own material proportions and equipment and labour requirements.

Intending Bidders are to note that the Unit Price Analysis details which are submitted in accordance with this Article will be used by the Employer as an aid to bid evaluation and may also be used as a reference for determining new or revised unit prices should the need for such new or revised prices be required during the Contract Period.

The above Bid Documents shall be bound to form the following books:

Book I

- a. (i) Joint Enterprise Agreement (if applicable)
- (ii) Joint Enterprise Affidavit-Agreement (if applicable)
- b. Business Cooperation Contract - the duly certified document(s) that stipulate the responsibilities of and the sharing of business results between the parties.
- c. Power(s) of Attorney
- d. Latest Balance Sheet(s), List of Owners, Management Organization(s) etc.
- e. Labour Permit(s) (if appropriate)
- f. Tax Registration Number(s) (if appropriate)
- g. Bank Reference(s)
- h. Bid Bond

Book II

- i. Bid and Appendix to Bid
- j. Bid Schedule and Schedule of Rates and Prices (together with a floppy disk containing the same data.)
- s. Letter with details of the Balancing Item (if appropriate)

Book III

- k. Works Progress Schedule
- l. Detailed Price Analyses for Materials
- m. Detailed Price Analysis of Pay Items
- n. Method Statements

Book IV

- o. List of Construction Plant
- p. Details of Construction Experience
- q. Site Staff Organization Chart and List of Senior Staff
- r. List of Works proposed to be sub-contracted

Article 16

Submission of Bids

The Bidder shall use, and submit with his Bid, the Form "Checklist of Documents to be Submitted", given in the front of Volume IV "Bid, Bid Schedule and Schedule of Rates and Prices".

1. The Bid and copies as described later shall be submitted each in a closed and sealed buff-coloured envelope, all enclosed in an outer envelope of the same colour.
2. The outer envelope must be sealed, must not be transparent and must not carry any indication of the identity of the Bidder. Both outer and inner envelopes shall be addressed to the Employer's Bidding Committee and marked as follows:

To:

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HANOI Vietnam

DOCUMENTS FOR  
RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA

DO NOT OPEN BEFORE 10:15 hrs

on.....2001 at HANOI

Only the inner envelopes, which contain the Bid, shall bear the name and address of the Bidder, to enable the Bid to be returned unopened in case it is declared "late" or otherwise disqualified.

If the inner and the outer envelopes are not sealed and marked as instructed above, the Employer will assume no responsibility for the misplacement or premature opening and rejection of the Bid.

The Bid envelopes shall be hand delivered to the Bidding Committee and must be received not later than the deadline indicated in Table 1 of these Instructions to Bidders.

All pages in the Bid Envelopes must be initialed by the authorized signatory. No submission of initialed "Instructions to Bidders" and Volumes I, II, III, V and VI is required with the Bid, however these documents are required to be submitted by the successful Bidder after the notification of Award.

The complete Bid shall be without alterations, inter-lineations or erasures, except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

The original copy and three photocopies of all Bid Documents as required on the "Checklist of Documents to be Submitted" are required to be submitted. These four sets of Bid Documents shall be sealed in separate envelopes, with the envelope containing the original set and each of the original books being clearly marked "ORIGINAL" and each of the other three envelopes and books therein being clearly marked "COPY".

In the case of any discrepancy between the contents of the four sets of documents, the set marked "ORIGINAL" shall govern. The four envelopes of Bid Documents shall be submitted in the before mentioned outer envelope with a covering letter of transmittal, using Guide Form F of these Instructions to Bidders.

The covering letter shall be submitted separately from, but at the same time as, the envelope containing the Bid Documents. The purpose of the covering letter is to provide the name and address of the Bidder and to provide an official record of the time and date of transmittal to the Employer of the completed Bid Documents. If the Bidder has not yet a legal residence in Vietnam, a postal address in Hanoi must be provided to which all correspondence or communications will be directed.

The Bidder will be given a signed copy of the covering letter as his record of receipt of the Bid by the Employer.

## Article 17

### Opening of Bids

#### a) Opening of Bids

The opening of Bids will take place at the time and date fixed in Table No. 1 in these Instructions to Bidders by the Bidding Committee duly appointed by the Employer. The Bidders or their authorized representatives, may attend the opening of the Bids, if they so desire, and all Bidders or their representatives who are present at the opening shall sign a register evidencing their attendance. Two of the attendant Bidders or their representatives will be nominated to witness that the results of the Bid Opening are recorded correctly by the Bidding Committee.

Each Bid Envelope will be opened in turn and the Bidder's name, the presence or absence of the requisite Bid Bond, price of the Bid, and such other details as the Employer, at its discretion, may consider appropriate will be announced and recorded. In addition, as each Bid envelope is opened in turn, all pages of the original and copies of the Bid, Bid Schedule and the Schedule of Rates and Prices of Volume IV shall be countersigned by one member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

b) Preliminary Examination of Bids

During the Bid opening ceremony, the Bid Documents will be checked for general compliance with the requirements of the Bid. In particular the Bidding Committee will check and ascertain that all of the documents comprising the Bid as nominated in Article 15 of these Instructions to Bidders are included and have been correctly completed. Where Bid Documents are required to be signed the Bidding Committee will ascertain that all such documents bear the signature of the authorized signatory.

The Bidding Committee will also check that the price in the bid is clearly stated in figures and words, and that the amount written in figures is the same as the amount written in words. At the time of opening of Bids a Bid will be declared not substantially responsive to the Bidding Documents for the following reasons:

- a. if all documents comprising the Bid as required in Article 15 of these Instructions to Bidders are not included.
- b. if the Bid enclosing envelope is not marked only as required in Article 16 of these Instructions to Bidders.
- c. if the Bid is received after the time limit for submission of Bids.
- d. if the Bid price is not written in figures and in words.
- e. if the amount of the Bid price written in figures is not the same as the amount written in words.
- f. if the Bid documents have been sent to a member of the Bidding Committee or other official.

If a Bid is not dated and signed, the Bid can be made responsive to the Bidding Documents if these items are fulfilled at the time of opening of Bids.

If all of the foregoing requirements have been met in full and the Bid includes no reservations of any kind whatsoever, the Bid will be judged to be fully responsive to the Bidding Documents.

Any Bid determined by the Bidding Committee at the time of opening of Bids as not being substantially responsive to the Bidding Documents will be rejected by the Bidding Committee and may not subsequently be made responsive by the Bidder by correction of the non conformity.



The results of the preliminary examination of the Bids shall be recorded in a Process Verbal of the Bid Opening which shall be signed by each member of the Bidding Committee and the two witnesses selected from the attendant Bidders.

Article 18

Evaluation of Bids

No information relating to the examination, clarification and evaluation of Bids, or to recommendations concerning Award, shall be communicated to any persons not officially concerned with these procedures.

The Bids received will be evaluated on the basis of their responsiveness to the Bidding Documents, on the basis of administrative, contractual and technical evaluations, and on the VND equivalent of the total Bid Sum.

The administrative, contractual and technical evaluations will be carried out first and provided these comply with all administrative, contractual and technical requirements and specifications the price evaluation will proceed.

In case of discrepancy being discovered between the total Bid Sum shown in the Bid and that obtained by adding the products of the listed quantities and the Unit Prices, the Unit Prices as quoted shall not be altered, but errors found in the said products, or in their addition, shall be corrected. Such corrections may result in the change of the total Bid Sum. In such case, the Bidder shall be given the option either of accepting the corrected total Bid Sum or of withdrawing his Bid in which latter case the Bid Bond will be forfeited under the provision of Article 22 of these Instructions to Bidders.

The Employer reserves the right, for whatsoever reason, to reject any or all Bids, to waive technicalities, to advertise for new Bids, or to proceed to do work otherwise, without the necessity of furnishing each Bidder with a statement giving the reason or reasons for the Employer's action. In the event that it becomes necessary for the Employer to invoke this right, the Employer will return all Bid Bonds without forfeiture.

After the submission of the Bid, any further clarification by the Employer of the Contract Documents or by the Bidder of his Bid will be formalized by a letter from one party and a reply letter from the other party, and these letters of agreement will then form a legally binding part of any Contract subsequently entered into.

During evaluation Bids may be considered irregular, and if not adequately clarified to the satisfaction of the Bidding Committee, may be rejected or disqualified for, but not limited to, the following reasons :

- a. if the Bid is not submitted on the forms furnished or true copies thereof, or if any of the forms as required under the provisions of these Instructions to Bidders are missing from the Bid;
- b. if there are any unauthorized additions, conditional or alternate Bids or irregularities of any kind which tend to make the proposal incomplete, indefinite, or ambiguous as to its meaning;

- c. if the Bidder adds any provisions reserving the right to accept or reject an Award;
- d. if more than one Bid for the same work is submitted by an single Enterprise, a Firm, Corporation, Joint Enterprise or Consortium under the same or different name(s);
- e. if there is evidence of collusion between Bidders (Identical Bids would indicate collusion and the Employer reserves the right to reject any such Bids and, if necessary, to call for new Bids excluding the identical Bidders);
- f. if Bids are submitted in which the Unit Prices in the Bid Schedule and/or Schedule of Rates and Prices do not follow those included in the Detailed Unit Price Analyses;
- g. if the Bid is substantially unbalanced as a result of unreasonable weighting of certain Unit Prices;
- h. if the Bid Bond is not valid or is valid for less than the period established in Article 21 herein.
- i. if the respective proportions of contributed capital to the Joint Venture or Consortium have been modified without the prior written approval of the Employer.
- j. if the Bid Documents have been signed by a person other than one of the authorized signatories as defined under Article 12 of these Instructions to Bidders.

If, after the completion of evaluation and ranking of responsive Bids, any Pay Item Price has been found to be disproportionately high in the lowest qualified Bidder's Bid and the Bidder is unable to provide adequate justification in support of the quoted price, the Bidding Committee in consultation with the Bidder may agree on an alternative lower price that is acceptable to both parties and such agreed and lower price will be used for the payment of all work completed in excess of the quantity stated in the original Bid Schedule. If such agreement cannot be obtained, the Bid may be disqualified and the ranking of responsive Bids revised accordingly

#### Article 19

##### Validity of Bids

The Bid shall remain valid up to at least 150 ( one hundred and fifty ) calendar days after the date of opening of Bids. In exceptional circumstances prior to expiry of the original Bid validity period, the Employer may request the Bidder for a specified extension in the period of validity.

The request and the responses thereto shall be made in writing or by facsimile or telex. A Bidder may refuse the request without forfeiting his Bid Bond. A Bidder agreeing to the request will not be required nor permitted to modify his Bid, but will be required to extend the validity of his Bid Bond correspondingly.

If any Bidder withdraws his Bid before the validity period expires or if any Bidder refuses or fails to sign the Contract when requested by the Employer to do so, then the amount of the Bid Bond will be forfeited.

Article 20

Award and Signing of Contract

Within 120 (one hundred and twenty) days after the Opening of Bids the Employer will issue a Notice of Award to the successful Bidder together with a Draft of the Proposed Contract. The Bidder who receives the Notice of Award shall within 7 (seven) days of the date of issue of the Notice of Award notify the Employer in writing whether the Bidder is willing to carry out the Works and whether the draft Contract given by the Employer is acceptable.

Within 15 (fifteen) calendar days after the date of issue of the Notice of Award or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, and before signing the Contract, the successful Bidder is required to submit Performance Bonds in accordance with the requirements of Clause G.12(1) of the General Conditions of Contract. Also within 15 (fifteen) calendar days of issue of the Notice of Award, or within such extended time limit as may be granted by the Employer, such extension not to exceed thirty days, the successful Bidder is required to sign the Contract Agreement and to return it to the Employer for his signature. The Employer will then arrange for the various signatories from the Employer to affix their signatures within the following 15 (fifteen) days.

If the successful Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the second most acceptable Bid. If the second responsible Bidder refuses or fails to sign the Contract, the Employer may issue a Notice of Award to the responsible Bidder offering the third most acceptable Bid. In such event the Bidders may be requested to extend the validity of the Bids for such further period as may be agreed upon in writing between the Employer and the Bidders concerned.

Where the Bidder is a Joint Enterprise, each member of the partnership or association shall be liable for the Bid submitted.

If for any reason the Bid should be withdrawn before expiry of the said period, the Bid Bond given by one or more members of the partnership or association will be retained by the Employer.

In the case of the second, or third responsible Bidder, the signing of the Contract by all parties shall also take place within 30 (thirty) days from the date of issuance of the Notice of Award to the Bidder who accepts the Award.

After the signing of the Contract and its approval by Japan Bank for International Cooperation (JBIC) the Employer will send a written Notice to Proceed to the Contractor.

The written Notice to Proceed will be issued within thirty (30) days after the date of the approval by JBIC mentioned above, and the Notice will specify the date to be considered as the Commencement Date of the Works which shall be not more than thirty (30) days after issuing the Notice to Proceed by the Employer.

Article 21

Bid Bond

The Bidder shall together with his Bid submit a Bid Bond as security for full compliance with all of the requirements of the Bid. The amount of the Bid Bond shall be \_\_\_\_\_ United States Dollars (US\$ \_\_\_\_\_).

A Joint Enterprise either proposed or not yet licensed in Vietnam shall submit the Bid Bond in the name of one or more representatives of the Partnership or Association who are authorized by a Power of Attorney to act as representatives of the Joint Enterprise.

Bidders who are party to a Contractual Business Cooperation Agreement may, in accordance with the proportioning of responsibilities and results of business set out in the Agreement, submit the Bid Bond in the name of one or more of the parties who are duly authorized by Power of Attorney to act as their representatives.

The Bid Bond shall consist of a Bank guarantee issued by a State Bank, Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer. A sample guide is given in Guide Form E of these Instructions to Bidders

The Bid Bond shall be valid for 30 (thirty) days beyond the period of validity of the Bid as given in Article 19 of this document or at least 180 (one hundred and eighty) days from the date of opening of Bids or for such extension of the Bid validity period as may be granted by the Bidder in writing to the Employer or agreed to by mutual consent.

An unsuccessful Bidder's Bid Bond will be discharged or returned as promptly as possible after award of Contract but in any event no later than 30 (thirty) days after the expiration of the period of bid validity as given in Article 19 of this document.

The successful Bidder's Bid Bond will be discharged or returned after the Bidder has furnished the Performance Bond in accordance with Article 23 of this document and all signatures have been affixed to the Contract Agreement.

Article 22

Forfeiture of Bid Bond

In the event of any Bidder withdrawing his Bid or of a successful Bidder failing to prepare and sign a Contract Agreement as required by the General Conditions of Contract, Clause G.11, within the specified time period of 15 (fifteen) days, or failing to furnish a Performance Bond in accordance with the requirements of Clause G.12 of the General Conditions of Contract within 15 (fifteen) days of the issue of the Notice of Award then the sum lodged with the Bid as guarantee of good faith shall be absolutely forfeited to the Employer and the Employer shall be entitled (but not obliged) by notice in writing to withdraw his acceptance of the Bid.

The Employer's acceptance of a Bid, if so withdrawn, shall thereupon be void and as though it had never been given and the Contractor shall have no claim against the Employer whether for damage, specific performance, or otherwise in respect of such acceptance or withdrawal.

Article 23

Performance Bond

In the event of a Bid being accepted by the Employer, the successful Bidder who receives a Notice of Award and acknowledges in writing agreement to enter into a Contract, shall submit a Performance Bond in accordance with the required timing and conditions specified in Clause G.12(1) of the General Conditions of Contract and in accordance with the format of the sample Performance Bond given in Form PB, a copy of which is attached. The Performance Bond shall consist of a bank guarantee issued by a State Bank or a Private Bank or Financial Institution and shall be in form and substance and in all other respects satisfactory to the Employer.

Should the successful Bidder fail to comply with the specified timing or conditions for Bond submission, the Employer may withdraw his acceptance of the Bid and forfeit the Bid Bond in accordance with Article 22 of these Instructions to Bidders.

Article 24

Advance Payment Bonds

Within 15 (fifteen) days following the signing of Contract, the successful Bidder shall submit to the Employer in accordance with the requirements of Clause G.12(2) of the General Conditions of Contract, and in the format of Guide Form AB, an Advance Payment Bond in both local and foreign currencies against which the Employer will make available Advance Payments of fifteen percent (15%) of the foreign and local currencies as established in the Contract Agreement. A copy of Guide Form AB - Advance Payment Bond is attached.

The Advance Payment is being made available by the Employer for the proper and timely progressing of the Works by the Contractor, and Bidders are requested to take particular note of the conditions pertaining to the Advance Payment Bond(s), Advance Payment repayments, and the recovery of any outstanding Advance Payment sum in the event of failure by the Contractor to abide by the requirements of Clauses G.12(2) and G.58(2) of the General Conditions of Contract.

Article 25

Form of Power of Attorney

Power(s) of Attorney as required by Article 12 hereof shall follow or be similar to the format shown in Guide Forms PA-1, PA-2, and PA-3 of these Instructions to Bidders. The Guide Form descriptions are intended to illustrate the particular cases that could apply in the use of these documents for establishing Powers of Attorney.

GUIDE FORM PA-1. Could be used by a Sole Enterprise (Vietnamese or Foreign) who is already organised and existing in Vietnam .

GUIDE FORM PA-2. Could be used by a foreign investor who proposes to proceed on the basis of 100% Foreign Owned Capital to establish an Enterprise or to form a Contractual Business Cooperation Agreement in Vietnam.

GUIDE FORM PA-3. Could be used by Joint Venture/Enterprises that either exist or are proposed, in accordance with the Affidavit Agreement for a Joint Enterprise.

Article 26

Taxation

Any special requirements as to the method of dealing with Vietnamese taxes will be given in the Special Specifications.

Article 27

Method Statements

The Bidder shall submit method statements describing in detail the methods by which the Bidder proposes to carry out the work, including details of temporary and permanent works and equipment to be used, for the items listed below. The method statements are to be detailed and are to include narrative descriptions, explanatory diagrams and timing schedules for the various items or phases of work.

1. Traffic Management during construction of bridge and road work
2. Working Schedules ( Ref. Guide Form S ).
3. Cofferdams for pier construction in water.
4. Pre-casting and post-tensioning arrangements for PCI-Girders.
5. Temporary bridges and temporary access and approach roads.
6. PC I-Girder erection methods.
7. Site drilling and investigative methods for soft ground proposed to be used and who/which organisation will carry out the testing.
8. For the treatment of soft soils in identified soft soil areas, the type of equipment, methods proposed and production rates for :
  - removal of soft soil and replacement with sand fill.
  - installation of vertical sand drains and fibre wick drains.
  - sand compaction.
9. Following the requirements of the latest TCVN Standards concerning protection of the environment state clearly the measures you would intend to adopt in carrying out your work in order to mitigate the impact of your activities.
10. Procuring, transporting and placing of Borrow material for embankments.
11. Pavement construction including details of the location and capacity of the asphalt batching plant, laying equipment, daily work capacity, etc.
12. Production, transporting and placing of concrete.

Article 28 Contractors Superintendence

It should be noted by the bidders that the Project Manager for the Contractor is also known as the General Superintendent and as such is the executive representative of the Contractor authorised to receive and fulfil instructions from the Engineer and to supervise and direct the construction of the works. Ref: General Conditions of Contract Clause G15.

As required by the General Conditions of Contract the person submitted in the bid, if approved in writing by the Engineer before the Commencement of Works, is to be constantly on the works and shall give his whole time to the superintendence of the same. This may be different from actual conditions due to the practice of each partner in providing their own Manager, however this practice will not be allowed. There shall be one only General Superintendent responsible for the Works.

DECLARATION OF INTENTION TO BID

To: Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA**

Gentlemen,

We have received Bid Documents for our use in the preparation of a Bid for the construction of the above Package.

We intend to submit our Bid to the above address before the closing date for submission of Bids as given in your Invitation to Bid.

----- \* Signature and stamp mark of Company  
----- 2001  
----- \*  
----- \*\*  
----- \*\*\*

- \* Name of signer of this declaration
- \*\* Position in the Company
- \*\*\* Name of Company



AFFIDAVIT AGREEMENT  
FOR JOINT ENTERPRISE

Considering :

1. The issue of the Bid Documents for the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA due for submission to the Ministry of Transport, Projects Management Unit Thang Long on ....., 2001, and

2. That the parties to the above Joint\* Enterprise Agreement, comprising:

.....  
and  
.....  
and  
.....

being represented by the Joint Enterprise representative as designated in Article E below, desire to participate jointly in the Bidding and the Execution of this project;

NOW IT HAS BEEN AGREED UPON, AND DECIDED:

A. To appoint ..... for this project as Sponsoring Member/Leading Enterprise to represent and to act "FOR AND ON BEHALF" of the Joint Enterprise and to sign in its name all documents, including the Bid and the Contract.

B. That ..... as Sponsoring Member/Leading Enterprise shall hold itself responsible for the Works and the execution of the Contract in case of Award and shall hold the Ministry of Transport, and its authorised executing agency Projects Management Unit Thang Long blameless for all consequences and damages in case of any claim by any third party, forthcoming from the Works and the execution of the Contract.

\* *Enterprise shall be understood to mean any business unit established for the purpose of carrying on business activities or undertakings.*

C. That regardless of what is stated in Clause A and B above,

.....  
and  
.....  
and  
.....

have agreed together that in case of Award they are and shall remain jointly and severally liable for their respective and joint obligations pursuant to the Contract.

D. That the interest of each enterprise in the Joint Enterprise will be as follows:

..... (..... per cent)  
..... (..... per cent)  
..... (..... per cent)

and that each enterprise will participate in these same proportions in the expense and in the profit and loss of the Joint Enterprise These partnership proportions will not be modified throughout the whole period of the Contract except with the prior written approval of the Employer and the joint written agreement of the participating enterprises Irrespective of the relative size of the partnership proportions shown above, each of the enterprises, and also the Employer when necessary, shall have the right of full supervision of all aspects of the implementation of this agreement, including the right of full access to all documentation relevant to the execution of the Contract such as financial records, purchase orders, receipts, lists of plant, equipment and personnel, subcontract agreements, correspondence, telexes, etc.

E. That the Power to sign for and on behalf of the Joint Enterprise shall vest in the person of .....(name) in his capacity as .....(position) of ..... (company name) subject to prior written approval of the other parties to this Agreement regarding the contents of the documents to be signed and the conditions thereof.

- F. That this Agreement for a Joint Enterprise in the RED RIVER BRIDGE CONSTRUCTION PROJECT PACKAGE 4 will become operative with immediate effect upon receipt of the Notice of Award issued by the Ministry of Transport, through its authorised executing agency the Projects Management Unit Thang Long.
- G. That this Agreement shall automatically be null and void if the Contract is not awarded to the Joint Enterprise.
- H. That this Agreement for Joint Venture in the INFRASTRUCTURE IN RESETTLEMENT AREA PACKAGE 4 has been prepared in ..... copies, of which the first copy will be held by Ministry of Transport, Projects Management Unit Thang Long and the other copies given to the parties to this Agreement. All copies possess equal legal status and strength.

In witness whereof the participating parties have hereto placed their signature and seals at ....., on this ..... day of ..... 200 ....

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

For ..... (company name) .....(signature & seal)

.....(name and position of signatory)

Witnessed by : ..... (company name) .....(signature & seal)

.....(name and position of signatory)

DETAILED PRICE ANALYSIS  
FOR  
COST OF MATERIAL

Item :  
Unit :

Cost Element / Unit	Cost (Yen)		Cost (VND)	
	Yen/ Unit	Total Yen	VND/ Unit	Total VND
1. CIF Cost at Port / Quarry from .....				
2. Handling				
3. Transport to site (Km )				
4. Unloading, Storage, etc.				
5. Other Costs (describe)				
Sub-Total				
Overheads and Profit at the rate of .....%				
Total Price at Site				

Notes:- The above prices should include all taxes and duties except Vietnamese VAT.

**DETAILED UNIT PRICE ANALYSIS**

Pay Item No. : \_\_\_\_\_ Description : \_\_\_\_\_ Total Estimated Quantity as shown  
 Pay Item Unit : \_\_\_\_\_ Site Output : \_\_\_\_\_ in Bid Schedule:

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND)	
			Yen/Unit	Total	VND/Unit	Total
A. Equipment ( taken from Schedule of Rates and Prices )						
B. Labour ( taken from Schedule of Rates and Prices )						
C. Materials ( taken from Schedule of Rates and Prices )						
Sub Total						
[Overhead & Profit are already included in the above cost elements ]	-	-	-	-	-	-
Total (per site output)						
Total (per Unit)						

Exchange Rate : One Yen = ..... VND (as advised by the Employer)

UNIT PRICE - Use in Bid Schedule	Foreign Currency Comp.(¥)	Local Currency Comp.(VND)	Combined Total (VND)
Note : Quantity required for one unit of Pay Item			

DETAILED UNIT PRICE ANALYSIS

Pay Item No. : \_\_\_\_\_  
 Pay Item Unit : per. tonne  
 Description : Aggregate for A.C  
 Site Output : 50 tonne/hour  
 Total Estimated Quantity as shown in Bid Schedule: \_\_\_\_\_

Cost Element	Unit	Quantity	Foreign Cost (Yen)		Local Cost (VND) x 1000	
			Yen/Unit	Total	VND/Unit	Total
<b>A. Equipment</b> ( taken from Schedule of Rates and Prices )						
- A.M.P 80 t/h	h	1	18,950	18,950	1,200.0	1,200.0
- Wheel loader 100 HP	h	2	2,928	5,856	300.0	600.0
- Steel Roller 8 - 10 t	h	2	800.0	1,600.0	100.0	200.0
- Pn. Tyred Roller 12/20 t	h	1	6,050.0	6,050.0	450.0	450.0
- Asphalt Paver 68 HP	h	1	4,000.0	4,000.0	256.5	256.5
			36,456			2,706.5
<b>B. Labour</b> ( taken from Schedule of Rates and Prices )						
- Supervisor	h	1	600.0	600.0	30.0	30.0
- Operator	h	19	250	4,750.0	16.7	317.3
			5,350			347.3
			41,806			3,053.8
<b>C. Materials</b> ( taken from Schedule of Rates and Prices )						
- Aggregate	tonne	50	1,100	55,000.0	54.0	2,700.0
- Wastage ( estimated for this example as 5% )	tonne	0.05		2,750.0		135.0
- Haulage	tonne	1	11,250	11,250.0	750.0	750.0
			69,000			3,585.0
			110,806			6,638.8
<b>Sub Total</b>						
[ Overhead & Profit are already included in the above cost elements ]						
<b>Total (per site output)</b> 50 tonne/hour				110,806		6,638.8
<b>Total (per Unit)</b> 1 tonne				2,216		132.776

Exchange Rate : One Yen = ..... VND (as advised by the Employer) (Assume for this example One Yen = 110 VND)  
 Foreign Currency Comp.(¥) 2,216  
 Local Currency Comp.(VND) 132,776  
 Combined Total (VND) 376,536

UNIT PRICE - Use in Bid Schedule  
 Note : Quantity required for one unit of Pay Item

BANK GUARANTEE FOR BID

(BID BOND)

No. : .....

Whereas Bank \_\_\_\_\_ (Name of Bank) \_\_\_\_\_  
having a registered office located at \_\_\_\_\_ (city) \_\_\_\_\_, with a branch office located at \_\_\_\_\_ (city) \_\_\_\_\_ and  
hereinafter called the "BANK", on the request of \_\_\_\_\_ (Name of Firm / Bidder) \_\_\_\_\_  
\_\_\_\_\_ having a registered address at \_\_\_\_\_ (full  
address) \_\_\_\_\_

\_\_\_\_\_ hereinafter called the  
"BIDDER", for the interest of the Ministry of Transport of the Socialist Republic of  
Vietnam through their authorised executing agency referred to as Projects Management Unit  
Thang Long, hereinafter called the "EMPLOYER", hereby guarantees as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the full amount of US\$ \_\_\_\_\_ ( \_\_\_\_\_ United States Dollars) if, in the opinion of the EMPLOYER, the BIDDER should fail to fulfil his obligations in accordance with the Instructions to Bidders for the Contract for \_\_\_\_\_ (Name of Project) \_\_\_\_\_ for which bids are to be received by the EMPLOYER on \_\_\_\_\_ at \_\_\_\_\_
2. This Bank Guarantee shall be valid for the full period of \_\_\_\_\_ ( \_\_\_\_\_ ) calendar days from \_\_\_\_\_ (date) \_\_\_\_\_ until \_\_\_\_\_ (date) \_\_\_\_\_
3. In accordance with the provisions of the Instructions to Bidders referred to in item 1, any claim on this Bank Guarantee as a result of the default by the BIDDER shall be made by written application from the EMPLOYER promptly after such default has arisen. The BANK guarantees to pay the full amount of this Bid Bond mentioned in item 1 to the EMPLOYER promptly and within seven (7) working days after having received a written claim from the EMPLOYER.
4. A claim may be served by the EMPLOYER up to thirty (30) calendar days after the Bank Guarantee expiry date mentioned in item 2.

\_\_\_\_\_, \_\_\_\_\_ 200 \_\_\_\_\_

Bank .....

(BIDDER'S NAME AND ADDRESS TO BE CLEARLY SHOWN AT TOP OF LETTER)

To :

Bidding Committee  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI** Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA**

Gentlemen,

We submit herewith the original and three copies of our Bid for the above mentioned Contract Package.

We confirm that each of the four attached envelopes contains a full set of correctly completed Bid documents as listed in the "Checklist of Documents to be Submitted".

Yours faithfully,

.....  
Authorized Representative

ORIGINAL Bid and three COPIES of Bid

received at ..... hours on .../... 200... by :

.....  
Bidding Committee Official



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 - INFRASTRUCTURE IN RESETTLEMENT AREA**

**ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
PROJECT MANAGER/GENERAL SUPERINTENDENT**

1. Full name of Project Manager/General Superintendent \_\_\_\_\_  
(Delete title not applicable) \_\_\_\_\_

2. Nationality \_\_\_\_\_

3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Full details of past experience with particular reference to work on similar projects.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

(\*) To be inserted by the Contractor

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA  
ADDITIONAL DETAILS OF CONTRACTOR'S SENIOR STAFF  
(TECHNICAL MANAGER/CO-PROJECT MANAGER/DEPUTY GENERAL SUPERINTENDENT)**

- \* Co-project Manager)
1. Full name of \*Technical Manager) \_\_\_\_\_  
\*Deputy General Superintendent)
  
  2. Nationality \_\_\_\_\_
  
  3. Full details of qualifications \_\_\_\_\_  
(giving dates, places, etc.) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
  
  4. Full details of past experience with particular reference to work on similar projects.  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date \_\_\_\_\_

Signature of Contractor \_\_\_\_\_

\*Delete title not applicable.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA  
CONSTRUCTION EXPERIENCE**

DETAILS OF CONSTRUCTION CONTRACTS OVER THE LAST FIVE YEARS  
AND FOR WORKS IN PROGRESS

*(Use a separate sheet for each contract)*

Number of Contract

---

Name of Contract

---

Name of Employer

---

Employer's Address

---

Nature of works and special features relevant to this contract

---

Contract role (check one)

- Sole Contractor       Main Contractor       Partner in Joint Enterprise/Consortium

---

Contract Sum	CURRENCY	SUM
.....	.....	.....
.....	.....	.....

---

Date of commencement of work

---

Date of completion if already finished

---

Progress to date for on going project (%)

---

Construction Period (days)

---

Scope of Work	Bridge work :	..... total metres span
	Road work :	..... kilometre length

LIST OF PORTION OF THE WORK PROPOSED  
TO BE SUB CONTRACTED

PAY ITEM NO.	DESCRIPTION OF PAY ITEM	PERCENT OF PAY ITEM TOTAL PRICE (%)	PERCENT OF TOTAL BID SUM (%)

Signature of Contractor \_\_\_\_\_

Date \_\_\_\_\_

**DECLARATION FORM R1 FOR NOTIFICATION OF ILLEGAL PRACTICES**

<b>CONFIDENTIAL</b>	
<b>R1</b>	<b>Tendering Procedure</b>

To : The General Director  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**DECLARATION**

I, the below mentioned :

Name : \_\_\_\_\_ Company : \_\_\_\_\_

Occupation : \_\_\_\_\_

truthfully state in good conscience that in the Prequalification/Tendering of the following Government contract:

Name of Contract : \_\_\_\_\_

Directorate/Project : \_\_\_\_\_

a number of illegal events have occurred as shown in the table on this declaration form.

PHASE		PROCEDURAL STEPS	ILLEGAL PAYMENT REQUEST		
			TOTAL	REQUESTED BY	NAME OF HIGH GOVERNMENT OFFICIAL USED
Pre-qualification		1. Obtaining Documents 2. Submitting Documents 3. Evaluation			
Tendering	Bid Submission	4. Invitation to Bid 5. Issue of Documents 6. Clarification 7. Submission of Bids			
	Bid Evaluation	8. Opening of Bids 9. Bid Evaluation 10. Negotiation 11. Recommendation of Winners 12. Final Evaluation 13. Selection of Winners			
	Contract Preparation	14. Clarification 15. Signing of Contract 16. Submission of Performance Bond			
Other		217. 18.			

- Notes :
- You must sign this declaration for it to be considered valid
  - Please submit the original copy and keep a 2nd copy for your own file
  - When you submit this declaration ask for a receipt from the official who receives it

I have written this Declaration form most conscientiously, truthfully, with responsibility and not with any malicious intent to bring disgrace upon anybody, and I agree to bear all consequences in the event that this declaration proves to be false.

Signed in ..... this .....day of .....200 .....

\_\_\_\_\_  
(Signature)

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI Viet nam**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise) duly organized and existing  
under the laws of the SOCIALIST REPUBLIC OF VIETNAM hereby duly authorize and extend  
complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the Enterprise.

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Enterprise seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_

\_\_\_\_\_  
(name of Enterprise and seal)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

Witnessed By

\_\_\_\_\_  
\_\_\_\_\_  
(seal)

\* GUIDE FORM PA-1:

For use by a sole Enterprise (Vietnamese or Foreign) who is  
already organised and existing in Vietnam, to authorise signature.

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
**HA NOI Viet nam**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA  
POWER OF ATTORNEY**

Know all men by these presents, that we \_\_\_\_\_  
\_\_\_\_\_ (name of Enterprise ) of  
\_\_\_\_\_ (name of Country) hereby duly authorize and  
extend complete POWER OF ATTORNEY to the following named person to sign all documents  
concerning proposals, bid, negotiations, contract and other documents as may be necessary, for  
and on behalf of the above named Enterprise

Name in Full	Title	Signature
_____	_____	_____

In witness whereof the undersigned made this Power of Attorney under their legal signatures and  
Company seals on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_\_

\_\_\_\_\_  
(name of company and seal)

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_  
(name)

Signed : \_\_\_\_\_  
(name)

\_\_\_\_\_  
(title)

\_\_\_\_\_  
(title)

Witnessed by

\_\_\_\_\_  
(seal)

**\*\* GUIDE FORM PA-2:**

For use by Foreign Investor who proposes to proceed on the basis  
of 100% Foreign Owned Capital to establish an Enterprise or to  
form a Contractual Business Cooperation Agreement.

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport,  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HA NOI Viet nam

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA  
POWER OF ATTORNEY**

Know all men by these presents, that I/we \_\_\_\_\_  
\_\_\_\_\_ (name and title of authorised representative)

of \_\_\_\_\_ (name of first enterprise) appointed  
representative(s) of the said Enterprise duly organised and existing under the laws of the SOCIALIST  
REPUBLIC OF VIETNAM and \_\_\_\_\_ (name and title of  
authorised representative of second enterprise) of \_\_\_\_\_ (name  
of second enterprise) appointed representative(s) of the said Enterprise duly organised and  
existing under the laws of \_\_\_\_\_ (country) hereby duly  
authorize and extend complete POWER OF ATTORNEY to the following named person to sign  
all documents concerning proposals, bid negotiations, contract and other documents as may be  
necessary, for and on behalf of the \_\_\_\_\_  
(name of Joint Enterprise that is either existing or proposed in accordance with the Affidavit  
Agreement)

Name in Full

Signature

\_\_\_\_\_

\_\_\_\_\_

Title \_\_\_\_\_

In witness whereof the undersigned made this Power of Attorney under legal signature and  
Company seal on this \_\_\_\_\_ day of \_\_\_\_\_ 200\_\_

\_\_\_\_\_  
(name of company and seal)

Signed : \_\_\_\_\_

(name) \_\_\_\_\_ (title) \_\_\_\_\_

Witnessed by

\_\_\_\_\_ (seal)

\*\*\* GUIDE FORM PA-3.

For use by Joint Venture/Enterprises that either exist or are  
proposed in accordance with the Affidavit Agreement for Joint  
Enterprise.



BANK GUARANTEE FOR CONTRACT PERFORMANCE

(PERFORMANCE BOND)

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ ( the works ) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bank Guarantee to warrant his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :

(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

---

2. If, in the opinion of the EMPLOYER, the CONTRACTOR has failed to meet his obligations under the contract, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.

3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
  
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER has issued the Provisional Handover Certificate as required under the terms of the CONTRACT.

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the BANK by \_\_\_\_\_

( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

## BOND FOR CONTRACT PERFORMANCE

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at \_\_\_\_\_ (address) \_\_\_\_\_, hereinafter called the "CONTRACTOR", will enter into an agreement for \_\_\_\_\_ (the works) \_\_\_\_\_, hereinafter called the "CONTRACT" with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of the CONTRACT the CONTRACTOR is required to give the EMPLOYER a Bond to guarantee his satisfactory performance in accordance with the terms and conditions of the CONTRACT.

**now THEREFORE**, by this Bond, we \_\_\_\_\_ (Name of Bonding or Insurance Company) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ (address) \_\_\_\_\_ and with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ hereinafter called the "SURETY", on the request of the CONTRACTOR agree that we are held and firmly bound unto the EMPLOYER in the sum of \_\_\_\_\_ ( name of currency and amount ) \_\_\_\_\_ for the payment of which sum we hereby bind ourselves and our successors.

**the CONDITION** of this Bond is such that if the CONTRACTOR shall duly perform and observe all the terms and conditions, provisions, conditions and stipulations of the said CONTRACT on the CONTRACTOR's part to be performed and observed according to the true purport intent and meaning thereof, or if on default by the CONTRACTOR, the SURETY shall satisfy and discharge the damages sustained by the Employer thereby up to the amount of this Bond as written above then this obligation shall be null and void. Otherwise, this Bond shall be and remain in full force and effect and the EMPLOYER may demand immediate and full settlement of the above sum from the SURETY without further discussion or prior notice.

It is understood and agreed that none of the following events shall in any way release the SURETY from our liabilities to the EMPLOYER under this Bond:

- 1) any alteration in the terms of the CONTRACT made by agreement between the EMPLOYER and the CONTRACTOR.
- 2) any change in the extent or nature of the Works as given in the signed CONTRACT.

- 3) any allowance of time by the EMPLOYER under the CONTRACT, or
- 4) any forbearance or forgiveness in respect of any matter or thing concerning the CONTRACT by the EMPLOYER or the Engineer appointed to supervise the WORKS..

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

Signed and Sealed on behalf of the SURETY by \_\_\_\_\_

( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

## BANK GUARANTEE

FOR

(Name of Currency) ADVANCE PAYMENT

No. : .....

**WHEREAS** \_\_\_\_\_ (Name of Contractor) \_\_\_\_\_ having a registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_, hereinafter called the "CONTRACTOR", has entered into a contract for \_\_\_\_\_ ( the works ) \_\_\_\_\_ with the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long, hereinafter called the "EMPLOYER".

**and WHEREAS** under the terms of their contract the EMPLOYER will make an Advance Payment to the CONTRACTOR to facilitate the construction of the works. Prior to release of this Advance Payment, the CONTRACTOR is required to submit a Bank Guarantee to the EMPLOYER for the full amount of the Advance due to be received by him. The Advance Payment will be recovered by the EMPLOYER making deductions from sums due to the CONTRACTOR under the Monthly Certificates. The Bank Guarantee to be held by the EMPLOYER may therefore later be replaced by an equivalent guarantee for such lower sum as equals or exceeds the Advance Payment still remaining with the CONTRACTOR at that time.

**now THEREFORE**, we \_\_\_\_\_ ( Name of Bank ) \_\_\_\_\_ having our registered office located at \_\_\_\_\_ ( address ) \_\_\_\_\_ with a branch office located at \_\_\_\_\_ (address) \_\_\_\_\_ and hereinafter called the "BANK", on the request of the CONTRACTOR hereby guarantee as follows :

1. The BANK shall be firmly bound unto the EMPLOYER for the payment of the ( name of currency ) amount of :

(in figures) \_\_\_\_\_ (in words) \_\_\_\_\_

\_\_\_\_\_

2. If, in the opinion of the EMPLOYER, the CONTRACTOR should wilfully fail to achieve the works progress as mutually agreed under the terms of their contract, or shall have utilized any part of the Advance for purposes other than the above works, the EMPLOYER shall be entitled to request the BANK for the payment in full of the above amount.
  
3. Within seven (7) days of the EMPLOYER's written request for the above sum, the BANK will, without query, remit the full amount as given over, to the account as requested by the EMPLOYER.
  
4. This Bank Guarantee shall be valid from the date of issue as given below, until the EMPLOYER confirms in writing that the total amount of the Advance Payment has been recovered by him or until this Guarantee is replaced by such replacement guarantee as is acceptable to the EMPLOYER.

Dated this \_\_\_\_ day of \_\_\_\_\_, 200\_\_.

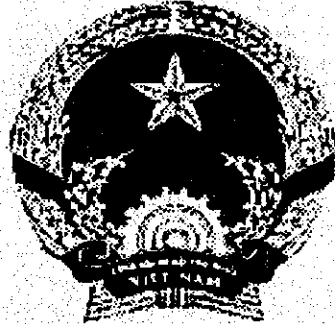
Signed and Sealed on behalf of the BANK by \_\_\_\_\_

\_\_\_\_\_  
( Signature )

\_\_\_\_\_  
( Name )

\_\_\_\_\_  
( Position )

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE**  
**PACKAGE 2 : GIA LAM SECTION**  
**PACKAGE 3 : THANH TRI SECTION**  
**PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

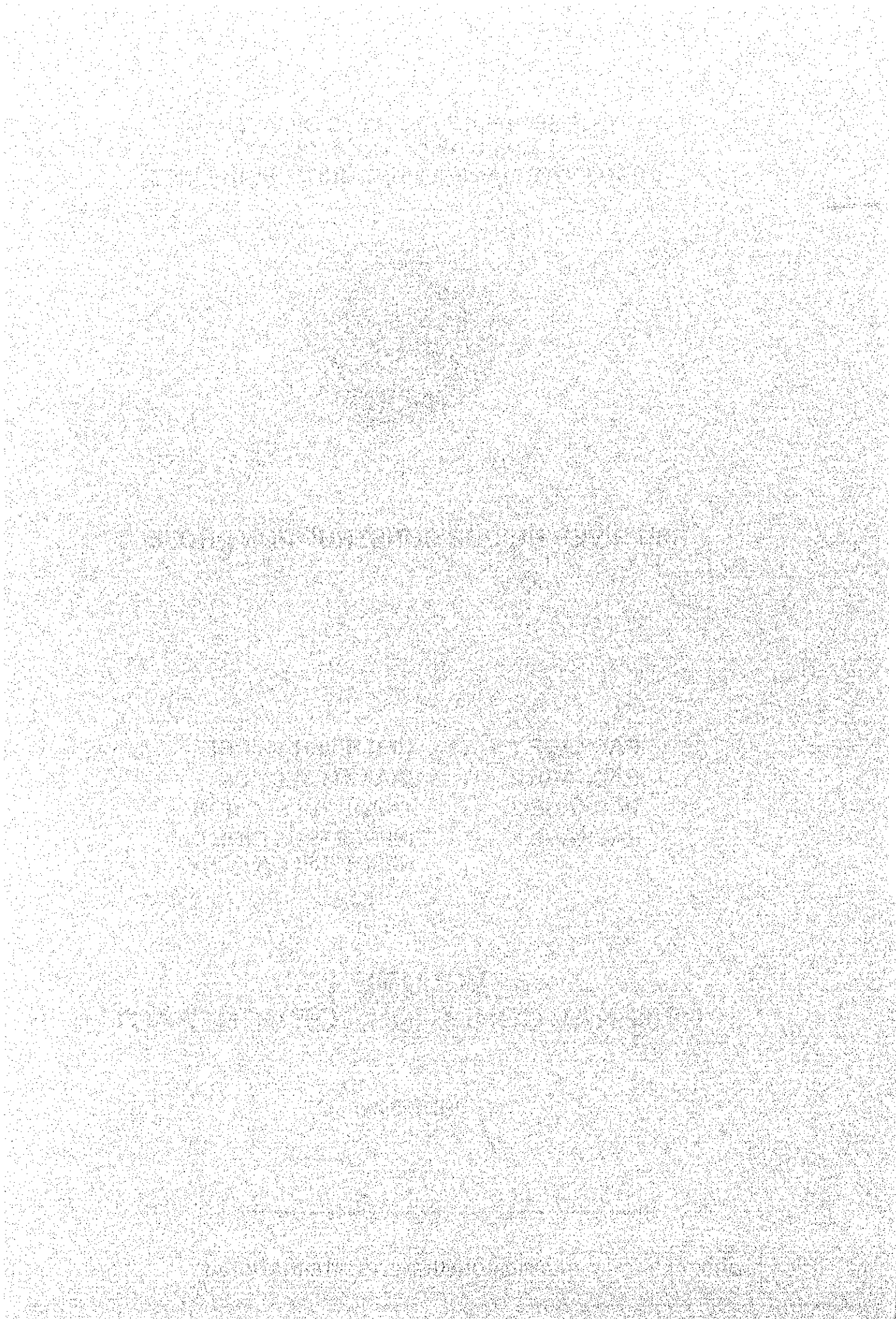
**VOLUME I  
GENERAL CONDITIONS OF CONTRACT**

**JUNE 2000**

---

**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**





**GENERAL CONDITIONS OF CONTRACT**

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## GENERAL CONDITIONS OF CONTRACT

### DEFINITIONS AND INTERPRETATIONS

#### G.01 (1) Definitions and Interpretations

Wherever in these General Conditions of Contract or in other Contract Documents the following terms or pronouns in place of them are used, the intent and meaning shall be interpreted as follows :

<u>AASHTO</u>	The American Association of State Highway and Transportation Officials. Reference to AASHTO. shall refer to the last revision of the specification or method of test at the time the project was bid, except where the specific revision is nominated in the Contract Documents.
<u>ADDENDUM</u>	A written agreement between Employer and Contractor formalizing a change in the Contract Documents initiated directly by the Employer or by a Change Order issued by the Engineer. Addenda shall be made whenever additional Pay Item Unit Prices or other sums are agreed, or the Contract Sum is varied from the amount entered in the Contract Agreement or preceding Addenda, or whenever significant contractual or technical changes occur.
<u>APPROVED</u>	Approved means approved in writing, including subsequent written confirmation of previous verbal approval and approval means approval in writing including as aforesaid.
<u>ASTM</u>	The American Society for Testing and Materials. Reference to ASTM shall refer to the last revision of the specification or method of test at the time the project was bid, except where the specific revision is nominated in the Contract Documents.
<u>AWARD</u>	The written acceptance of a Bid by the Employer.
<u>BID</u>	The offer of a Bidder submitted on the prescribed forms to perform the Works and to furnish all labour and materials and equipment at the quoted Pay Item Unit Prices or Sums.
<u>BID BOND</u>	The security furnished with a Bid as a guarantee that the Bidder will enter into the Contract if his Bid is accepted.
<u>BID SCHEDULE</u>	Bid Schedule means the tabulated forms on which are stated the Pay Item number, description, unit and estimated quantity of work to be performed, and on which the Bidder enters the Unit Prices and computes the total bid prices for each Pay Item and Section of work in making his Bid.
<u>TOTAL BID SUM</u>	The total sum named in the Bid (comprising of a local currency component and a foreign currency component).

BIDDER An individual company, partnership, joint-venture, corporation, joint-operation or consortium pre-qualified by the Employer, submitting a Bid.

BIDDING COMMITTEE The Committee, duly appointed by the Employer, in charge of receiving, opening and evaluating the Bids.

CHANGE ORDER A written order issued by the Engineer, accepted by the Contractor and approved by the Employer covering additional instructions, quantity variations or changes to the Works or the Contract documents. Change Orders shall establish the basis of payment and any time adjustment required as a result of the additional instructions, variations or changes.

COMMENCEMENT OF WORKS DATE The commencement of works date shall be stated in the Notice to Proceed and shall be not more than thirty (30) days after issuing the Notice to Proceed by the Employer, or in the case where site take-over being part of the conditions for commencement of works takes place after this date, this latter date will define the commencement of works date, and shall be the starting date of the Construction Period.

COMPLETION DATE The date upon which the Works are considered to be completed. This date is the date of issuing a Certificate of Final Completion by the Employer.

CONSTRUCTION PERIOD The scheduled period in days from Commencement of Works Date during which the Contractor has to substantially complete the Works for Provisional Hand-Over. This period is defined as the number of days given in the Contract Agreement plus any authorized time extensions.

CONSTRUCTION PLANT Construction Plant means all machinery, equipment or things of whatsoever nature required in or about the execution, completion or maintenance of the Works or Temporary Works but does not include materials or other things intended to form or forming part of the Permanent Works.

CONTRACT The legal written agreement between the Employer and the Contractor setting forth the obligations of the respective parties under the Contract, including, but not limited to, the administration of the Contract, the execution and performance and warranty of the Works, the furnishing of Drawings, labour, materials and equipment, and the basis of payment and determination of the Contract Sum.

The Contract includes all documents and forms which are defined as Contract documents in the Instructions to Bidders. The Contract documents include those documents issued during the Bidding Period and also written agreements which



are established subsequently to provide for completion of the Works in an acceptable manner.

CONTRACT PERIOD

The number of days scheduled for completion of the works, including authorized time extensions. This period consist of a Construction Period terminating on the date of the Provisional Hand-Over and a Warranty Period commencing on the date of the Provisional Hand-Over.

CONTRACT SUM

The total sum named in the Contract Agreement (comprising a Local currency component and a Foreign currency component) subject to such additions thereto or subtractions therefrom as may be made by subsequent Addenda under the provisions of the Contract during the course of the Contract Period that change its value.

CONTRACTOR

Contractor shall mean the company, partnership, joint-venture, joint-operation, consortium or corporation whose Bid has been accepted by the Employer and includes the Contractor's authorized representatives, successors and permitted assigns.

DATE OF CONTRACT SIGNING

Means the date of signing of the Contract by the Employer.

DAY

Means a calendar day in accordance with the Gregorian calendar, including Sundays and Holidays, beginning and ending at midnight.

DRAWINGS

Drawings means the drawings referred to in the Contract Documents and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time be furnished or approved in writing by the Engineer.

EMPLOYER

Means the Ministry of Transport of the Socialist Republic of Vietnam through their authorised executing agency referred to as Projects Management Unit Thang Long.

ENGINEER

Means the person appointed as the duly authorized representative of the Employer acting within the scope of the particular duties and authority assigned to him by the Employer. This person is the Project Manager who may be assisted by a Resident Engineer and /or an advisory team or supervising body as required.

ENGINEER'S REPRESENTATIVE

Means the Resident Engineer and /or any advisory team or supervising body that may appointed from time to time by the Engineer (Project Manager) with delegated authority to assist him and to perform all or certain of the duties set forth in Clause G.02 of these General Conditions of Contract.

The status and authority of the Engineer's Representative as well as any changes in status and authority delegated by the Engineer from time to time shall be notified in writing to the Contractor by the Engineer.

GENERAL SPECIFICATIONS

Volume II of the Contract Documents in accordance with which items of work shall be performed.

GENERAL SUPERINTENDENT

The executive representative of the Contractor authorized to receive and fulfill instructions from the Engineer and to supervise and direct the execution of the Works.

INSTRUCTION

A formal written order, or an informal written order subsequently confirmed formally, issued by the Engineer to the Contractor requiring work to be performed in accordance with the Contract. Such instructions will include, but shall not be limited to, orders to start, stop and resume work, orders to perform work under any contingent item in the Contract and orders which define the precise requirements for items within the scope of work that were not originally defined in detail in the Contract documents. Such instructions do not require the Contractor's agreement and shall not be used for orders which involve any variations in the basis of payment or in the Contract documents.

INSPECTOR

The Engineer's authorized representative assigned to make detailed inspections for contract compliance.

JIS

Japanese Industrial Standards.

MAJOR PAY ITEM

Refers to any "Pay Item", as defined elsewhere in this Clause, which may have, at any time during the entire period of the Contract, a value based on the product of the Unit Price and the current estimated quantity of work which is equal to or greater than 5 (five) percent of the current Contract Sum. The Unit Price of any such designated Major Pay Item may, when provided for in the applicable Clauses of these General Conditions of Contract be subject to adjustment due to a change in the estimated quantity of the Pay Item in excess of 20 (twenty) percent of the original quantity stated in the Contract documents.

MINOR PAY ITEM

Refers to any "Pay Item", as defined elsewhere in this Clause which has, at all times during the entire period of the Contract, a value based on the product of the Unit Price and the current estimated quantity of work which is less than 5 (five) percent of the current Contract Sum. The Unit Price of all such designate Minor Pay Items shall not be subject to adjustment due to a change in the estimated quantity of the Pay Item.

NOTICE TO PROCEED

Written notice from the Employer to the Contractor to proceed with the Works, initiated with the site take-over. The Contractor shall not commence the Works without this notice.

PAY ITEM

A specifically described unit of work for which a Unit Price or Sum is provided in the Bid Schedule, and by which payments are made to the Contractor for the number of actual units of work performed.

PERFORMANCE BOND

The security furnished by the Contractor as his surety to guarantee performance of the Works in accordance with the Contract.

PERMANENT WORKS

Permanent Works shall mean such parts of the works as are required under the Contract to be completed by the Contractor for the Employer's acceptance.

PRODUCTS

Products means materials, machinery, equipment and fixtures forming part of the Permanent Works but does not include materials, machinery and equipment used for preparing, conveying and installing the Works normally referred to as Construction Plant, Equipment and Materials.

PROVISIONAL SUM

Shall mean a sum included in the Contract and so designated in the Bid Schedule for the execution of any part of the Works or for the supply of goods, materials, plant or services or for contingencies, which sum may be used, in whole or in part, or not at all, on the instructions of the Engineer. The Contractor shall be entitled to only such amounts in respect of the work, supply or contingencies to which such Provisional Sum(s) relate as the Engineer shall determine in accordance with this definition.

RIGHT-OF-WAY

The right-of-way is the land to be acquired for and devoted to the Road. The right-of-way widths shown on the Drawings are approximate only, the effective width to be established by the Employer.

SCHEDULE OF RATES AND PRICES

A tabulated form included in the Bid Schedule, containing items and blank spaces for unit Bid Rates and Prices to be affixed by the Bidder and to be applied only when, in the opinion of the Engineer, it is necessary or desirable that any additional or substituted work shall be executed on a day-work basis.

SITE

Site means the lands and other places, on, under, in or through which the Works are to be executed or carried out and any other lands or places provided by the Employer for the purposes of the

Contract together with such other places as may be specifically designated in the Contract as forming part of the Site.

SPECIAL SPECIFICATIONS

Additions and revisions to the General Conditions of Contract and General Specifications, covering conditions peculiar to an individual project.

SUBCONTRACTOR Subcontractor means a person or persons, or organization to whom the Contractor subcontracts part of the Works under the Contract.

TEMPORARY WORKS

Temporary Works means all temporary works of every kind required in or about the execution, completion or warranty of the Works.

WARRANTY PERIOD

The period from the Provisional Hand-Over date accepted by the Employer, to the completion of the Contract Period, which period shall be that defined in the Contract Agreement.

WORKING DRAWINGS

Working Drawings means the drawings furnished by the Contractor and approved in writing by the Engineer to supplement the Drawings furnished by the Employer or the Engineer as may be necessary to adequately control the Works.

WORKS

The Permanent Works and the Temporary Works or either of them as appropriate. The Works shall cover the construction of expressway, frontage road and ancillary works in the Contract Documents of the Project and carrying out of all the duties and obligations imposed by the Contract upon the Contractor.

G.01 (2) Singular and Plural

Words importing the singular only also include the plural and vice versa where the context requires.

## ENGINEER

### G.02 (1) Authority of the Engineer

The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress and sequencing of work; all questions which may arise as to the interpretation of the plans and specifications; all questions as to the acceptable fulfillment of the Contract on the part of the Contractor.

The Engineer will have the authority to suspend the Work wholly, or in part due to the failure of the Contractor to correct conditions unsafe for the workmen, or the general public; for failure to carry out the provisions of the Contract; for failure to carry out job instructions; for such periods as he may deem necessary due to unsuitable weather; for conditions considered unsuitable for the execution of the work, or for any other condition or reason deemed to be in the public interest.

### G.02 (2) Authority and Duties of the Engineer's Representative

The Engineer may from time to time in writing delegate to the Engineer's Representative any of the powers and authorities vested in the Engineer and shall furnish to the Contractor a copy of all such written delegations of powers and authorities.

As the direct representative of the Engineer they have immediate charge of the engineering and technical details of the Contract, and their duties are to watch and inspect the Works on behalf of the Engineer and to test and examine any materials to be used. They are responsible for the administration and satisfactory completion of the Work, and have the authority to approve satisfactory works and materials, and to reject unsatisfactory works and defective material and suspend any work that is being improperly performed. They shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract or, except as expressly provided hereunder or elsewhere in the Contract, to order any work involving delay or any extra payment by the Employer or to make any variation of or in the Works.

Any written instruction or approval given by the Engineer's Representative to the Contractor within the terms of such delegation (but not otherwise) shall bind the Contractor and the Employer as though it had been given by the Engineer, provided always as follows:

- (a) Failure of the Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal or breaking up thereof.
- (b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative he shall be entitled to refer the matter to the Engineer who shall thereupon confirm, reverse or vary such decision.

### G.02 (3) Emergency Powers of the Engineer's Representative

Notwithstanding the provisions of sub-clause (2) of this Clause, if in the opinion of the Engineer's Representative an emergency occurs affecting the safety of life or of

the Works or of adjoining property, he may direct the Contractor to carry out all such work or to do all such things as may be necessary in the opinion of the Engineer's Representative to abate or reduce the risk. The Contractor shall forthwith comply without appeal with any such direction of the Engineer's Representative.

G.02 (4) Engineer to Act Impartially

Whenever, under the Contract, the Engineer is required to exercise his discretion by:

- (a) giving his decision, opinion or consent,
- (b) expressing his satisfaction or approval,
- (c) determining value, or
- (d) otherwise taking action which may affect the rights and obligations of the Employer or the Contractor.

The Engineer shall exercise such discretion impartially within the terms of the Contract and having regard to all the circumstances. Any such decision, opinion, consent, expression of satisfaction, or approval, determination of value or action may be opened up, reviewed or revised as provided in Clause G.67.

## ASSIGNMENT AND SUBLETTING

G.03 (1) Assignment by Contractor

The Contractor shall not assign the Contract or any part thereof or any benefit or interest therein or thereunder, (otherwise than by a charge in favour of the Contractor's bankers of any monies due or to become due under this Contract) without the prior approval of the Employer.

G.03 (2) Assignment by Subcontractor

Any Subcontractor shall not assign or sublet a Subcontract Agreement or any portion thereof.

G.04 (1) Subletting

The Contractor shall not sublet a greater total value than 50% of the Contract Sum. Except where otherwise provided by the Contract the Contractor shall not sublet any part of the Works without the prior approval of the Employer and such approval if given shall not relieve the Contractor from any liability or obligation under the Contract, particularly in respect of the provision of superintendence in accordance with Clause G.15, and he shall be responsible for the acts, defaults and omissions of any subcontractor, his agents, servants or workmen, as fully as if they were the acts, defaults or omissions of the Contractor, his agents, servants or workmen. Provided always that the provision of labour on a piece-work basis shall not be deemed to be a subletting under this Clause.

G.04 (2) Award of Subcontracts

Unless otherwise required by the Contract Documents or the Engineer, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Engineer in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work.

The Engineer will promptly reply to the Contractor in writing stating whether or not the Employer, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Engineer to reply promptly shall constitute notice of no reasonable objection.

The Contractor shall not contract with any such proposed person or entity to whom the Engineer has made reasonable objection under the provisions of the above paragraph. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Engineer makes reasonable objection to such substitution.

G.04 (3) Sub-contractual Relations

By an appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Works to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and

responsibilities which the Contractor, by these Documents, assumes toward the Engineer and the Employer. The said agreement shall preserve and protect the rights of the Employer under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor - Subcontractor Agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Employer.

The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Clause, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents.



CONTRACT DOCUMENTS

G.05 Extent of Contract

The Contract comprises the preparation of working drawings and as-built drawings for all aspects of the Works under this Package, the construction, completion and warranty of the Works and, except in so far as the Contract otherwise provides, the provision of all labour, materials, construction plant, temporary works and everything, whether of a temporary or permanent nature, required in and for such construction, completion and warranty so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

G.06 (1) Language

The English language and the metric system of weights and measures shall be used in all correspondence and matters relating to the Contract. The Contractor's representative(s) shall be able to speak and understand English sufficiently well to be able to clearly make themselves understood by the Engineer, and in turn be able to clearly understand him.

G.06 (2) Documents Mutually Explanatory

Except if and to the extent otherwise provided by the Contract the provisions of the General Conditions of Contract shall prevail over those of any other Contract Documents.

Subject to the foregoing the several Contract Documents are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions directing in what manner the work is to be carried out.

The Contractor shall perform the work in accordance with the intent of Drawings and Specifications, and shall take no advantage of any error or omission in the Drawings or discrepancy between the Drawings and Specifications.

G.07 (1) Custody of Drawings

The drawings provided by the Employer shall remain in the sole custody of the Employer, but two copies (A3) thereof shall be furnished to the Contractor free of cost by the Employer. The Contractor shall provide and make at his own expense any further copies required by him or pay at a standard rate laid down from time to time by the Employer for further copies. At the completion of the Contract, the Contractor shall return to the Employer all drawings provided under the Contract. The Contractor shall give adequate notice in writing to the Engineer of any further drawings or specifications that may be required for the execution of the Works or otherwise under the Contract.

G.07 (2) One Copy of Drawings to be Kept on Site

One copy of the Drawings furnished to the Contractor or as aforesaid shall be kept by the Contractor on the Site and the same shall at all reasonable times be available for inspection and use by the Engineer and by any other person authorized by the Engineer in writing.

G.07 (3) Drawings Required by Contractor

The Contractor shall give written notice to the Engineer whenever planning or progress of the Works is likely to be delayed or disrupted unless any further drawing or order, including a direction, instruction or approval, is issued by the Engineer within a reasonable time. The notice shall include details of the drawing or order required and of what and by when it is required and of any delay or disruption likely to be suffered if it is late.

G.07 (4) Drawings Required from Contractor

The Contractor shall submit in duplicate to the Engineer for approval all design and working drawings, including those for Temporary Works which may be required in connection with the Contract, and any change or modification therein which the Engineer shall consider desirable shall be made and the work executed accordingly. Up to six sets of fully figured copies, black lines on white back ground, of such approved Drawings shall be furnished to the Engineer. Drawings shall be prepared using an approved version of "Auto-CAD" (Presently V14.0 for Windows) and disks ( CD or Opto-mechanical ) of the drawings shall also be furnished to the Engineer.

The Contractor shall also be responsible for the preparation and production in a manner suitable to the Employer of draft as-built drawings, plotted in A3 size, to be supplied to the Employer 15 days before the Provisional Hand over inspection. Final as-built drawings shall be submitted after the Provisional Handover inspection but before the Employer issues the Provisional Handover Certificate.

G.07 (5) Further Drawings and Instructions

It shall also be anticipated that revisions of drawings will be required by the Engineer during the Construction Period. Any deviation from the Drawings due to field conditions will be determined by the Engineer although the Contractor should draw the attention of the Engineer to such deviations at all times for consideration by the Engineer.

The Engineer shall have full power and authority to require the Contractor from time to time during the progress of the Works to supply such further drawings and the Engineer shall issue such instructions as shall be necessary for the purpose of the proper and adequate execution and warranty of the Works and the Contractor shall carry out and be bound by the same.

G.08 (1) Issuance of Instructions

Instructions may be issued by the Engineer for ordering the starting, stopping and resuming of work, for ordering work under any Pay Item in the Contract, for clarifying the Contract documents or for detailing the work requirements for Daywork or for other partially specified work items. Instructions may include detailed drawings, supplementary technical guidelines or such other information as is considered necessary by the Engineer to clarify the information already provided in the Contract Documents. Such Instructions will not, however, in any way change the Contract Documents or vary the quantity of work specified in the Bid Schedule. The implementation of contractual or quantity variations requires instead the issuance of Change Orders or Addenda, as provided under Clause G.51 of these General Conditions of Contract.

G.08 (2) Instructions to be in Writing

Instructions shall be issued by the Engineer in writing and the Contractor will immediately acknowledge receipt of any Instruction by signing and returning a copy of it to the Engineer. The Contractor shall be obliged to comply with all Instructions issued by the Engineer.

If for any reason the Engineer shall consider it desirable to give any such instruction verbally, the Contractor shall comply with the verbal order. All such verbal orders given by the Engineer shall be confirmed in writing within two (2) days, and the written confirmation, whether issued before or after the carrying out of the verbal order shall be deemed to be an instruction. Where such verbal order is confirmed in writing by the Contractor and such confirmation shall not be contradicted in writing by the Engineer, it shall be deemed to be an instruction within the meaning of this Clause.

G.08 (3) Contractor's Liability

No examination by the Engineer of any document submitted by the Contractor or of any Contractor's working drawings including those for Temporary Works, shops, sheds or any other temporary arrangements nor the approval expressed by the Engineer in regard thereto either with or without modifications shall absolve the Contractor from any liability imposed upon the Contractor by any provision of the Contract or for responsibility for his own errors.

G.09 Information not to be Divulged

None of the documents relating to the Contract shall be used by either of the parties hereto for any purpose other than the Contract and neither the Contractor, the Employer, the Engineer nor the Engineer's Representative shall divulge or use except for the purposes of the Contract any information contained in the Documents. No articles on the Works or photographs may be published unless with the prior written approval of the Employer.

## GENERAL OBLIGATIONS

### G.10 Contractor's General Responsibilities

The Contractor shall, subject to the provisions of the Contract, and with due care and diligence, execute and maintain the Works and provide all labour, including the supervision thereof, materials, construction plant and all other things, whether of a temporary or permanent nature, required in and for such execution and maintenance, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

The Contractor shall take full responsibility for the adequacy, stability and safety of all site operations and methods of construction. Provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for that part of the design or specification of the Permanent Works that has been prepared solely by the Engineer. Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall be fully responsible for that part of such Works, notwithstanding any approval by the Engineer.

However it is the Contractor's responsibility to notify the Engineer of any inadequacy or impropriety in the design which may come to his notice and at the same time to propose a suitable remedy.

### G.11 Contract Agreement

The Contractor shall, on receipt of the written Notice of Award enter into and affix his signature to the Contract Agreement within 15 days (or within such extended time limit as may be granted, such extension not to exceed 30 days) in accordance with the Form of Contract Agreement with such modifications as may be necessary. This agreement will then be signed by the appropriate signatories of the Employer.

### G.12 (1) Performance Bond

With due regard to all obligations of the Contractor under the Contract, the Contractor shall submit, before the signing of the Contract and within 15 (fifteen) days after the date of issue of the Notice of Award, or within such extended time limit as may be granted by the Employer, such extension not to exceed 30 (thirty) days Performance Bond(s) in the form of a Bank Guarantee for an amount equal to fifteen (15%) percent of the foreign currency component of the net Bid Sum, in Japanese Yen, and fifteen (15%) percent of the local currency component of the net Bid Sum, in Vietnamese Dong, issued by a State Bank, Private Bank or a Financial Institution as guarantee for the due performance of the Contractor in the construction and completion of the Works according to the requirements of the Contract. Alternatively, the Contractor may submit a Bond for Contract Performance issued by a Bonding/Insurance Company to the value of forty (40%) percent of the foreign currency component of the net Bid Sum, in Japanese Yen, and forty (40%) percent of the local currency component of the net Bid Sum, in Vietnamese Dong, as a guarantee for the due performance of the Contract.

Either alternative must be acceptable to the Minister of Finance of the Government of the Socialist Republic of Vietnam and shall be in form and substance and in all other respects satisfactory to the Employer.

If during the construction of the Works, the Contractor should fail to fulfill completely his obligations with respect to due performance under the Contract, then the Employer shall be entitled under the terms of the Performance Bond(s) and in accordance with the provisions of Clause G.63 of these General Conditions of Contract to demand the complete forfeiture of the guarantee in consequence of the default by the Contractor.

The Performance Bond(s) so submitted shall be valid for a period commencing on the date of signing of the Contract Agreement and terminating 30 (thirty) days after the date of Provisional Hand-over. For the purpose of establishing this validity period the Provisional Hand-over date shall be taken as the last day of the Construction Period as established in the Contract Agreement.

In the event that the Construction Period may be extended by the Employer in accordance with Clause G.44 of these General Conditions of Contract, or that the Contractor should fail to substantially complete the Works within the allotted time, or for any other reason, the Contractor shall, at least 60 days prior to the expiry of the Performance Bond(s), furnish to the Employer a Performance Bond(s) under the same conditions to cover the extended time required to substantially complete the Works. Failure by the Contractor to comply with the timing of this requirement will be cause for the Employer to demand forfeiture of the Performance Bond(s).

The cost of procurement of the said Performance Bond(s) and any required additional Bonds shall be in all respects at the expense of the Contractor.

The Employer shall return the Performance Bond(s) within the 30 (thirty) day period following the acceptance date of the Provisional Hand-over.

G.12 (2) Advance Payment Bond or Bonds

The Employer will make available to the Contractor an Advance Payment of 15 (fifteen) percent of the total Contract Sum entered in the Contract Agreement. The Advance Payment will be furnished in both local and foreign currencies by applying the above percentage to the respective local and foreign currency components of the Contract Sum.

The Advance Payment will be authorized by the Employer after the Contractor has furnished the required bank guarantees in the form of an Advance Payment Bond or Bonds which shall be submitted to the Employer within 15 (fifteen) days following the Contract signing. The Advance Payment Bond(s) shall consist of a bank guarantee issued by a State Bank or Private Bank or Financial Institution and shall be in form and substance and in all other respects acceptable to the Employer.

The Advance Payment Bond(s) shall be equal in value to the Advance Payment amount and shall have provision for subsequent replacement to reflect the value of repayments made, the arrangements for which are set out in Clause G.58(2) of these General Conditions of Contract. The cost of procurement of the Advance Payment Bonds and any replacements or adjustments thereof shall in all respects be at the expense of the Contractor. The Employer will return each of the Advance Payment Bonds when the full amount of the value of the Advance Payment for each of the respective currency components has been recovered or when a replacement Bond

is submitted which covers the amount of the Advance Payment which is still outstanding.

G.13 Work to be to the Satisfaction of Engineer

The Contractor shall execute, complete and warrant the Works in strict accordance with the Contract to the satisfaction of the Engineer and shall comply with and adhere strictly to the Engineer's instructions and directions on any matter (whether mentioned in the Contract or not), touching or concerning the works. The Contractor shall take instructions and directions only from the Engineer, except that the Engineer's Representative will be delegated certain duties and responsibilities on which he will direct and instruct the Contractor.

G.14 Programme to be Furnished

Within seven (7) days of the Notice of Award the Employer and Contractor shall meet and discuss the Progress Schedule submitted with the Bid, as well as Construction Plant and Contractor's staff. After this discussion, the Contractor shall prepare and request the approval of the following progress schedules :

- (a) Within 15 (fifteen) days of the date of the Notice of Award, the Mobilisation Program as required per the Special Specifications.
- (b) Within 15 (fifteen) days of the date of the Notice of Award, Construction Schedule showing the order of procedure and method in which the Contractor proposes to carry out the Works as required per the Special Specifications.

The Engineer, or the Employer, after reviewing the above mentioned programs and schedules, shall give final approval before the signing date of the Contract.

- (c) Within 15 (fifteen) days after signing the Contract Agreement a detailed Schedule showing the duration of the Total Project using a CPM (Critical Path Method) by which means the Contractor shall identify that single series of tasks that determine the shortest possible length of the project.

The Contractor shall, whenever required by the Engineer or by the Employer, furnish for information other particulars in writing of arrangements for the carrying out of the Works and of the Construction Plant and Temporary Works which it is proposed the Contractor intends to supply, use or construct as the case may be.

Submission to and approval by the Engineer or the Employer of programs and schedules and other particulars shall not relieve the Contractor of any of his obligations and responsibilities under the Contract.

G.15 Contractor's Superintendence

The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The name of the Contractor's representative or a competent and authorized agent hereinafter called the Contractor's General Superintendent will be submitted in the Bid and such agent shall be approved of in writing by the Engineer before the Commencement of Works, which approval may at any time be withdrawn, and is to be constantly on the Works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer, the Contractor shall, as soon as is practicable, having regard to the requirements of replacing him as hereinafter mentioned, after receiving written

notice of such withdrawal, remove the agent from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another agent approved by the Engineer. Such authorized agent or representative shall be proficient in the English language and shall receive, on behalf of the Contractor, directions and instructions from the Engineer.

The Contractor's General Superintendent shall possess the full authority of the Contractor to act on behalf of the Contractor on the Site.

G.16 (1) Contractor's Employees

The Contractor shall provide and employ on the Site in connection with the execution and warranty of the Works :

- (a) only such superintendents, engineers and technicians as are skilled and experienced in their respective calling and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise; and
- (b) such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and warranty of the Works.

The key personnel detailed in the Bid shall be approved by the Engineer before the Commencement of Works and shall always be available at the job site during the construction period. The Contractor may not remove or replace personnel detailed in the Bidding Documents from the Works without the written approval of the Engineer.

The Contractor may select staff of his own choosing, but is required to employ as many Vietnamese Nationals to key positions as possible so far as such personnel are qualified for the project.

In selecting his personnel, whenever possible, the Contractor is requested to hire qualified residents of the province in which the project is located.

All Contractor's local personnel, at all levels of employment shall be paid salaries in accordance with prevailing wage practices.

All obligations of the Contractor as stipulated in this Clause are also valid for all subcontractors.

G.16 (2) Objection to Employees

The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person employed by the Contractor in or about the execution or warranty of the Works who, in the opinion of the Engineer, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose employment is otherwise considered by the Engineer to be undesirable and such person shall not be again employed upon the Works without the written permission of the Engineer. Any person removed from the Works shall be replaced as soon as possible by a competent substitute approved by the Engineer.

G.17(1) Setting-Out

- (a) The Contractor, as soon as the site, or part thereof, has been handed-over, shall re-survey the whole alignment, taking new cross sections of the terrain under supervision of the Engineer. When this work has been completed, the Contractor shall draw the ground cross sections and ground profile and fix the grade line thereon based on the design drawings which he has received

from the Engineer. The profile shall be submitted to the Engineer for approval and endorsement. After the Engineer's approval, these profiles together with the already taken cross sections, shall become the basis of quantity calculations.

- (b) The Contractor shall be responsible for the true and proper setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing and for the correctness, subject as above mentioned, of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith.
- c) If, at any time during the progress of the Works, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer shall at his own expense rectify such error to the satisfaction of the Engineer.
- d) The checking of any setting-out or of any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all benchmarks, sight-rails, pegs and other things used in setting-out the Works.
- e) The Contractor shall be responsible for taking due care of electric and telephone lines, cables, poles, pipes, other utility lines and the like, and he shall give the Engineer timely notice in order to have these removed if required.
- f) The Contractor shall be deemed to have, prior to submitting his bid, thoroughly acquainted himself with the situation regarding utilities to be protected during his work and the need to facilitate the work of other utility contractors during the Contract Period.

**G.17(2) Latent Conditions**

Latent Conditions are:

- a. physical conditions on the Site or its surroundings, including artificial things but excluding weather conditions at the Site, which differ substantially from those which should have been anticipated by the Contractor at the time of the tender if a reasonably competent Contractor had:
  - i. examined all information made available in writing by the Employer to the Bidder for purposes of tendering; and
  - ii. examined all information relevant to the risks, contingencies and other circumstances having an effect on the tender and obtainable by the making of reasonable inquiries; and
  - iii. inspected the Site and its surroundings.
- b. any other conditions which the Contract specifies to be Latent Conditions.

If during the work under the Contract, the Contractor becomes aware of a Latent Condition the Contractor shall forthwith and were possible before the Latent Condition is disturbed, give written notice thereof to the Engineer.



If required by the Engineer, the Contractor shall provide to the Engineer a Statement in writing specifying:

- a. the physical conditions encountered and in what respects they differ materially;
- b. the additional work and additional resources which the Contractor estimates to be necessary to deal with the physical conditions;
- c. the time the Contractor anticipates will be required to deal with the physical conditions and the expected delay in achieving substantial completion;
- d. the Contractor's estimate of the cost of the measures necessary to deal with the physical conditions; and
- e. other details reasonably required by the Engineer.

Delay caused by Latent Condition may justify an extension of time for completion under clause G.44. If a Latent Condition causes the Contractor to:

- a. carry out additional work; or
- b. use additional Construction Plant; or
- c. incur extra cost, (including but not limited to the cost of delay or disruption which the Contractor could not have anticipated at the time of tendering a valuation shall be made under Clause G.52.

Regard shall not be had to additional work carried out, additional materials or additional Construction Plant used or extra cost, loss, expense or damages incurred more than 28 days before the date on which the Contractor gives the written notice of claim.

G.18 Boreholes and Exploratory Excavation

If, at any time during the execution of the Works, the Engineer shall require the Contractor to make boreholes or to carry out exploratory excavations, such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of Clause G.51 hereof, unless such anticipated work shall have been included in the Bid Schedule.

G.19 Watching and Lighting

The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or required by the Engineer or by any duly constituted authority for the protection of the Works or for the safety and convenience of the public or others.

The Contractor shall promptly and accurately report to the Engineer immediately upon receipt and discovery, any and all information or data, whether or not verified, relating to physical security incidents, crimes and misdemeanors, including but not limited to murder, voluntary or involuntary manslaughter, larceny, burglary, narcotics, dangerous drugs, destruction of Government property, fraud, sabotage, subversion, treason and espionage. The Contractor shall recognize and comply with all laws and regulations promulgated by the Government of the Socialist Republic of Vietnam.

G.20 (1) Care of Works

From the commencement to the completion of the Works the Contractor shall take full responsibility for the care thereof and of all Temporary Works and in case any damage, loss or injury shall happen to the Works, or to any part thereof or to any Temporary Works from any cause whatsoever, save and except the excepted risks as defined in sub-clause (2) of this Clause, shall, at his own cost, repair and make good the same, so that at completion the Works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer's instructions. In the event of any such damage, loss or injury happening from any of the excepted risks, the Contractor shall to the extent required by the Engineer and subject always to the provisions of Clause G.65 hereof, repair and make good the same as aforesaid at the cost of the Employer. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clause G.49 or G.50 hereof.

G.20 (2) Excepted Risks

The "excepted risks" are :

- a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, or unless solely restricted to employees of the Contractor or of his Sucontractors and arising from the conduct of the Works, riot, commotion or disorder, or
- b) use or occupation by the Employer of any portion of the Works in respect of which a Certificate of Final Completion under Clause G.59(1) has not been issued, or
- c) a cause solely due to the Engineer's design of the Works, or
- d) any such operation of the forces of nature as an experienced contractor could not foresee, or reasonably make provision for or insure against all of which are hereinafter collectively referred to as "the excepted risk".

G.21 Insurance of Works

Without limiting their obligations and responsibilities under Clause G.20 hereof, and before commencing the execution of the Works the Employer and the Contractor shall insure in their joint names against all loss or damage from whatever cause arising (other than a), b) and c) in the "excepted risks") in such manner that both parties are covered during the period of the construction of the Works and during the period of Warranty for loss or damage arising from a cause occurring prior to the commencement of the Period of Warranty and for any loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clause G.49 or G.50 hereof. Although the policies will be in joint names, the responsibility for arranging and paying for the various insurance policies shall be as follows:

- (a) the Employer shall insure the Works, the Temporary Works and all materials and plant to be incorporated therein to the full contract value plus an additional sum to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature;

it being understood that such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

- (b) the Contractor shall insure the construction plant and equipment and the construction machinery and other things brought on to the Site by the Contractor to the full value of such construction plant, equipment and machinery and other things.

Such insurance's shall be effected with insurers in terms approved by both the Employer and the Contractor (which approval shall not be unreasonably withheld) and both parties shall produce to the Engineer the policy or policies of insurance and the receipts for payment of current premiums before the Commencement of Works. All monies paid under any policy or policies of insurance shall be received for the purpose of replacing the materials or repairing or rebuilding all construction works which have been damaged or destroyed as certified by the Engineer and the balance, if any, shall be employed on completion of such replacement, repair or rebuilding. Both the Employer and the Contractor shall renew the policy or policies upon expiration during the Contract Period. Such replacing, repairing or rebuilding shall be carried out in every way according to the Contract Documents and the only variation of such terms and conditions shall be that the time for completion of the Works may be extended for such period as deemed reasonable, having regard to all the circumstances of the case and in accordance with Clause G.44. If the time for completion is not extended, then the Works must be completed within the time already fixed. Provided always that, without limiting his obligations and responsibilities as aforesaid, nothing in this Clause contained shall render the Employer liable to insure against the necessity for the repair or reconstruction of any work constructed with materials or workmanship not in accordance with the requirements of the Contract.

G.22 (1) Damage to Persons and Property

The Contractor shall (except if and so far as the Contract Documents provide otherwise) indemnify and keep indemnified the Employer against all losses and claims for death of or injury to any person, or loss or damage to any property whatsoever or which may arise out of or in consequence of the construction and maintenance of the Works and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto. Provided always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to indemnify the Employer against any compensation or damages for or with respect to :

- (a) the permanent use or occupation of land by the Works or any part thereof or (save as hereinafter provided) surface or other damage as aforesaid;
- (b) the right of the Employer to construct the Works or any part thereof on, over, under, in or through any land;
- (c) interference whether temporary or permanent with any right of light, air, way, or water or other easement or quasi-easement which is the unavoidable result of the construction of the Works in accordance with the Contract;
- (d) injuries or damages to persons or property resulting from any act or neglect done or committed during the currency of the Contract by the Employer, his agents, servants or other contractors (not being employed by the Contractor) or for or in respect of any claims, demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

Provided further that for the purposes of this Clause the expression "the Site" shall be deemed to be limited to the area defined in the specifications or shown on the

drawings in which land and crops will be disturbed or damaged as an inevitable consequence of the carrying out of the Works.

G.22 (2) Indemnity by Employer

The Employer will save harmless and indemnify the Contractor from and against all claims, demands, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the proviso to sub-clause (1) of this Clause.

G.22 (3) Personal Liability of the Public Officials

In carrying out any of the provisions of these General Conditions of Contract, or in exercising any power or authority granted to them by or within the scope of the Contract, there shall be no liability upon the Employer's principals or his authorized representatives, either personally or as officials of the Government, it being understood that in all matters they act solely as agents and representatives of the Government.

G.23 (1) Third Party Insurance

Before commencing the execution of the Works, but without limiting his obligations and responsibilities under Clause G.22 hereof, the Contractor shall insure, in the joint names of Employer and the Contractor, against any damage, loss or injury which may occur to any property (including that of the Employer) or to any persons (including any employee of the Employer) by or arising out of the execution of the Works or Temporary Works or in the carrying out of the Contract otherwise than due to the matters referred to in the proviso to Clause G.22 (1) hereof.

The Contractor shall also take out insurance policies against accidents to third parties, such as death, injuries, damage to property related to the use of the Contractor's cars, trucks and construction plant. The Contractor shall ensure that every sub-contractor is similarly insured.

G.23 (2) Amount of Third Party Insurance

Such insurance shall be effected with an insurer and in terms approved by the Employer, which approval shall not be unreasonably withheld, and shall be in the amount of the US\$ equivalent of the combined total Contract Sum in respect of damage arising out of the execution of the Works or Temporary Works and for accidents related to the use of unlicensed cars, trucks and construction plant while operating within the construction area.

The Contractor shall produce to the Engineer the policy or policies of insurance and the receipts for payment of the current premiums and shall renew the policy or policies upon expiration if in the Contract Period.

Prior to receiving the initial Advance Payment the Contractor shall submit evidence or copies of insurance policies, or cover notes and the receipts for payment of the current premiums and provide similar submittals of insurance coverage by annual or longer term renewal of policies.

G.23 (3) Provision to Indemnify Employer

The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the Employer, the insurer will indemnify the Employer against such claims and any costs, charges and expenses in respect thereof.

G.23 (4) Cross Liability

The policy of this insurance shall include a cross liability clause whereby the policy is deemed as if it were separately issued for each of the insured parties named in the policy.

G.24 (1) Accident or Injury to Workmen

The Employer shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any subcontractor, save and except an accident or injury resulting from any act or default of the Employer, his agents, or servants, and the Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, save and except as aforesaid, and against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

G.24 (2) Insurance against Accident, etc., to Workmen  
(Civil Responsibility Insurance)

The Contractor shall insure against such liabilities as set out in the Labour Code of Vietnam with an insurer approved by the Employer, which approval shall not be unreasonably withheld, and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall produce to the Engineer such policy of insurance and the receipt for payment of the current premium. Provided always that, in respect of any persons employed by any subcontractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the subcontractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such subcontractor to produce to the Engineer such policy of insurance and the receipt for payment of the current premium.

G.25 (1) Remedy on Failure to Insure

If, after being requested in writing by the other party so to do, the Employer or the Contractor shall fail to effect and keep in force the insurances referred to in Clauses G.21, G.23 and G.24 hereof, or any other insurance which he may be required to effect under the terms of the Contract, then the Employer or the Contractor may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose. The amount paid shall be a debt due from the party in default to the other party. Where the defaulting party is the Contractor the Employer may refuse payment until evidence of compliance is produced by the Contractor. The rights given by Clause G.25 are in addition to any other right.

Both the Employer and the Contractor are entitled to effect the above insurances on failure of either party to insure, but neither are obliged to do so and full responsibility in such a case will be to the Employer or Contractor alone.

G.25 (2) Other Insurance

For avoidance of doubt, the Contractor may, at his own expense, effect and maintain any insurance other than those referred to in the Contract. However, any

such insurance shall comply with the terms under the Contract wherever applicable and in no case shall it adversely affect any insurance referred to in the contract.

G.25 (3) Waiver of Subrogation

The Contractor shall ensure that the insurers of the insurance's to be effected and maintained by him (pursuant to the Contract or otherwise) shall waive any subrogation of a claim or claims

G.26 (1) Giving of Notices and Payment of Fees

Except for the right-of-way acquisition which will be furnished and paid for by the Employer, and unless otherwise agreed in Addenda, the Contractor shall give all notices and pay all fees required to be given or paid by any National Statute, Ordinance, or other Law, or any Regulation of any local or other duly constituted authority in relation to the execution of the Works or of any Temporary Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works or any Temporary Works.

G.26 (2) Compliance with Laws, Ordinances, Statutes, Decrees Regulations, etc.

The Contractor shall conform in all respects with the provisions of any such Law, Ordinance, Statute or Decree as aforesaid and the Regulations of any local or other duly constituted authority which may be applicable to the Works or to any Temporary Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the Employer indemnified against all penalties and liability of every kind for breach or any such Law, Ordinance, Statute or Decree.

Provided that the Employer will repay or allow to the Contractor all such sums as the Engineer shall certify to have been properly payable and paid by the Contractor in respect of such fees.

G.27 Fossils, Antiques, etc.

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the Works shall as between the Employer and the Contractor be deemed to be the absolute property of the Employer. The Contractor shall take reasonable precautions to prevent his work-men or any other persons from removing or damaging any such article or thing and shall immediately upon discovery thereof and before removal acquaint the Engineer of such discovery and carry out, at the expense of the Employer, the Engineer's orders as to the disposal of the same.

G.28 Patent Rights and Royalties

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any construction plant or material used for or in connection with the Works or Temporary Works or any of them and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other

royalties, rent and other payments or compensation, if any, for getting any stone, sand, gravel, clay or other materials required for the Works or Temporary Works or any of them.

G.29 (1) Interference with Traffic and Adjoining Properties

All operations necessary for the execution of the Works and for the construction of any Temporary Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the public, or to reduce the capacity or condition or function or amenity of the road being improved, or to reduce access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the Employer or of any other person, and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters in so far as the Contractor is responsible therefor.

G.29 (2) Public Services and Utilities

The Contractor shall ascertain from each public utility and supply authority the existence and location of all services which may be affected by the Works. The absence of such information on the Drawings shall in no way release the Contractor from his responsibility under this Clause. The Contractor shall be responsible for advising the appropriate authority and the Engineer of any services likely to be affected by the Works and the planned timing of his operations relative thereto. The cost of moving the services to permit the execution of the work will be borne, and the work will be undertaken by, the appropriate authority except where otherwise specified in the Contract.

G.29 (3) Protection of Utilities

The Contractor shall conduct his operations, make necessary arrangements, take suitable precautions and perform all required work incidental to the protection of and avoidance of interference with power transmission and other utilities within the areas of his operations in connection with this Contract and the cost therefor shall be borne by the Contractor and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, damages, costs, charges and expenses whatsoever arising out of or in relation to any such construction operations or interference with power transmission or other utilities.

In the event of damage to any services the Contractor shall immediately notify the relevant authority and the Engineer. The cost of any necessary repairs shall then be borne by the Contractor.

G.29 (4) Obstruction to Flow in Water-Courses

The Contractor shall conduct his operations so as to offer the least possible obstruction to flow in canals, channels and water-courses. The Contractor shall observe all rules and regulations of appropriate authorities regarding the interruption and maintenance of flow in irrigation canals and channels, and drainage channels and water-courses and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such construction operation or interference with water flows.

G.29 (5) Arrangements with Irrigation Authorities

The Contractor shall not interrupt or interfere with the flow or level of irrigation waters without making prior arrangements with and obtaining the agreement of the Irrigation Authorities. The Employer will assist the Contractor as to the necessary steps for such consent from the Irrigation Authorities.

The Contractor shall arrange with the Irrigation Authorities and allow in his program for the construction of those works which might interfere with the flow of irrigation waters to be carried out at such times as will cause the least disturbance to irrigation operations.

G.29 (6) Arrangements with Railway Authorities

The Contractor shall make all necessary arrangements with the Railway Authorities regarding work to be carried out in the vicinity of the railway lines, and arrange his work and take all necessary precautions to avoid accidents, damage, delay or interference with trains or other railway property. The Employer will assist the Contractor as to the necessary steps for such consent from the Railway Authorities. The Contractor shall have no right or claim for compensation arising out of the obligations prescribed in this sub-clause and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such operations or interference's.

G.30 (1) Extraordinary Traffic

The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his subcontractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

G.30 (2) Special Loads

In the event that the Contractor's moving or use of Construction Plant or the hauling of materials is considered likely to damage any highway or bridge unless special protection or strengthening is carried out, then the Contractor shall before moving the load on to such highway or bridge give notice to the Engineer of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway or bridge. Unless within fourteen days of the receipt of such notice the Engineer by counter-notice directs that such protection or strengthening is unnecessary, then the Contractor will carry out such proposals or any modification thereof that the Engineer shall require.

G.30 (3) Settlement of Extraordinary Traffic Claims

If during the carrying out of the Works or at any time thereafter the Contractor shall receive any claim arising out of the execution of the Works in respect of damage or injury to highways or bridges he shall immediately report the same to the Engineer.



If any such claims or part thereof shall, in the opinion of the Engineer, be due to any failure on the part of the Contractor to observe and perform his obligations under sub-clauses (1) and (2) of this Clause, then the Contractor shall be required to repair immediately at his own cost, such damage or injury in accordance with the Engineer's instructions.

G.31 Opportunities for other Contractors

The Contractor shall, in accordance with the requirements of the Engineer, afford all reasonable opportunities for carrying out their work to any other contractors employed by the Employer and their workmen and to the workmen of the Employer and of any other duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works. If, however, the Contractor shall, on the written request of the Engineer, make available to any such other contractor, or to the Employer, or any such authority, any roads or ways for the maintenance of which the Contractor is responsible during the Construction Period, or permit the use by any such of the Contractor's scaffolding or other plant on the Site, or provide any other service of whatsoever nature for any such, the Employer shall pay to the Contractor in respect of such use or service such sum or sums as shall, in the opinion of the Engineer, be reasonable.

G.32 (1) Supply of Construction Plant, Materials and Labour

Except where otherwise specified, the Contractor shall at his own expense supply and provide all the construction plant and materials both for Temporary and for Permanent Works, labour (including the supervision thereof), transport to or from the Site and in and about the Works and other things of every kind required for the construction completion and warranty of the Works.

G.32 (2) Sites for Contractor's Activities

The Contractor shall select, arrange for, and bear all expenses and charges for any land, property and interest therein which he requires to use for access to the Site, for detours, temporary road works, sites for offices, accommodation, mixing plants, the storage of equipment or materials, or for any other purpose necessary for the execution of the Works. Before any land belonging to the Government or to a private landowner is used for any purpose in connection with the execution of the Works the Engineer's approval shall be obtained.

G.33 (1) Contractor to Keep Site Clear

During the progress of the Works the Contractor shall keep the Site reasonably free from all unnecessary obstruction and shall store or dispose of any construction plant and surplus materials and clear away and remove from the Site any wreckage, rubbish or Temporary Works no longer required.

G.33 (2) Protection of the Environment

The Contractor shall take all reasonable precautions to avoid harm to the living and working environment. Such precautions shall follow the requirements of the

appropriate TCVN standards concerning the environment which shall include but not be limited to the following :

- (a) provision of sanitation facilities to prevent the biological or olfactory pollution of the Site or any water course, stream, well, tank, reservoir or water supply;
- (b) avoidance of wanton destruction of flora and fauna;
- (c) avoidance of excessive particulate matter, noxious gaseous or smoke emission from plant and other operations in connection with the Works;
- (d) avoidance of damage or interruption to water courses, irrigation channels and drainage paths;
- (e) avoidance of excessive harmful or objectionable noise emissions.

Together with these requirements, the Contractor shall take such further precautions or measures as the Engineer shall reasonably direct.

G.33 (3) Clearance of Site on Completion

On the completion of the Works the Contractor shall clear away and remove from the Site all construction plant, surplus materials, rubbish and Temporary Works of every kind, and leave the whole of the Site and Works clean and in a workmanlike and sanitary condition to the satisfaction of the Engineer.

## LABOUR

G.34 (1) Engagement of Labour

The Contractor shall make his own arrangements for the engagement of all labour, and shall do so in accordance with all relevant "Labour Codes" and "Regulations On Labour In Enterprises With Foreign Invested Capital" currently in force in Vietnam.

Generally, when coming from another country, only highly skilled technicians and professionally qualified engineers will be approved for employment within Vietnam.

G.34 (2) Supply of Water

The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site to the satisfaction of the Engineer an adequate supply of drinking and other water for the use of the Contractor's staff, work people and labour.

G.34 (3) Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and other official Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs or permit or suffer any such importation, sale, gift, barter or disposal by his subcontractors, agents or employees.

G.34 (4) Arms and Ammunition

The Contractor shall not otherwise than in accordance with the Statutes, Ordinances and other official Regulations or Orders for the time being in force, give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

G.34 (5) Festivals and Religious Customs

The Contractor shall in all dealings with labour in his employment have due regard to all official festivals, days of rest and religious or other customs.

G.34 (6) Epidemics

In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

G.34 (7) Disorderly Conduct, etc.

The Contractor shall at all times take all reasonable precautions to prevent any

unlawful, riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

G.34 (8) Observance by Subcontractors

The Contractor shall be responsible for observance by his subcontractors of the foregoing provisions.

G.34 (9) Other Conditions Affecting Labour and Wages

The Contractor shall also take steps to acquaint himself and conform with all the other labour regulations as may be issued from time to time by the Ministry of Labour Invalids and Social Affairs or other authorities concerned.

G.35 Returns of Labour, etc.

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail in such form and at such intervals as the Engineer may prescribe showing the supervisory staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting construction plant as the Engineer may require.

## MATERIALS AND WORKMANSHIP

### G.36 (1) Quality of Materials, Workmanship and Tests

All materials and workmanship shall be of the respective kinds prescribed and specified in the Contract Documents and in accordance with the Engineer's instructions and shall be subjected from time to time to such tests as the Engineer may direct at the place of manufacture or fabrication, or on the Site, or at all or any of such places. The Contractor shall, at his own cost, provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the composition, quality, weight or quantity of any materials used and shall supply samples of materials as may be selected and required by the Engineer for testing before incorporation in the Works.

### G.36 (2) Suitability of Materials

The Contractor shall determine for himself the suitability of all construction materials including quarry materials and the amount and type of equipment and work necessary to produce, haul and place the materials necessary for the Work according to the Specification. The Contractor shall carry out any test which he considers necessary in this connection or which is required to confirm quality specifications given in these Contract Documents or which may otherwise be ordered by the Engineer. No material shall be incorporated in the Works without the prior written approval of the Engineer. Such prior approval by the Engineer for the use of materials shall in no way be construed as approval or acceptance of the quality of the materials or of the work in which the materials are incorporated, nor shall it in any way relieve the Contractor of his responsibility to supply materials meeting the specifications or to rectify at his own cost any unsatisfactory work resulting from material quality deficiencies.

### G.36 (3) Cost of Samples

All samples shall be supplied by the Contractor at his own cost, whether the samples are taken on his own initiative or to fulfill the requirements of the Specification or to meet the Engineer's request.

### G.36 (4) Cost of Tests

The cost of making any test shall be borne by the Contractor if such test is specified in these Contract Documents or required, in the opinion of the Engineer, to confirm engineering properties or performance specified in these Contract Documents.

### G.36 (5) Cost of Tests not Provided For, etc.

If any test is ordered by the Engineer which is either :

- (a) not provided for or described in or implied as necessary by these Contract Documents; or
- (b) though provided, described or intended by the Contract Documents is ordered by the Engineer to be carried out by an independent person or at any

place other than the Site or the place of manufacture or fabrication of the materials tested,

then the cost of such test shall be borne by the Employer unless the test shows the workmanship or materials not to be in accordance with the provisions of the Contract Documents or the Engineer's instruction in which case the cost of any such test shall be borne by the Contractor.

G.37 Access to Site

The Engineer and any person authorized by him shall at all times have access to the Works and to the Site and to all workshops and places where work is being prepared or where materials, manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

G.38 (1) Notice of Operation

Full and complete notice in writing shall be given to the Engineer sufficiently in advance of the time of any operation for him to be able to make such arrangements as he may deem necessary for its inspection.

To enable detailed planning of the Engineer's staffing, 48 hours notice shall normally be given of a pending inspection or request for measurement. Requests shall be prepared in triplicate and submitted to the Engineer for verification and recording. Requests shall not be given to field staff.

G.38 (2) Examination of Work before Covering Up

No work shall be covered up or put out of view without the approval of the Engineer and the Contractor shall afford full opportunity for the Engineer to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer whenever any such work is ready for examination. If, however, the Contractor should cover up any work without complying with the above, the Engineer may, at his option, require the work to be opened up for examination and the Contractor shall have no recourse for compensation.

G.39 (1) Removal of Improper Work and Materials

The Engineer shall during the progress of the Works have power to order in writing from time to time :

- (a) the removal from the Site, within such time or times as may be specified in the order, of any materials which, in the opinion of the Engineer, are not in accordance with the Contract Documents;
- (b) the substitution of proper and suitable materials; and
- (c) the removal and proper re-execution (notwithstanding any previous test thereof or interim payment therefor) of any work which in respect of materials or workmanship is not, in the opinion of the Engineer, in accordance with the Contract Documents.

G.39 (2) Default of Contractor in Compliance

In case of default on the part of the Contractor in carrying out such order, the Employer shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the Contractor and shall be recoverable from him by the Employer, or may be deducted by the Employer from any monies due or which may become due to the Contractor.

G.40 (1) Suspension of Work

The Contractor shall, on the written order of the Engineer, suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work, so far as is necessary in the opinion of the Engineer. The extra cost including all running wages to be paid on the site, salaries, depreciation and maintenance of plant, site on-costs and general overhead costs of the Contract incurred by the Contractor in giving effect to the Engineer's instructions under this Clause shall be borne and paid by the Employer unless such suspension is:

- (a) otherwise provided for in the Contract Documents; or
- (b) necessary for the proper execution of the work or by reason of weather conditions affecting the safety or quality of the Works or by some default on the part of the Contractor; or
- (c) necessary for the safety of the Works or any part thereof.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Engineer within twenty-eight (28) days of the Engineer's order. The Engineer shall settle and determine such extra payment to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer, be fair and reasonable.

G.40 (2) Suspension Lasting More Than 90 (ninety) Days

If on the written order of the Engineer (in this sub-clause referred to as a "Suspension Order") the progress of the Works or any part thereof shall be suspended for a period or consecutive periods amounting in all to 90 (ninety) days or if the Engineer having previously issued a Suspension Order for a period which has lasted less than 90 (ninety) days shall within less than 90 (ninety) days from the expiration of that period of suspension issue a further Suspension Order either in respect of the whole of the Works or (where the previous Suspension Order has affected only a part) affecting or including that part, then and in any such case the Contractor may serve a written notice on the Engineer requiring permission within 28 (twenty-eight) days from the receipt thereof to proceed with the Works or that part thereof in regard to which progress is suspended, and if such permission is not granted within that time, the Contractor by a further written notice so served may (but is not bound to) elect to treat the suspension where it affects part only of the Works as an omission of such part under Clause G.51 hereof or where it affects the whole Works as an abandonment of the Contract by the Employer under Clause G.69 hereof.

## COMMENCEMENT TIME AND DELAYS

### G.41 Notice to Proceed

The Notice to Proceed will be issued within 30 (thirty) days after contract signing or as soon as the signed contract is approved by other government agencies.

### G.42 (1) Take-Over of Site by Contractor

Save in so far as the Contract or Notice to Proceed may prescribe the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him, and subject to any requirement in the Contract as to the order in which the Works shall be executed, the Contractor shall, before the thirtieth day after issue by the Employer of the Notice to Proceed, proceed to take-over the Site or so much of the complete Site as may be required to enable the Contractor to commence and proceed with the Works in accordance with his program approved in accordance with Clause G.14 hereof.

The Employer will from time to time as the Works proceed give to the Contractor possession of such further portions of the Site as may be required to enable him to proceed with the construction of the Works without delay in accordance with the said approved program.

### G.42 (2) Possession of Site by the Contractor

If the Contractor suffers delay from failure on the part of the Employer to give possession in accordance with the terms of sub-clause (1) of this Clause, the Engineer shall grant an extension of time for the completion of the Works.

### G.42 (3) Furnishing Right-Of-Way

The Employer will be responsible for obtaining at his own expense all necessary right-of-way for the Permanent Works in advance of construction.

### G.43 Time for Completion

Subject to any requirement in the Contract as to completion of any portion of the Works before completion of the whole, the whole of the Works shall be substantially completed, in accordance with the provisions of Clause G.48 hereof, within the time specified in the Contract for the Construction Period, as defined in Clause G.01 hereof, or such extended time as may be allowed under Clause G.44 hereof.

### G.44 Extension of Time for Completion

Should the amount of extra or additional work of any kind or other special circumstances of any kind whatsoever which may occur, other than through non-performance of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the completion of the Works, the Engineer shall determine the amount of such extension and shall notify the Employer and the Contractor



accordingly. Provided that the Engineer is not bound to take into account any extra or additional work or other special circumstances unless the Contractor has within twenty eight days after such work has been commenced, or such circumstances have arisen, delivered to the Engineer full and detailed particulars of any claim to extension of time to which he may consider himself entitled in order that such claim may be investigated at the time.

G.45 No Night, Sunday or Official Holiday Work

Subject to any provision to the contrary contained in the Contract, none of the Work shall, save as hereinafter provided, be carried on during the night (after 6 p.m.), on Sundays, or official holidays, without the permission in writing of the Engineer, save when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works in which case the Contractor shall immediately advise the Engineer. Provided always that the provisions of this Clause shall not be applicable in the case of any work, which it is customary to carry out by rotary or double shifts.

G.46 Rate of Progress

The whole of the materials, construction plant and labour to be provided by the Contractor under Clause G.05 hereof and the mode, manner and speed of execution and warranty of the Works are to be of a kind and conducted in a manner to the satisfaction of the Engineer.

Should the rate of progress of the Works or any part thereof be at any time, in the opinion of the Engineer, too slow to ensure completion of the Works by the prescribed time or extended time for completion, the Engineer shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as the Contractor may think necessary and the Engineer may approve to expedite progress so as to complete the Works by the prescribed time or extended time for completion.

If the work is not being carried on by day and by night and the Contractor shall request permission to work by night as well as by day, then, if the Engineer shall grant such permission, the Contractor shall not be entitled to any additional payment for so doing. Such permission will not be refused unless in the opinion of the Engineer there is an equivalent practicable method of expediting the progress of the Works. All works at night shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, costs, charges and expenses whatsoever in regard or in relation to such liability.

If the Engineer gives permission for night work under the conditions prescribed above then the Contractor shall be liable for all extra costs in staffing for Supervision of the Works incurred by the Employer or the Engineer at a mutually agreed rate.

G.47 (1) Liquidated Damages for Delay

If the Contractor shall fail to complete the Works within the time prescribed by Clause G.43 hereof, then the Contractor shall pay to the Employer the sum stated in the Appendix to the Bid as liquidated damages for such default and not as a penalty for every day or part of a day which shall elapse between the end of the

Construction Period as prescribed in Clause G.01(1) hereof and the date of substantial completion of the Works as given by the date of Provisional Hand-Over. However, the aggregated maximum sum payable to the Employer under this Clause shall be limited as stated in the Appendix to the Bid.

The Employer may without prejudice to any other method of recovery deduct the amount of such damages from any monies in his hands due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works or from any other of his obligations and his liabilities under the Contract, nor prejudice the Employer's rights according to the provisions of Clause G.63 hereof on account of the default of the Contractor.

G.47 (2) Reduction of Liquidated Damages

If, before the completion of the whole of the Works any part of the Works has been certified by the Engineer as completed, pursuant to Clause G.48 hereof, and occupied or used by the Employer, the liquidated damages for delay shall, for any period of delay after such certificate and in the absence of alternative provisions in the Contract be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works.

G.48 (1) Provisional Hand-Over

After the Contractor has substantially completed the Works of this Contract according to the Contract Documents including that of handing over to the Employer the draft as-built drawings required under clause G.07(4), and any subsequent modifications agreed to between the two parties, he may apply in writing to the Engineer for Provisional Hand-Over and shall name his representative for participation in such Provisional Hand-Over. The Engineer shall investigate the application and shall write to the Employer within 10(ten) days from the application date, notifying the date of the actual substantial completion of the Works so that this shall be the date for such Provisional Hand-Over, and the Provisional Hand-Over shall then be certified by a Committee composed of representatives of the Employer, the Engineer and the named representative of the Contractor, provided that the Employer within 10 (ten) days from the date of the Engineer's notification shall previously notify the Contractor in writing of the names of the Employer's representatives and confirm the composition of the Committee. This Committee shall go on the Site within thirty (30) days from the date of notification of the Employer's representatives.

The Engineer shall make a program for performance of tests for Hand-Over according to accepted good practice and forward it to the Contractor, and all materials and facilities the supply of which according to the Contract is the responsibility of the Contractor shall be prepared by him on the Site and the necessary tests shall be carried out and reported by the Contractor, and witnessed by the Engineer, before the Committee visits the Site. The Contractor shall also prepare all such materials and facilities on the Site for the day of the visit of the Committee to the Site and any further tests as required by the Committee will be carried out.

The Provisional Hand-Over Committee shall make a list of any defects and deficiencies of the Works and a list of the test results and such lists shall be

attached to the Provisional Hand-Over process-verbal. In order to remove the deficiencies and defects the Committee shall grant one only period of grace not exceeding 30 days from the date of the end of the Construction Period or any extension thereof which has been given and if, in the opinion of the Committee, such deficiencies and defects are not due to failure of the Contractor to perform the work in accordance with the Contract Documents, the value of such work shall be ascertained and paid for as if it were additional work. If such deficiencies and defects are found to be due to faulty performance by the Contractor, then the Contractor shall remedy such deficiencies and defects within the said single grace period of 30 days and shall have no right to claim any cost therefor. If such deficiencies and defects are not remedied within the said single grace period the Employer shall be entitled to invoke the provisions of Clause G.47. In both cases, at the expiry of the said period of grace the Committee will inspect the Works again and, if there are no deficiencies remaining as based on the list, confirmation of the remedy of the defects and deficiencies as based on the list will be attached to the process-verbal of the provisional hand-over, and the provisional hand-over process-verbal will be certified with the Provisional Hand-over date.

For the purposes of this Clause, the Works shall not be considered to be substantially completed unless all work associated with the surface course, structures, sidewalks, drainage, culverts and shoulders over the full length of the project road is 100% completed and unless Works comprising at least 97% of the Contract Sum have been completed.

In the above paragraph "Works" and "Contract Sum" shall exclude Work Item : Section 1 - General, of the Bid Schedule.

G.48 (2) Certification of Completion by Section

Applying the procedure stated in Clause G.48 (1) above, the Contractor may request, and in some cases the Employer may accept, Provisional Hand-over in respect of:

- (a) Any section of the Works for which a separate time for completion is provided in the Contract;
- (b) Any substantial part of the Works, which has been both, completed to the satisfaction of the Engineer and occupied or used by the Employer.

If any part of the Works shall have been substantially completed and shall have satisfactorily passed any final test that may be prescribed by the Contract Documents, the Employer may accept Provisional Hand-over in respect of that part of the Works before completion of the whole of the works and, upon such acceptance by the Employer, the Warranty Period for that portion of the Works shall be deemed to have commenced.

Provided always that such Provisional Hand-over accepted in respect of any section or part of the Works before completion of the whole shall not be deemed to certify completion of any surfaces which subsequently require reinstatement or repair, unless the Certificate so states.

The Warranty Period for the substantially completed section or part shall be of the same length as that specified in the Contract Agreement for the whole works and therefore the final completion date for the section or part of the Works may occur earlier than that for the whole Works.

## WARRANTY AND DEFECTS

G.49 (1) Definition of Period of Warranty

In this Clause the expression "Period of Warranty" shall mean the period named in the Contract Agreement calculated from the date of completion of the Works certified by the Provisional Hand-over process-verbal in accordance with Clause G.48 hereof.

G.49 (2) Execution of Repair Work

For speedy and efficient execution and completion of all designated repair, rectification and corrective work, the Engineer shall require, during the Provisional Hand-over, that the Contractor retain on Site during the Warranty Period a reasonable portion of his construction plant, equipment, and materials, as may be deemed appropriate by the Engineer or his Representative. The Engineer may therefore allow only partial demobilization and/or removal from site of the Contractor's total contingent of construction plant, equipment, and materials on site at the time of or after the Provisional Hand-over.

G.49 (3) Obligation and Cost of Execution of Repair Work

To the intent that the Works shall at or as soon as practical after the expiration of the Period of Warranty be delivered up to the Employer in the condition required by the Contract, fair wear and tear excepted, the Contractor shall execute all such work of repair, reconstruction, rectification and making good of defects, imperfections, shrinkages or other faults as may be required of the Contractor in writing by the Engineer during the Period of Warranty or within fourteen days after its expiration as a result of an inspection made prior to the expiration of the Period of Warranty.

All such work shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer, be due to the use of materials or workmanship not in accordance with the Contract Documents or to any other neglect or failure on the part of the Contractor to comply with any obligation expressed or implied under the Contract.

In the event that necessary repair work identified by the Engineer during the Warranty Period has not resulted from any failure on the part of the Contractor to meet his obligations under the Contract, the Engineer may request the Contractor in writing to carry out the repairs as additional work at the expense of the Employer, in accordance with Clause G.52(1) of these General Conditions of Contract, and the Contractor shall be obliged to comply with the Engineer's request provided that the repair work to be carried out is part of the permanent works as defined under the Contract at the time of the Provisional Hand-Over.

G.49 (4) Remedy on Contractor's Failure to Carry Out Work Required

If the Contractor shall fail to do any such work as aforesaid required by the Engineer, the Employer shall be entitled to carry out such work by his own workmen or by other contractors and, if such work is work which the Contractor

should have carried out at the Contractor's own cost, shall be entitled to recover from the Contractor the cost thereof or may deduct the same from any monies due or that become due to the Contractor.

G.49 (5) Contractor to Search for Defects

The Contractor shall, at any time throughout the Contract Period, if required by the Engineer in writing, search for the cause of any defect, imperfection or fault, under the direction of the Engineer.

Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out by the Contractor in the searching as aforesaid shall be borne by the Employer. But if such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense.

G.50 Final Hand-Over

The Contractor shall apply for the implementation of procedures necessary for the Final Hand-Over of the Works upon the expiration of the Period of Warranty as stipulated in the Contract Agreement and subject to his compliance with the provisions of Clause G.49 in total, which are complementary to this Clause.

The Contractor should make the application at least twenty-one (21) days prior to the expiration date of the Warranty Period. A Final Hand-Over Committee formed by the Employer will inspect the Works and record all defects. These defects shall be made good in accordance with the provisions of Clause G.49(2) and G.49(3) hereof. The Engineer will recommend and the Employer will certify and issue the Certificate of Final Completion twenty-eight days after acceptance of the Works as being so prescribed and all defects made good as notified.

If the Engineer does not consider the Work to be completed, the Contractor will be notified in writing of the reasons for rejection or deferment of the application. When the Contractor has completed any further remedial measures required by the Engineer he should immediately make a further application for the Certificate of Final Completion.

## ALTERATIONS, ADDITIONS AND OMISSIONS

### G.51 (1) Variations

The Engineer may make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary or desirable. For that purpose, or for any other reason the Engineer shall have power to order the Contractor to do and the Contractor shall carry out any of the following :

- (a) increase or decrease the quantity of any work or Pay Item included in the Contract;
- (b) omit any such work or Pay Item;
- (c) change the character or quality or kind of any such work;
- (d) change the levels, lines, position and dimensions of any part of the Works;
- (e) execute additional work of any kind necessary for the completion of the Works; and
- (f) provide protection either temporary or permanent of completed Works or Works in process that would be affected by the implementation of the above work variations.

No such variation shall in any way vitiate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Sum.

### G.51 (2) Change Orders and Addenda

All orders for variations of the work shall be effected by means of a written Change Order signed by both the Engineer and the Contractor and approved by the Employer which shall establish the basis of payment and any time adjustment required for the execution of the work affected by the variation.

Either the Contractor or the Engineer may propose variations, but in all cases the formal Change Order will be issued by the Engineer following negotiation with the Contractor and agreement by the Employer.

For all significant contractual and technical changes, and when the basis of payment established in a Change Order requires additional Pay Item Unit Prices or other sums to be agreed, or a variation in the Contract Sum, the negotiated Change Order shall be formalized in an Addendum.

In the event that the amount of work actually performed by the Contractor is such that the calculated sum total of payments to the Contractor will exceed the current value of the Contract Sum, whether because of adjustments in the estimated quantities required for the Works or because of revised projections of the overall effect of any Change Order or for any other reason whatsoever, the amount in excess of the Contract Sum will not be paid unless an appropriate Addendum is formally agreed and issued to cover such excesses.

G.51 (3) Eliminated Items

Should any items contained in the tender be found unnecessary for the proper completion of the Works contracted, the Engineer may issue and the Contractor shall accept a Change Order which eliminates such contract items from the Contract under the terms and conditions described under Clause G.52(1) hereof.

G.51 (4) Change in Contract Documents

If the Employer orders a change to be made in the Contract Documents, appropriate revised Contract Unit Prices for affected Pay Items, if any, shall be agreed between the Contractor and the Engineer. The agreement shall be formalized by way of a Change Order or an Addendum as aforesaid.

G.52 (1) Valuation of Variations

Except where provided for under Clause G.52(2), all additional work done or work omitted by order of the Engineer shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable.

If the Contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between the Engineer and the Contractor, subject to the approval of the Employer. In the event that agreement on suitable rates and prices cannot be reached between the Engineer and the Contractor, the Employer reserves the right to complete the extra or additional work himself or to employ another contractor to carry out the work or to instruct the Engineer to determine such rates or prices as shall, in his opinion, be reasonable and proper having regard to the circumstances.

G.52 (2) Quantity Variations Exceeding Twenty Percent

If during the execution of the Contract, any one variation or the aggregate effect of several or all variations ordered by the Engineer shall increase or decrease the quantity of work of any Major Pay Item, as defined in Clause G.01(1) of these General Conditions of Contract, by more than 20 (twenty) percent from the original quantity stated in the Contract Documents, then, subject to the requirement for notice as provided hereunder having been fulfilled, the Unit Prices of the affected Pay Items may be adjusted in accordance with the provisions set out in the Special Specifications.

No adjustment of any Unit Price under this Clause shall be made unless, as soon after the date of issue of the order affecting such increase or decrease in quantity as is practicable, but no later than 14 days, notice shall have been given in writing :

- (a) by the Contractor to the Engineer in accordance with Clause G.52(3), stating his intention to claim an adjustment to the Unit Price or Prices concerned, or
- (b) by the Engineer to the Contractor stating his intention to adjust the Unit Price or Prices concerned.

Adjustments made under this Clause to the Unit Price of any Major Pay Item shall be applied to all payments for that Pay Item due under the Contract, and all payments already made using the unadjusted Unit Price shall be adjusted accordingly.

G.52 (3) Claims

In the event that the Contractor considers that he is justified to claim for additional payment or for a varied rate or price on the basis of any order issued by the Engineer, the Contractor shall, as soon as practicable and not later than 14 days after the date of the order notify the Engineer in writing of his intention to claim and of the general nature of his claim. In addition, the Contractor shall send to the Engineer a monthly account giving particulars (as full and detailed as possible) of any unsettled claims for additional payment to which he may consider himself entitled as a result of any such order issued by the Engineer. No claim for payment for any such work will be considered which has not been so notified to the Engineer and included in the monthly account submitted to the Engineer.

Any claim for any additional payment under this Clause shall include for overhead and profit a percentage no more than that entered in the Detailed Price Analyses submitted by the Contractor in his Bid. The claim shall also include adjustment for previous discounting should this apply.



## PLANT, TEMPORARY WORKS AND MATERIALS

G.53 (1) Plant, etc., Exclusive Use for the Works

The construction plant detailed in the Bid shall be approved by the Engineer before the Commencement of Works and shall always be in working order and available at the job site during the construction period. The Contractor shall not remove or replace the equipment so submitted without the written approval of the Engineer.

All Construction plant, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the construction and completion of the Works and the Contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the Site to another) without the approval of the Engineer, which shall not be unreasonably withheld.

The Contractor shall enter into formal written agreement with the subcontractors, nominated subcontractors, and any persons from whom the Contractor may hire plant so as to ensure that all the provisions of this Clause shall apply to all subcontractor's plant, Temporary Works and materials (whether the same or any of them be the property of the subcontractors or hired by the subcontractors) and to all hired plant on the Site or plant on the Site being purchased under a hire purchase or other agreement, in every way as if they were the Contractor's own property.

G.53 (2) Customs Clearance

The Employer will not assist in obtaining the exemption of Customs Duty for the importation of construction plant, materials and other items imported for the Works under this Contract. However the Employer will assist the Contractor with regard to importation formalities.

G.53 (3) Local Purchases

The Contractor shall pay the taxation charges according to the laws and associated regulations in respect of any construction plant, materials or other things purchased in Vietnam.

G.53 (4) Removal of Plant, etc.

Upon completion of the Works the Contractor shall remove from any Government owned Site all the construction plant and Temporary Works remaining thereon and any unused materials provided by the Contractor.

G.53 (5) Re-Export of Plant

Plant which has been previously imported duty free for previous construction projects must be re-exported or if transferred to this project the Contractor must make his own arrangement for such equipment without any assistance from the Employer.

G.53 (6) Plant, Generally

The construction plant, temporary works, materials, and things of every kind supplied for the Works shall be of a type, capacity, power, quantity and design, and shall be constructed or erected in such position, or used or executed at such times and in such manner as is indicated in the program to be provided by the Contractor under the terms of Clause G.14 of these General Conditions of Contract or any subsequent modifications to such program agreed by the Engineer as most efficient and suitable for the proper, timely, and safe execution of the Works to be undertaken under this Contract.

If during the execution of the Works the Contractor should, in contradiction of the method of execution or equipment requirements envisaged in the Construction Schedule previously approved by the Employer or the Engineer, employ such methods or equipment (or lack of equipment) which in the opinion of the Engineer are less efficient or less suitable than those originally envisaged and give an unreasonable financial gain to the Contractor, then the Engineer may, without prior warning, give notice to the Contractor that he considers the Unit Price or Prices for the work in question to be no longer valid. In such case the Engineer shall determine such rates or prices as shall in his opinion be reasonable and proper for the employment of such alternative methods or equipment (or lack of equipment), and for all works carried out in this manner the Contractor shall be paid accordingly.

G.53 (7) Responsibility

The Contractor shall be solely responsible for the provision, sufficiency, stability, safety, protection, construction, demolition and removal, transport and maintenance of all the aforesaid construction plant, temporary works, materials, transport and things of every kind supplied for the Works and shall replace or reconstruct them or re-execute them in the event of their being lost or damaged or inaccurate, all at his own expense.

G.53 (8) Employer Not Liable for Damage to Plant, etc.

The employer shall not at any time be liable for the loss of or injury to any of the construction plant, temporary works or materials save as mentioned in Clauses G.20 and G.25 hereof.

G.54 Approval of Materials, etc. Not Implied

Any action taken or not taken by the Employer relating to Clause G.53 hereof shall not be deemed to imply any approval of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time.

The Contractor shall, at his own expense, make all necessary arrangements for procuring and testing materials at source and for haulage roads from the sources to the work site. Land from which materials have been removed shall be left in a neat and presentable condition upon completion of the Works.

## MEASUREMENT

### G.55 Quantities

The quantities set out in the Bid Schedule are the estimated quantities of the work, but they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

### G.56 Works to be Measured

All works acceptably completed shall be measured by the Contractor and the measurements shall be checked and approved by the Engineer. The Engineer shall be present and supervise such measurement. The Contractor shall prepare records and drawings of the measurements of Permanent Work which shall be submitted to the Engineer for approval. If after examination of such records and drawings the Engineer withholds his approval of them, the Engineer and the Contractor together shall retake the measurements using the Contractor's equipment and personnel. In the event of further disagreement concerning the measurement the decision of the Engineer shall be final.

### G.57 Measurement

- (a) All methods of measurement shall be approved by the Engineer.
- (b) Except in so far as the Specifications may expressly state to the contrary, all measurement for payment shall be to the neat lines and dimensions shown on the Drawings.
- (c) All work completed under the Contract shall be measured according to the S.I. metric system for all items unless specified otherwise in the Contract Documents.
- (d) The measurement of the Works shall be performed on the basis of the Specifications. If actual physical measurement exceeds the measurement indicated in the Specifications and Drawings, such excess shall not be measured for payment and the Contractor shall not be entitled to any compensation, provided always that the specified measurements are technically acceptable and there is no provision to the contrary in any other part of the Contract Documents.
- (e) Full compensation for all expenses involved in conforming to above requirements for measuring shall be considered as included in the Unit Prices, and no additional compensation will be allowed therefor.

## CERTIFICATES AND PAYMENTS

### G.58 (1) Certification by Engineer

All payments under the Contract will be made against invoices and statements of the Contractor duly certified and approved by the Engineer in writing. By issuing any certificate for payment the Engineer does not necessarily accept the correctness or completeness of the Works included in that certificate.

No payment made by the Employer, based on the Engineer's certificate, for partial or entire use or occupancy of the Work by the Employer will constitute an acceptance of work or products which are not in accordance with the requirements of the Contract Documents.

### G.58 (2) Advance Payment and Repayment

The Advance Payment made available by the Employer of 15 (fifteen) percent of the Contract Sum shall be paid after the Contractor has furnished the Advance Payment Bond(s) as required by Clause G.12 hereof and the evidence of insurance as required by Clauses G.21, G.23 and G.24 of these General Conditions of Contract.

The amount of such Advance Payment shall be refunded to the Employer by the Contractor by deduction from the Monthly Certificates, in accordance with the provisions of sub-clause G.58(5) hereof. The repayment deductions shall be 20 (twenty) percent of each of the VND and foreign currency components of the gross sum of each Monthly Certificate, starting from the third Monthly Certificate, until the total amount of the Advance Payment is recovered. Should the Advance Payment not be fully refunded by the time of Provisional Hand-over, the outstanding amount of the Advance Payment shall be recovered by deducting this amount from the value of the retention monies released in accordance with Clause G.61 hereof. During the repayment period of the Advance Payment, the Contractor may periodically reduce the value of his Bank Guarantee(s) to reflect the value of repayments recorded in the Monthly Certificates in accordance with Clause G.12 hereof.

In accepting the Advance Payment, the Contractor agrees that he will ensure that construction progress is maintained in accordance with the approved Construction Schedule(s). In the event of failure on the part of the Contractor to maintain the required construction progress, or should the Engineer suspect from good authority that any part of the Advance Payment was used or was intended for use on works other than the Contracted Works, the Employer may exercise his option to recover the Advance Payment or the remaining portion of the Advance Payment by demand on the Bank or Institution guaranteeing the Advance Payment Bond(s), and may also seek other remedies within the terms of the General Conditions of Contract.

### G.58 (3) Payment for Materials on Site

Cement, reinforcing steel, structural steel, bituminous materials and concrete aggregates required for the performance of the Works, when already on the Site and not yet incorporated in the Works, shall be, on the request of the Contractor, included by the Engineer in the Monthly Certificate applying eighty (80) percent of the Unit Prices indicated in the Schedule of Rates and Prices. In the case of road making aggregates, such interim payments may be made on the estimated

quantities of crushed aggregates produced for Aggregate Base, Asphalt Treated Base and Asphalt Concrete Binder and Surface Courses satisfactorily stockpiled on Site. The quantities of such loose aggregate will be converted into equivalent volumes of compacted material or tonnes, as the case may be, and paid for at a rate of 40 (forty) percent of the Contract Unit Prices for the particular Pay Item or portion of Pay Item into which it is intended the aggregates will be incorporated.

Payment for materials on Site will not constitute acceptance, and any faulty material will be condemned even though previous payments may have been made in the Monthly Certificates.

Payments advanced under this sub-clause will be deducted from the following Monthly Certificates as and when the materials are incorporated into the Works. Payment will not be made for any stockpiled materials if the furnishing of such material is included in the Bid Schedule as a separate Pay Item.

G.58 (4) Application for Interim Payment

The Contractor shall, not later than the last day of each month, make his application for interim payment by submitting a Monthly Statement together with all supporting documentation to the Engineer for his approval in accordance with the provisions of this Clause and the Specifications.

The Monthly Statement shall summarize the gross value of the Works completed since the commencement of the Contract as computed from the actual quantities measured for payment and the respective Unit Price, together with any completed additional work authorized by Change Order.

G.58 (5) Certification and Payment

The Engineer will not later than seven (7) calendar days after the receipt of an application for Monthly payment submitted in accordance with sub-clause G.58(4) above, issue a Certificate for Payment in the amount applied for or in such other amount as he determines to be properly due.

If the Engineer finds the Monthly Statement to be incorrect in any way he may either, amend the value of the statement and promptly notify the Contractor in writing giving the details and reasons for the amendment or, return it to the Contractor for adjustment and resubmission.

The Monthly Statements which are prepared in this manner and which are signed by the Contractor and certified by the Engineer shall be handed over to the Employer before the end of the tenth day of the following month. The Employer shall check the Certificate and if it is found to be accurate and in compliance with the Contract, the Employer shall deduct the following items:

- (1) the net sum of all previous Monthly Certificates;
- (2) 10 (ten) percent of the calculated gross sum of each particular Monthly Certificate which will be retained as a retention amount;
- (3) the installment for the repayment of the Advance Payment in accordance with sub-clause G.58(2) hereof;
- (4) any other deduction for taxes and charges required by law or the Contract or any other requirement;

- (5) any liquidated damages for delay according to the context of the "General Conditions of Contract";
- (6) any other miscellaneous deductions that are owed by the Contractor according to the context of the "General Conditions of Contract".

The Employer will make payment to the Contractor not later than ninety (90) calendar days after the certification date of the Monthly Statements. The date of payment shall be deemed to be the date of the Notice of Issue of the Statement(s) of Performance. If any monies remain unpaid after the expiration of the ninety (90) days then interest at a maximum rate of zero point two percent (0.20 %) per month shall become payable by the Employer thereon from the day after the date of expiry.

On payment of the Monthly Certificates, all the Works paid for shall be the property of the Employer but they shall be in the custody of the Contractor until the Contract is completed.

G.58 (6) Correction to Monthly Certificates

All of the quantities in the Monthly Certificates and also the payments that have been made shall be considered provisional and not final and they are on account and any mistake in measurement or computation in the Monthly Certificates shall be corrected and payment adjusted accordingly.

In the event of any dispute concerning the accuracy of measurement or computation of the quantities in the Monthly Certificate, or if the Works or any part thereof are not being carried out to the Engineer's satisfaction, the Engineer shall have the power to withhold any Monthly Certificate or to make interim payment up to a maximum of 70 (seventy) percent of the value of the Monthly Certificate.

Should it be necessary for the Engineer to amend, withhold or make interim payment only on any Monthly Certificate, he will promptly notify the Contractor in writing giving his reasons for the amendment or withholding or interim payment.

G.58 (7) Completion of Work Statements

- (a) A Completion of Work Statement shall be prepared and submitted by the Contractor within fifteen (15) days after the accepted Provisional Hand-over Date.
- (b) A Final Completion of Work Statement shall be prepared and submitted by the Contractor within 7 (seven) days immediately subsequent to the accepted Final Hand-over Date.

G.58 (8) Payment for Completed Sections or Parts

When Provisional Hand-Over is effected in accordance with the provisions of Clause G.48(2) hereof for a section or part of the Works separately, the Contractor may claim for payment, subject to the various provisions of the Contract regarding payment, in respect of such section or part of the Works, and reference to the Contract Sum payable in this case shall mean such part of the Contract Sum as is relevant and applicable to the section of work completed. The relevant payment, the proportion of retention money that may be returned and all other matters concerning Provisional Hand-Over of the completed part or section of the Works shall, in the absence of agreement, be apportioned by the Engineer.

G.58 (9) Payment for Substantial Completion

At the same time as the Contractor submits his application for Provisional Hand-Over of the whole Works or part of the Works he shall prepare a Payment Statement for the Engineer to check.

After comments from the Engineer and within fifteen (15) days after the accepted Provisional Hand-Over Date, the Contractor will submit a financial statement with his Completion of Work Statement.

The Engineer will review this statement and if approved the Employer will pay the outstanding amount within 90 (ninety) days after the date of the submittal of the statement.

G.59 (1) Certificate of Final Completion

(a) The Works shall not be accepted as completed until a Certificate of Final Completion is issued to the Contractor by the Employer, stating that the Works have been completed and maintained in compliance with the provisions of Clause G.05, Clause G.48 and Clause G.49 in total of these General Conditions of Contract. The Employer will issue such a Certificate of Final Completion 28 (twenty-eight) days after the expiration of the Period of Warranty, subject to Clause G.62 hereof.

The Contractor shall submit a Final Payment Statement to the Employer concurrent with the application for the Final Hand-Over acceptance 21 days before the scheduled Final Hand-Over.

(b) The issuance of the Certificate of Final Completion of the Work will constitute a waiver by the Employer of all claims against the Contractor except one or more of the following:

1. those made in writing prior to the issuance of the above Certificate and still unsettled;
2. those arising from the provisions of the Period of Warranty.

(c) If the Engineer does not consider the Work to be completed, the Contractor will be notified in writing of the reasons for rejection or deferment of the application. When the Contractor has completed any further remedial measures requested by the Engineer, he shall immediately make a further application for the Certificate of Final Completion.

G.59 (2) Final Application for Payment

After the Contractor has completed all such corrections to the satisfaction of the Engineer and delivered all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, marked-up record of documents and other project records - all as required by the Contract Documents, and after the Engineer has indicated that the Work is acceptable, the Contractor may make application for Final Payment.

G.59 (3) Payment of Final Account

Not later than seven (7) days after the date of the Final Hand-Over, the Contractor shall submit to the Engineer a revised Statement of Final Account with supporting

documents showing in detail the value of the work done in accordance with the Contract, together with all further sums which the Contractor considers to be due to him under the Contract. Within seven (7) days after receipt of this final account, and of all information reasonably required for its verification, the Engineer shall issue a statement of final account stating:

- (a) the amount which in his opinion is finally due under the Contract (after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled under the Contract); and
- (b) the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer, as the case may be.

Such Final Account shall, subject to Clause G.48, be paid by the Employer or the Contractor within 45 (forty-five) days of the issue of the Certificate of Final Completion.

G.60 (1) Payments to Subcontractors

- (a) The Contractor shall promptly pay each Subcontractor (upon receipt of payment from the Employer out of the amount paid to the Contractor on account of such Subcontractor's work) the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor.
- (b) The Engineer may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amount applied for by the Contractor and the action taken thereon by the Engineer on account of Work done by such Subcontractor.
- (c) Neither the Employer nor the Engineer shall have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law.
- (d) When the Engineer has certified that the work of a Subcontractor has been totally performed to his satisfaction prior to the Provisional Hand-Over of the Work, the Engineer may at his discretion authorize the release of all or part of the retention monies held, being 10 (ten) percent of the value of work performed under that particular Subcontract. In such a case the total retention amount held by the Employer shall be adjusted accordingly in the subsequent Monthly Certificates.
- (e) Where the Employer, under the relevant provisions of the Contract, has found it necessary to engage a Third Party to carry out some portion of the Contract and has entered into a third party agreement for this purpose, full responsibility for the execution of the works in accordance with the Contract Documents will be retained by the Contractor, but payment for that part of the Works carried out by the Third Party may be made directly from the Employer to the Third Party, as provided under sub-clause G.60(2) hereof.

G.60 (2) Payment of Other Parties

In the event that the Employer must invoke those provisions of this Contract under which he is entitled to engage other parties to carry out work which properly the



Contractor was obliged to carry out under the Contract, the terms of engagement of the other parties will be negotiated solely between the Employer and these parties, and all claims for payment for the work, or for other costs properly incurred in carrying out the work, shall be paid in either of two ways, as follows:

Payment Method 1

The Employer may elect to pay the claims and deduct the full cost, plus any damages or other deductions that may be provided for in the various relevant clauses of the Contract, from any monies due or which may become due to the Contractor.

Payment Method 2

Alternatively, the Employer may instruct the Contractor in writing to pay the other parties the full amount. Subsequently, the Contractor may claim reimbursement for the full amount from the Employer. In this case, the Employer will deduct from any monies due or which may become due to the Contractor only the damages or other deductions as provided for in the relevant clauses of the Contract, but not the cost of the work. On receipt of the Employer's instruction to pay the other parties, the Contractor shall make out a cheque in the name of the other parties for the full amount and submit the cheque together with his claim for reimbursement to the Employer who will pass the cheque on to the other parties in payment for the work done.

G.61 (1) Release of Retention Monies

Upon the issue of the certified Provisional Hand-Over Process-Verbal with respect to the whole of the Works, one half of the Retention Money shall be certified by the Engineer for payment to the Contractor. In the event that the issue of the certified Provisional Hand-Over Process-Verbal is in respect to a section or part of the Works in accordance with Clause G.48(2), such proportion thereof as the Engineer determines having regard to the relative value of such section or part to the whole of the Works, shall be certified by the Engineer for payment to the Contractor.

The balance of the Retention Money will be held by the Employer against the Contractor's fulfillment of his obligations during the Period of Warranty. However, solely at his discretion, the Employer may release the balance of the Retention Money on receipt of a Bank Guarantee for Maintenance. Such guarantee will be from a bank approved by the Employer and will be for the same amount as the balance of the Retention Money being released.

Upon the issue of the Certificate of Final Completion of the Works or if different Certificates of Final Completion for sections or parts of the Works have been issued, upon the issue of the last Certificate of Final Completion, the other half of the Retention Money will be certified by the Engineer for payment to the Contractor. In the event that the Employer has agreed to accept a Bank Guarantee for Maintenance as described above, such guarantee will be returned to the Contractor upon issue of the Certificate of Final Completion of the Works.

In the event of the Contractor failing to complete the whole of the work instructed by the Engineer during the Period of Warranty or otherwise fulfill his contractual obligations, the Employer may use the balance of the Retention Money or funds from the Bank Guarantee as is necessary to complete the work satisfactorily.

G.61 (2) Payment Currencies

All payments to the Contractor, with the exception of any adjustment amount payable on account of fluctuations in cost (escalation/de-escalation) in accordance with Clause G.70 hereof, shall be made in the Dong currency of the Socialist Republic of Vietnam (hereinafter called local currency) and Japanese Yen (hereinafter called foreign currency), and in the same proportions of the local and foreign currency components of the various Unit Prices and Rates as have been established in the Contract Agreement.

G.62 (1) Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of the Works, unless the Contractor shall have made a claim in writing in respect thereof before the giving of the Certificate of Final Completion.

G.62 (2) Unfulfilled Obligations

Notwithstanding the issue of the Certificate of Final Completion the Contractor and, subject to sub-clause (1) of this Clause, the Employer shall remain liable for the fulfillment of any obligation incurred under the provisions of the Contract prior to the issue of the Certificate of Final Completion which remains unperformed at the time such Certificate is issued and, for the purpose of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto.

## REMEDIES AND POWERS

### G.63 (1) Incapacity of Contractor

If before the completion of the Contract the Contractor shall become bankrupt, or have a receiving order made against him, or make an assignment in favour of his creditors, or being a corporation shall go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or restructuring) and the heir(s) of the Contractor or the appointed receiver, assignee or liquidator fails, within 14 (fourteen) days following the incapacity of the Contractor or such extended time as the Employer may otherwise allow, to make arrangements satisfactory to the Employer for the continued performance of the Works, then the Employer shall, at his option and without any further notice or process of law, determine the Contract in accordance with the powers hereinafter provided.

### G.63 (2) Default of Contractor

In the event of:

- (a) the Contractor assigning the whole or any part of the Contract to a third party without the consent in writing of the Employer first obtained; or
- (b) the Contractor, being a Joint Operation or Consortium of two or more companies, modifying the partnership proportions of the joint operation or consortium agreement between the companies without the consent in writing of the Employer first obtained; or
- (c) the Contractor subletting any part of the Contract to the detriment of good Workmanship and without the consent in writing of the Engineer first obtained; or
- (d) the Engineer certifying in writing to the Employer that in his opinion the Contractor;
  - (i) has abandoned the Contract; or
  - (ii) without reasonable cause, has failed to take-over the site and commence the Works within the 30 (thirty) day period following the Commencement of Works Date nominated in the Notice to Proceed; or
  - (iii) without reasonable cause, has failed to mobilize all of the major plant and equipment within the 45 (forty five) day period following the scheduled completion date for mobilization specified in the Contract Documents; or
  - (iv) has suspended the progress of the Works for more than 28 (twenty eight) days without the written instruction of the Engineer; or
  - (v) despite previous warning by the Engineer, in writing, has failed to proceed with the Works with due diligence or has failed to employ sufficient labour, plant or materials or has otherwise failed to make such progress with the Works as the Engineer deems sufficient to

ensure their completion within the time specified under the Contract;  
or

- (vi) has failed to remove materials from the Site or to pull down or replace any work for more than 28 (twenty eight) days after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer under Clause G.39(1) of these General Conditions of Contract; or
- (vii) despite previous warning by the Engineer, in writing, is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligations under the Contract;  
or
- (viii) has failed to substantially complete the Works in the prescribed time or such extended time as has been approved under Clause G.44 hereof, and the amount of liquidated damages imposed for the period of delay beyond such prescribed or extended time has reached the maximum allowed under Clause G.47(1) hereof,

then the Employer may at his option, after having given 14 (fourteen) days notice of his intended action and without remedy of the Contractor's default within this period, determine the Contract.

G.63 (3) Determination

If in proceeding under the provisions of Clause G.63(1) or G.63(2) the Employer elects to determine the Contract, he may absolutely determine the Contract without further process and from and after the expiration of the requisite period of notice the Contract shall be absolutely determined.

On such determination the money which shall have been previously paid to the Contractor under the Contract shall, if the Employer in his discretion thinks fit, be deemed to be the full value of the work executed and shall be taken and accepted by the Contractor in full payment and satisfaction of all claims and demands under the Contract, and all bonds then held by the Employer shall remain the absolute property of the Employer. Alternatively the Employer may fix and determine ex-parte, or by or after reference to the parties, or after such investigation or enquiries as he may think fit to make or institute, and shall certify what amount, if any, had at the time of such determination been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract.

In the event that the settlement herein before mentioned does not provide the Employer with full recovery of all costs incurred up to the time of determination to which he is fairly entitled to receive under the Contract, then the additional amount may, at the discretion of the Employer, be deemed a debt from the Contractor to the Employer and shall be recoverable accordingly.

G.63 (4) Use of Plant after Determination

In the event of the Employer, after such determination under Clause G.63(3) herein, electing to continue and complete the Works using his own resources or enter into another contract with any other contractor to complete the Works, he

may use for such completion any of the Contractor's Construction Plant, Temporary Works and unused materials as he should deem necessary, and for any such use the Contractor shall be entitled to receive such payment from the Employer as the Engineer should consider is fair and proper.

G.64 Urgent Repairs

If, by reason of any accident, or failure, or other event occurring to or in connection with the Works, or any part thereof, either during the execution of the Works, or during the Period of Warranty, any remedial or other work or repair shall, in the opinion of the Engineer, be urgently necessary for security or the safety of the Works and the Contractor is unable or unwilling at once to do such work or repair, the Employer may by his own or other workmen do such work or repair as the Engineer may consider necessary.

If the work or repair so done by the Employer is work which, in the opinion of the Engineer, the Contractor was liable to do at his own expense under the Contract, all costs and charges properly incurred by the Employer in so doing shall on demand be paid by the Contractor to the Employer, or may be deducted by the Employer from any monies due or which may become due to the Contractor. Provided always that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

## SPECIAL RISKS

G.65 Notwithstanding anything in the Contract contained :

G.65 (1) No Liability for War, etc., Risks

The Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of destruction of or damage to the Works (save to Work condemned under the provisions of Clause G.39 hereof prior to the occurrence of any special risk hereinafter mentioned) or Temporary Works or in respect of injury or loss of life which is the consequence whether direct or indirect of war, hostilities (whether war be declared or not), invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war or (unless solely restricted to the employees of the Contractor or his subcontractors and arising from the conduct of the Works) riot, commotion or disorder, (hereinafter comprehensively referred to as the "said special risks") and the Employer shall indemnify and save harmless the Contractor against and from the same and against and from all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising thereout or in connection therewith and shall compensate the Contractor for any loss or damage to property of the Contractor used or intended to be used for the purpose of the Works and occasioned either directly or indirectly by the said special risks.

G.65 (2) Damage to Works, etc., by Special Risks

If the Works or Temporary Works or any materials (whether for the former or the latter) shall sustain destruction or damage by reason of any of the said special risks the Contractor shall nevertheless be entitled to payment for any Permanent Works and for any materials so destroyed or damaged and the Contractor shall be entitled to be paid by the Employer the cost of making good any such destruction or damage whether to the Works or the Temporary Works and of replacing or making good such materials so far as may be required by the Engineer or as may be necessary for the completion of the Works on an actual cost basis plus such profit as the Engineer may certify to be reasonable.

G.65 (3) Explosion, etc.

Destruction, damage, injury or loss of life caused by the explosion or impact whenever and wherever occurring of any mine, bomb, shell, grenade, or other projectile, missile, munitions, or explosive of war, shall be deemed to be a consequence of the said special risks.

G.65 (4) Increased Costs arising from Special Risks

The Employer shall repay to the Contractor any increased cost of or incidental to the execution of the Works (other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause G.39 hereof prior to the occurrence of any special risk) which is howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks (subject however to the provisions in this Clause hereinafter contained in regard to outbreak of war) but the Contractor shall as soon as any such increase

of cost shall come to his knowledge forthwith notify the Engineer thereof in writing.

G.65 (5) Outbreak of War

If during the currency of the Contract, there shall be an outbreak of War (whether war is declared or not) in any part of the world which, whether financially or otherwise, materially affects the execution of the Works to the extent that further performance of the Contract is frustrated, the Contractor shall, unless and until the Contract is terminated under the provisions of Clause G.66(1) hereof, continue to use his best endeavors to continue with the execution of the Works.

## FRUSTRATION AND TERMINATION

### G.66 (1) Frustration

If a war, or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevented from fulfilling his obligations, then the Employer may consider that the Contract has become frustrated and shall be entitled, at any time after such circumstances have arisen, to terminate the Contract.

### G.66 (2) Termination for Convenience of Employer

At any time after the Contract is signed, the Employer shall be entitled to terminate the Contract whenever he shall determine that such termination is necessary to protect the interest of the Government of the Socialist Republic of Vietnam.

### G.66 (3) Notice of Termination

If the Employer shall elect to terminate the Contract under the provisions of Clause G.66(1) or G.66(2) hereof, such termination shall be effected by delivery to the Contractor of a written notice and upon such notice being delivered the Contract shall be terminated.

After receipt of such notice, and except as specifically mentioned in the notice or directed by the Engineer, the Contractor shall:

- (a) stop all work under the Contract;
- (b) place no further subcontracts or orders for materials, services or facilities;
- (c) terminate all existing orders and subcontracts;
- (d) settle, with the approval or ratification of the Engineer, any outstanding liabilities or claims arising out of such termination of orders and subcontracts;
- (e) take such action as is necessary, or as the Engineer may direct, for the protection and preservation of the Works;
- (f) remove, with all reasonable dispatch, all Construction Plant from the Site and the Works and allow similar facilities for his Subcontractors to do same;
- (g) deliver to the Employer, in the manner and at the times directed by the Engineer, all completed work, work in progress, material and other things produced as part of or acquired in connection with the Works including any completed or partially completed drawings, information or other records which, if the Contract had been completed, would have been required to be furnished under the terms and conditions of the Contract.

### G.66 (4) Payment if Contract Terminated

If the Contract shall be terminated under the provisions of Clause G.66(3) herein, the Contractor shall be entitled to payment from the Employer (insofar as such amounts or items shall not have already been covered by payments on account



made to the Contractor) for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

- (a) The proper proportion of the total amount payable, as may be certified by the Engineer, for items of mobilization which have been completed or partially carried out;
- (b) The cost of materials or goods reasonably ordered for the Works which shall have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials or goods becoming the property of the Employer upon such payment being made by him;
- (c) A sum to be certified by the Engineer, being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works insofar as such expenditure shall not have been covered by any other payment under this Clause. Such sum shall be limited solely to expenditures already incurred by the Contractor prior to the date of termination and shall not in any way include any allowance for loss of profit on work not completed as a result of such termination;
- (d) Any additional sum approved or ratified by the Engineer in settlement of any liabilities or claims arising out of the termination of work carried out under order of or subcontract to the Contractor;
- (e) The reasonable cost of protection, and preservation of the Works as a result of such termination;
- (f) The reasonable cost of removal of Construction Plant and, if required by the Contractor, return thereof to the Contractor's main plant yard in his country of registration or to any other destination, at no greater cost;
- (g) The reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the Works at the time of such termination.
- (h) Any additional sum payable under the provisions of Clauses G.65(1), G.65(2) and G.65(4) hereof, if applicable;

Provided always that against any payments due from the Employer under this Clause, the Employer shall be entitled to be credited with any outstanding balance due from the Contractor for any sum which at the date of termination was recoverable by the Employer from the Contractor under the terms of the Contract.

## SETTLEMENT OF DISPUTES

### G.67 (1) Decision of Engineer

If any dispute or difference of any kind whatsoever shall arise between the Employer and the Contractor in connection with, or arising out of the Contract, or the carrying out of the Works, (whether during the progress of the Works or after their completion and whether before or after the termination or determination of the Contract) it shall, in the first place, be referred to and settled by the Engineer who shall, within a period of ninety (90) days after being requested by either party to do so, give written notice of his decision to the Employer and the Contractor.

Subject to the right of the Employer or the Contractor to refer the matter or matters in dispute to arbitration, such decision in respect of every matter so referred shall be final and binding upon the Employer and the Contractor and shall forthwith be given effect to by the Employer and by the Contractor, who shall proceed with the execution of the Works with all due diligence whether he or the Employer requires arbitration or not.

If the Engineer has given written notice of his decision to the Employer and the Contractor and no claim to arbitration has been communicated to him by either the Employer or the Contractor within a period of ninety (90) days from receipt of such notice, the said decision shall remain final and binding upon the Employer and the Contractor.

If the Engineer shall fail to give notice of his decision, as aforesaid, within a period of ninety (90) days after being requested as aforesaid, or if either the Employer or the Contractor be dissatisfied with any such decision, then and in any such case either the Employer or the Contractor may within ninety (90) days after receiving notice of such decision, or within ninety (90) days after the expiration of the first-named period of ninety (90) days, as the case may be, require that the matter or matters in dispute be referred to arbitration as provided under Clause G.67(2) herein.

### G.67 (2) Arbitration

All disputes or differences in respect of which the decision, if any, of the Engineer has not become final and binding as provided under Clause G.67(1) herein, and any default of the Employer under Clause G.69(1), shall be finally settled in Vietnam under the Rules of Conciliation and Arbitration of the Vietnam Chamber of Commerce and Industry by one or more arbitrators appointed in accordance with International Rules and such settlement in arbitration shall be final and binding upon the Employer and the Contractor. The said arbitrator(s) shall have full power to open up, review and revise any decision, opinion, direction, certificate or valuation of the Engineer and neither party shall be limited in the proceedings before such arbitrator(s) to the evidence or arguments put before the Engineer for the purpose of obtaining his said decision. No decision given by the Engineer in accordance with the foregoing provisions shall disqualify him from being called as a witness and giving evidence before the arbitrator(s) on any matter whatsoever relevant to the dispute, difference or default referred to the arbitrator(s) as aforesaid.

The arbitrator(s) shall not enter on such reference until after the completion or alleged completion of the Works without the written consent of the Employer and the Contractor first obtained, provided always:

- (i) that any such reference may be opened before such completion or alleged completion in respect of the withholding by the Engineer of any certificate in accordance with Clause G.58(6), or the failure of the Engineer to certify the release of any portion of the retention money in accordance with Clause G.61 to which the Contractor claims to be entitled, or the exercise of the Engineer's power to determine the Contract under Clause G.63(3) hereof, or the default of the Employer under Clause G.69 hereof;
- (ii) that the giving of the Certificate of Final Completion under Clause G.59(1) hereof shall not be a condition precedent to the opening of any such reference.

In the event of any such reference being opened before such completion or alleged completion, the Contractor shall not be entitled to suspend the execution of the Works on account of such reference, except where instructed by the Engineer so to do.

## NOTICES

G.68 (1) Service of Notices on Contractor

All certificates, notices or written orders to be given by the Employer or by the Engineer to the Contractor under the terms of the Contract shall be served by sending by post or delivering the same to the Contractor's principal place of business, or such other address as the Contractor shall nominate for this purpose.

G.68 (2) Service of Notices on Employer or Engineer

All notices to be given to the Employer or to the Engineer under the terms of the Contract shall be served by sending by post or delivering the same to the respective addresses nominated as follow:

(a) To the Employer:

The General Director  
Projects Management Unit Thang Long  
Ministry of Transport  
Thong Trung, Dich Vong Ward, Cau Giay District,  
HANOI Vietnam

(b) To the Engineer:

As given in the Invitation to Bid.

G.68 (3) Change of Address Notice

Either party may change a nominated address to another address in the country where the Works are being executed by prior written notice to the other party and the Engineer may do so by prior written notice to both parties.

## DEFAULT OF EMPLOYER

G.69 (1) Default of Employer

In the event of the Employer :

- (a) failing to pay to the Contractor the amounts due under any certificate of the Engineer; or
- (b) interfering with or obstructing the issue of any such certificate without due reason,

the Contractor may give notice in writing to the Engineer of the default and if such default of the Employer is not remedied within a period of 90 (ninety) days after the giving of such notice the Contractor shall be entitled to seek the cancellation of the Contract by reference to arbitration in accordance with the provisions of Clause G.67(2) hereof.

G.69 (2) Additional Payment for Loss and Damage

In the event of an arbitration ruling in support of the Contractor's demand for the cancellation of the Contract, as a consequence of the last preceding Clause, the Employer shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of Clause G.66 hereof, but for any payment claimed by the Contractor, additional to the payments specified in Clause G.66(4) hereof, for the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such cancellation, the Contractor shall be entitled to refer such claim to arbitration in accordance with the provisions of Clause G.67(2) hereof.

G.69 (3) Removal of Plant on Cancellation

If the Contract shall be cancelled under the provisions of Clause G.69(1) herein, the Contractor shall, with all reasonable dispatch, remove from the Site and the Works all of his Construction Plant and shall give similar facilities for his Subcontractors to do same.

G.69 (4) Contractor's Rights

Nothing in this Clause contained shall prejudice the right of the Contractor to exercise either in lieu of or in addition to the rights and remedies in this Clause specified any other rights or remedies to which the Contractor may be entitled.

## CHANGES IN COSTS

### G.70 Price Escalation

Adjustments to the Contract Sum shall be made in respect of rise or fall in the costs of labour and/or materials or other matters affecting the cost of the execution of the Works, in accordance with the provisions set out in the Special Specifications.

## TAXATION AND OTHER REGULATIONS

### G.71 (1) Taxes, Duties and Other Regulations

The Contractor shall familiarize himself with the laws, ordinances, decrees, circulars and guidelines of the Government of the Socialist Republic of Vietnam (the Government) with regard to customs, immigration, duties, taxes, clearing of goods and equipment and the like, applicable to this type of project and its financing. The Contractor shall follow the required procedures, regardless of any relief provided by the Government, and the Government will provide prompt and effective assistance wherever possible.

In the event that the Contractor has to disburse his own funds for any legally exempted items he shall be entitled to full recovery from the Employer.

In the event that the Contractor elects to dispose of exempt equipment, materials, and vehicles in Vietnam the Contractor shall bear the cost of all applicable duties and taxes, as may be imposed in conformity with the laws, ordinances, decrees, circulars and guidelines of the Government of Vietnam.

### G.71 (2) Compensation for Losses due to Alterations in Tax, Duty and Other Regulations

It is fully and solely the Bidder's responsibility to consider and make all due allowance for taxes and other fees in accordance with the relevant regulations and no claims whatsoever for any additional compensation will be considered in this respect.

The cost of all central government and local authority taxes, duties and levies of whatsoever name which are relevant to the Contract, under legislation in force 30 (thirty) days prior to the latest date for submission of Bids will be deemed to have been fully allowed for in the Total Bid Sum.

Any special requirements as to the method of dealing with the matter of Vietnamese taxes will be given in the Special Specification.

Where changes of such regulations occur during the execution of the Contract the Employer may in certain cases, compensate the Contractor for any proven loss of the Contractor or request reimbursement from the Contractor for any unwarranted proven gain of the Contractor as a result of such changes in regulations.

### G.72 Visas and Permits

The Employer will assist in making arrangements for the Contractor and his expatriate personnel, including dependents, to be provided with all necessary entry and exit visas, immigration cards and travel documents required for their stay in Vietnam. All costs associated with these visas and permits shall however be borne by the Contractor.

### G.73 Law Governing Contract

The Contract shall be deemed to have been made in and shall be construed according to the Laws of the Socialist Republic of Vietnam. All the conditions stated in the documents forming the Contract, as specified in the Contract Agreement are binding and valid as law for both parties.

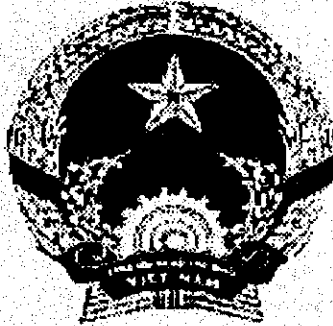
Any foreign Contractor who participates in whatever manner in this Contract consents to be sued in any court or tribunal of competent jurisdiction within the Socialist Republic of Vietnam on any question or matter arising from the documents, award, and implementation of the project. For this purpose any officer, agent or representative of the said foreign Contractor present in the territory of the Socialist Republic of Vietnam is authorized to receive process summons on behalf of the foreign Contractor notwithstanding any restriction or limitation imposed by the said foreign Contractor upon its officers, agents or representative.

G.74 Expenditures under the Contract

Goods and services which are to be supplied under the Contract may be procured from all countries and areas, as specified in the "JBIC Loan Agreement".



**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE  
PACKAGE 2 : GIA LAM SECTION  
PACKAGE 3 : THANH TRI SECTION  
PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

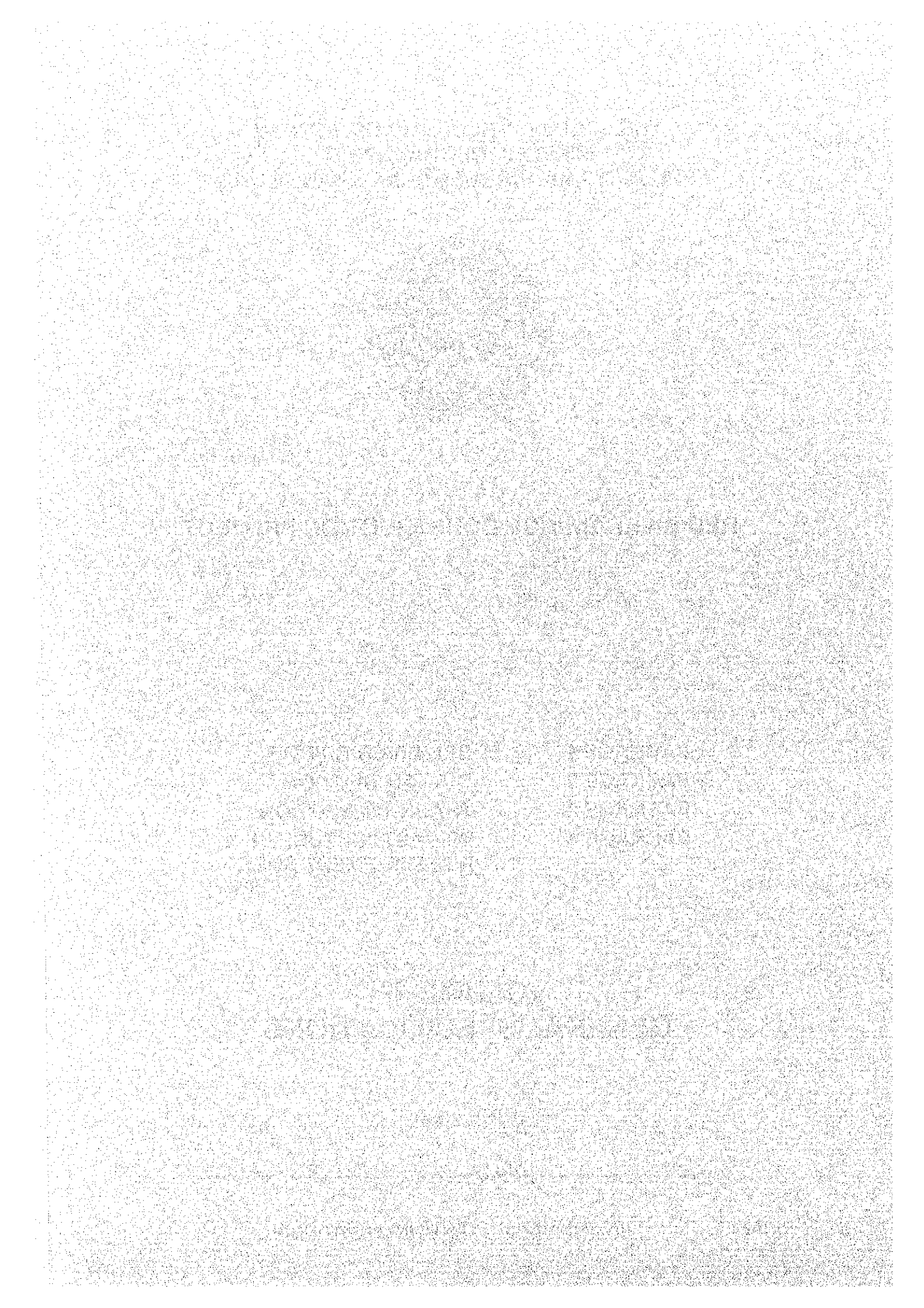
**VOLUME II  
GENERAL SPECIFICATIONS**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**



**GENERAL SPECIFICATIONS**  
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## SECTION 1 GENERAL

### S1.01 Abbreviations

In addition to the definitions stated in the General Conditions of Contract, the following abbreviations are used in the General Specifications and Bid Schedule and they shall be interpreted as follows :

CBR	-	California Bearing Ratio
cm	-	Centimeter(s)
Cov.Pl.	-	Cover plate
cu.m or m <sup>3</sup>	-	Cubic meter(s)
Dia. or $\Phi$	-	Diameter
Diaph.	-	Diaphragm
Drg. or Dwg	-	Drawing
Ea	-	Each
Guss.	-	Gusset
HP	-	Horsepower(s)
kg	-	Kilogram(s)
L.M. or m	-	Linear meter(s)
lt	-	Liter(s)
Max.	-	Maximum
Min.	-	Minimum
mm	-	Millimeter(s)
No.	-	Number
P.C	-	Pre-stressed Concrete
R.C	-	Reinforced Concrete
VND	-	Dong(s)of the Socialist Republic of Vietnam
Sht.	-	Sheet
Spl.	-	Splice
sq. cm or cm <sup>2</sup>	-	Square centimeter(s)
sq. m or m <sup>2</sup>	-	Square meter(s)
t or ton	-	Metric tonne (1000kg)
W or Wt	-	Weight

### S1.02 Materials

S1.02 (1) Unless otherwise specifically provided in the Contract, all items incorporated in the completed work, such as equipment, materials and other articles, are to be new and the most suitable grade for the purpose intended. Unless otherwise specifically provided in the Contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalogue number, shall be regarded as establishing a standard or quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process which, in the judgment of the Engineer, is equal to that named. Unless otherwise specified or instructed, all proprietary materials shall be used in accordance with the Manufacturer's instructions.

S1.02 (2) When required by the Engineer, the Contractor, before placing any order for materials or manufactured articles to be incorporated in the Permanent Works, shall submit for approval a complete description of such items, the names of the firms from whom he proposes to obtain them, and a list of such of the items that he proposes the firms should supply. When so directed, the Contractor shall submit samples and certificates for approval.

S1.03 Storage of Materials

S1.03 (1) Materials shall be stored so as to ensure preservation of their specified quality and fitness for the work. They shall be placed on a hard, clean surface and, when required, they shall be placed under cover. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without written permission of the owner and lessee and payment to them, if necessary.

S1.03 (2) The stockpile site shall be prepared by clearing and leveling as directed by the Engineer.

S1.03 (3) The centre of all aggregate stockpile areas shall be raised and sloped to the sides as required so as to provide proper drainage of excess moisture. The material shall be stored in such manner as to prevent segregation and coning and to ensure proper gradation and moisture content. Coarse aggregate storage piles shall be built up and removed in layers not exceeding one meter. The height of such stockpiles shall be limited to five meters.

S1.04 Royalties

The Contractor shall be responsible for all compensation and royalties due in respect of quarried materials. No separate payment will be made for the compensation of royalties, but all such costs shall be included in the applicable unit price and total of the Bid Schedule.

S1.05 Right-Of-Way

The right-of-way is the land to be acquired for and devoted to the Bridges and Roads. The right-of-way widths shown on the Drawings are approximate only, the effective width to be established by the Employer.

S1.06 Working Area

The Contractor shall make all arrangements, inclusive of payment, if necessary, for the use of any land required for working areas outside the right-of-way, and the Employer will not accept any liability in connection with the use of such land. Any exceptions to this will be given in the Special Specifications or at the time of Bidding.

S1.07 Site for Detours, Plant, and Other Uses

The Contractor shall select, arrange for, and if necessary pay for the use of sites for detours, for all central mixing plants for concrete and bituminous materials, for the storage of equipment, for his own office buildings, housing, or other uses necessary for the execution of the Work.



Before any land belonging to the Government or to a private landowner is used for any purposes in connection with the execution of the Work, the Engineer's approval shall be obtained.

If any utility for water, electricity, drainage, etc., passing through the temporary site will be affected by the Works, the Contractor at his own expense, shall provide a satisfactory alternative in full working order to the satisfaction of the owner of the utility and the Engineer, before the cutting or removal of the existing utility.

On completion of the Contract, or earlier if so directed by the Engineer, all plant and any other encumbrances shall be removed, the site properly cleaned, all damage made good, and, if necessary, the land-owner paid for the use of the land.

S1.08 Living Quarters, Sheds, and Stores

The Contractor shall supply, equip and maintain for the Contract period all his own living accommodation, sheds and stores necessary for the execution of the Work, and shall make his own arrangements, subject to the approval of the Engineer, with the owner of any land required and, if necessary, pay for its use.

The furnishing and maintenance of living quarters, sheds, and stores shall be paid for as provided in Clause S1.20 "Mobilization".

S1.09 Office, Housing, Vehicles for the Employer, Engineer and their Staff

S1.09 (1) The Contractor shall provide and maintain for the duration of the Contract, office accommodation and housing for the use of the Employer and the Engineer and his staff, and shall provide fuel, oil, maintenance and servicing for vehicles and motor cycles assigned to the Engineer's site teams, all as specified in the Special Specifications, and to the satisfaction of the Engineer.

S1.09 (2) The supply, equipping and maintenance of items described in this Clause shall be paid for as provided in Clause S1.20 "Mobilization".

S1.10 Laboratory

The Contractor shall supply, equip and maintain for the duration of the Contract, an approved fixed or mobile laboratory with facilities, furniture, equipment, personnel, apparatus, and installations for his own use and that of the Engineer. The laboratory will be operated by the Contractor under the supervision of the Engineer or his staff.

The laboratory shall be equipped with all the necessary apparatus and materials for the performance of all the standard tests required by the Specifications, except that tests as detailed below may be carried out at an external laboratory approved by the Engineer. If the Contractor elects not to supply equipment for the under-noted tests, then all charges payable to third parties for transportation and testing of the samples will be at the Contractor's expense.

Group 1. (Equipment supply at Contractor's option)

- |   |       |
|---|-------|
| 1. Tests on Penetration Graded Asphalt Cement | (M20) |
| 2. Tests on Portland Cement                   | (M85) |
| 3. Tests on Concrete Drains and Pipes         | (M86) |

- |   |        |
|---|--------|
| 4. Compressive Strength of Concrete Specimens   | (T22)  |
| 5. Abrasion of Aggregate by Los Angeles Machine | (T96)  |
| 6. Extraction of Bitumen                        | (T164) |
| 7. Effect of Water on Bituminous Mixtures       | (T165) |
| 8. Marshall Resistance to Flow                  | (T245) |

Group 2.

All other apparatus and materials necessary for tests required under the Contract shall be supplied by the Contractor and installed in the laboratory. Not later than 30 days after the issue of the Notice to Proceed, the Contractor shall submit for the Engineer's approval, a list of all equipment to be procured and details of suppliers.

All equipment used for testing shall be of standard type and approved by the Engineer and properly housed by the Contractor. An adequate supply of water and electric power shall be provided at all times.

Every designation of AASHTO Test and Material in these Specifications refers to "AASHTO Specifications for Highways Material and Methods of Sampling and Testing" and shall refer to the last revision of the Specification at the time of project bidding, except where otherwise nominated.

In any case where material or workmanship is specified by one of the above tests, and alternative test methods are allowed, the method used to determine compliance with this Specification will be at the absolute discretion of the Engineer. The Engineer's decision will be final and claims on the basis of the Engineer's selection of a particular allowable test method will be rejected.

Other than the laboratory prescribed in this Clause, a field laboratory shall be provided by the Contractor at the location designated by the Engineer in order that the Engineer can control and supervise the material used for bituminous pavements and operations of bituminous mixing plants, as provided in Section 9 of these Specifications.

The furnishing and maintenance of laboratories including staffing, water, electric facilities, and all other expenses will be paid for as provided under Clause S1.20 – Mobilisation. Such payment covers the utilization but not the ownership of the equipment, apparatus and installation of the laboratory which will remain the property of the Contractor at the completion of the Contract.

S1.11 Setting Out the Work, and Staking

S1.11 (1) The Contractor shall set construction stakes establishing lines and grades in accordance with the Drawings and shall secure the approval of the Engineer before commencing with the work of construction. The Engineer will, if he deems it necessary, revise the line and grade and require the Contractor to adjust the stakes accordingly. The Contractor shall give the Engineer not less than forty-eight hours notice of his intention to stake out or establish levels for any part of the work in order that arrangements may be made for checking. The Contractor shall measure the staking out and the Engineer will check the measurement. The approved measurement will be the basis of payments.

S1.11 (2) The Contractor shall, as a requirement of the Contract and without extra charge, furnish for the exclusive use of the Engineer all necessary instruments,

appliances, surveying personnel and labour, and any material that the Engineer may require for checking the setting out or for any other relevant work to be done. Such survey personnel and equipment shall include but not necessarily be limited to;

- (a) 4 Surveyors  
6 Surveyors labourers
- (b) Surveying Equipment  
1 Wild RDS Theodolite (360 degree); 1 Wild TO Theodolite (360 degree); 2 Wild NAK Levels; 2 steel measuring tapes 50 m long; 2 steel measuring rods (4 m); 20 target poles with targets and tripods; wooden survey stakes as required and miscellaneous tools required in surveying. All surveying instruments shall be supplied complete including tripods, etc.

Such survey equipment will be utilized by the Engineer and will be repaired or replaced by the Contractor as required by the Engineer, however the equipment will remain the property of the Contractor at the completion of the Contract.

The Contractor shall at his own expense make any additional surveys and measurements that are required for the construction of the work such as slope stakes, temporary grade stakes, and bridge and culvert layout, offset line, etc. The Contractor shall be responsible for the accuracy of all surveys or measurements made by his employees.

Any marks made by the Engineer or the Contractor shall be carefully preserved and, if disturbed or destroyed, shall be immediately replaced by the Contractor at his own expense and to the satisfaction of the Engineer. No work shall be carried out in any section until the necessary setting out in that section has been approved by the Engineer.

- S1.11 (3) The Contractor shall submit to the Engineer two copies of the cross-sections as required by Clause S4.02. The Engineer will endorse one copy with his approval or his revision thereof, and return it to the Contractor.

The Contractor shall resubmit as above for approval any cross-sections that the Engineer may require to be revised.

Once approved, three copies of the final cross-sections shall be formally submitted to the Engineer as a basis for future quantity calculations. The drawings shall be of A3 size, conform to the format of the project drawings, be produced using an approved version of "Auto-Cad" (Presently Version 14.0 for Windows) and shall include computer disks of the drawings for future records.

- S1.11 (4) The cost of complying with this Clause shall be considered to be included in the Bid Prices for pay items under the Contract.

S1.12 Notice of Operations

- S1.12 (1) The Contractor, when required by the Engineer, shall supply in writing full information regarding the locations in which the materials are being obtained and in which the work is being prepared.

- S1.12 (2) No permanent work shall be undertaken without the Engineer's approval. Full and complete notice in writing shall be given to the Engineer at least 48 hours

in advance of the time of the proposed operation for him to be able to make such arrangements as he may deem necessary for its inspection. Requests shall be prepared in triplicate and submitted to the office of the Resident Engineer. Requests shall not be given to field staff.

S1.13 Safety

S1.13 (1) The Contractor will be responsible for the safety of the public legitimately passing through the Site. All excavations, plant or items of potential danger to the public must be barricaded and sign-posted to the satisfaction of the Engineer and the Contractor must provide sufficient watchmen to ensure the safety of the public at all times. All existing pedestrian routes shall be maintained in a safe condition unless an alternative route is provided to the satisfaction of the Engineer.

S1.13 (2) All work must be carried out in such a way as to minimize danger to the public or the workmen on the Site.

S1.13 (3) The cost of complying with this Clause will not be paid for directly, but will be considered to be included in the Bid prices for pay items under the Contract.

S1.14 Temporary Road Works

S1.14 (1) The Contractor shall furnish, maintain, and remove on completion of the Work for which they are required, all temporary roads and road works such as sleeper tracks and staging over roads, access and service roads, temporary crossings or bridges over streams or unstable ground, and shall make them suitable in every respect for carrying Construction Plant required for the work, for providing access for traffic for himself or others, or for any other purpose. Such temporary road works shall be constructed to the satisfaction of the Engineer, but the Contractor shall nevertheless be responsible for any damage done to or caused by such temporary road works.

S1.14 (2) Before constructing temporary road works, the Contractor shall make all necessary arrangements, including payment if required, with the public authorities or landowners concerned, for the use of the land and he shall obtain the approval of the Engineer. Such approval will be dependent on the Engineer being satisfied with the Contractor's proposals for items such as signing, lighting and riding quality of the temporary road together with the proposed maintenance arrangements. Such approval will not, however, relieve the Contractor of his responsibilities under the Contract. Upon completion of the Works the Contractor shall clean up and restore the land to the satisfaction of the Engineer.

S1.14 (3) The Contractor, when required by the Engineer, shall submit for the Engineer's approval drawings giving full details of temporary roads. Such details shall include alignment, profile, pavement construction, signing, lighting and the duration of the temporary road.

S1.14 (4) The Contractor shall make all arrangements necessary to permit the passage along the road section relating to the Contract of the Construction Plant, materials and employees belonging to other Contractors engaged in the construction of contiguous stretches of road. For this purpose the Contractor and the Contractors concerned in the construction of the stretches contiguous to those through which they must pass shall, when necessary and with at least 15 days' notice, request the Engineer for permission to pass and submit a schedule for

such passage. After the Engineer has granted such permission and approved the schedule submitted, both the Contractors permitting the passage and those requesting it shall undertake to observe the schedule approved by the Engineer for the passage along the Site without having any right to extra payment in consequence of the restrictions on passage or the necessary temporary suspension of works due to the aforesaid schedule.

S1.14 (5) Payment for Temporary Road Works will be as provided in Clause S1.19 "Maintenance and Protection of Traffic".

S1.15 Temporary Traffic Ramps

In cases where it is necessary or required by the Engineer, the Contractor shall construct and maintain temporary traffic ramps, and furnish all the labour and materials required therefor. Payment for temporary traffic ramps will be as provided in Clause S1.19 "Maintenance and Protection of Traffic".

S1.16 Traffic Control

S1.16 (1) In order to facilitate traffic through or around the Works, or wherever ordered by the Engineer, the Contractor shall erect and maintain at prescribed points on the work and at the approaches to the Work, traffic signs, lights, flares, barricades, rubber cones with traffic lamps and other facilities as indicated in the Drawings or required by the Engineer for the direction and control of traffic.

S1.16 (2) Where required, or where directed by the Engineer, the Contractor shall furnish and station competent flag-men whose sole duties shall consist of directing the movement of traffic through or around the Work.

S1.16 (3) In addition to the requirements of (1) and (2) above, the Contractor shall furnish and erect, within or in the vicinity of the project area, such warning and guide signs as may be ordered by the Engineer.

S1.16 (4) In order to minimize disruption to traffic flows the Contractor shall enclose the Site with temporary fence to provide a visual barrier between his work and adjacent traffic. The temporary fence shall be of 2.0 m height as indicated in the Drawings and the movement of men, materials and plant into and out of the barriered area shall be controlled by flag-men.

S1.16 (5) Payment for traffic control will be as provided in Clause S1.19 "Maintenance and Protection of Traffic".

S1.17 Number of Lanes for Traffic Control

The existing number of traffic lanes on roads at the project site must be maintained at all times during the Work and if diversions are provided these must be of the same traffic capacity as the original road. Notwithstanding the above, the Engineer may give approval to reductions in traffic capacity if the Contractor can show that these will not cause excessive delay to traffic. If such approval is given, the Engineer may specify the hours during the day when the reduction in capacity may be applied and it should be anticipated that these hours may not include the peak period for the traffic movement under consideration.

The Contractor shall cooperate with the pertinent agencies regarding traffic control and all details will be subject to the Engineer's approval.

The cost of complying with this Clause shall be deemed to have been included in Pay Item 1.19 "Maintenance and Protection of Traffic".

**S1.18**      Extraordinary Traffic

The Contractor shall observe the requirements of Clause G.30 of General Conditions of Contract and is responsible for carrying out any necessary investigations and the obtaining of approvals, licences, escorts and any other necessary facilities in order to enable extraordinary traffic to be moved on the roads in the project area.

Any expenses arising out of this requirement shall be deemed to have been included in the lump sum payment for "Maintenance and Protection of Traffic" described in Clause S1.19.

**S1.19**      Maintenance and Protection of Traffic

The Contractor shall keep open to traffic existing roads during the performance of the Works, provided that when approved by the Engineer the Contractor may bypass traffic over a detour. The Contractor shall at all times keep roads and footpaths, affected by his operations, free from soil and material spillage.

The Contractor shall take necessary care at all times during the execution of the Work to ensure the existing convenience and safety of residents along and adjacent to the road, and any public highway or port facility that may be affected by the Work. Street lighting shall be relocated as necessary to maintain the same standard of lighting during the course of the works until new lighting facilities are brought into operation.

Any failure of the Contractor to meet these requirements will entitle the Engineer to carry out such works as he deems to be necessary and to charge the Contractor with the full cost thereof plus ten percent of such cost, which sum will be deducted from any money due or which may become due to the Contractor under the Contract.

Payment to the Contractor under Pay Item 1.19 shall be deemed to include the cost to the Contractor of meeting his obligations under this Clause together with such other items as are expressly stated in the General or Special Specifications as included for payment in this Clause.

Pay Item No.	Name	Unit of Measurement
1.19	Maintenance and Protection of Traffic	lump sum

Payment of this sum will be made in installments, as follows:

- 25% (twenty-five percent) with the first Monthly Certificate;

- 70% (seventy percent) as installments contained in the Monthly Certificates proportional to the number of months from the first Monthly Certificate to the Certificate of Provisional Handover; and
- 5% (five percent) with the Final Certificate.

S1.20 Mobilization

S1.20 (1) When the Bid Schedule contains an item for "Mobilization", the following are understood to be paid for :

- (a) Transport of Construction Plant, on the basis of the list of Construction Plant submitted with the Bid, from the port of unloading in Vietnam to the sites where they are to be used on the Bridges and Roads under Construction, and their installation;
- (b) The construction of offices, housing, workshops, stores, etc.;
- (c) The supply, installation and maintenance of vehicles, living quarters, offices, laboratories, workshops, stores, communications, facilities, etc.; and
- (d) Such other items as are expressly stated in the General or Special Specifications as being included in "Mobilization".

S1.20 (2) The Contractor may, always subject to the authorization of the Engineer, at any time during the Work, make any alterations, reductions and/or improvements to the Construction Plant and installations.

Payment is also intended to cover the dismantling of the work site by the Contractor, with the removal of all the installations, Construction Plant and equipment, so that the Site is restored to the state it was in before the installations, plant and equipment were placed there.

S1.20 (3) Within the time constraints given in Clause G.14(a) of the General Conditions of Contract, the Contractor shall prepare, submit and obtain the Employer's approval of a Mobilization Program.

The mobilization shall be completed within a period of 120 days from the Commencement of Works Date, except for the completion of the office, laboratory and housing and the supply of vehicles for the use of the Employer and the Engineer and staff as prescribed in Clauses S1.09 and S1.10 hereof which shall be completed within a period of 60 days from the Commencement of Works Date, and the preparation of detailed drawings as required under Clause S1.33 which shall be completed within a period of 90 days from the Commencement Works Date. All of the preceding timing shall commence at the date of commencement as given in the Notice To Proceed.

Where the Contract requires the provision of any equipment and facilities it should be understood that the Contractor's obligations include for the servicing and maintenance of these including supply of any consumables and payment of any recurring charges. Any exceptions to this will be clearly stated elsewhere in these documents.

S1.20 (4) Payments under this Clause will be made in installments as follows :

- 30% (thirty percent) on completion of the office, laboratory, housing and the supply of vehicles for the use of the Employer and Engineer;

- 65% (sixty five percent) as installments contained in the Monthly Certificates proportional to the number of months from the first Monthly Certificate to the Certificate of Provisional Handover; and
- 5% (five percent) in the Final Certificate on completion of all necessary dismantling and restoration of the Site.

Although the Pay Item may refer to facilities for the use of the Engineer's Staff, these may also be used by, or shared with, the Employer's staff as described elsewhere in these documents.

Pay Item No.	Name	Unit of Measurement
1.20(1)	Mobilization and Servicing of the Contractor's own Facilities	Lump Sum
1.20(2)	Supply and Servicing of Site Offices for the Engineer's Staff	Lump Sum
1.20(3)	Supply of Furniture and Equipment for Engineer's Site offices	Lump Sum
1.20(4)	Communications including Telephones, Faxes, Radio, etc.	Lump Sum
1.20(5)	Supply of Laboratory with Equipment and Staffing	Lump Sum
1.20(6)	Supply and Servicing of Site Housing	Lump Sum
1.20(7)	Supply of Furniture and Equipment for Site Housing	Lump Sum
1.20(8)	Supply and Servicing of Transport for Engineer's Staff	Lump Sum
1.20(9)	Supply and Servicing of Offices for the Engineer's Core Team	Lump Sum
1.20(10)	Supply of Furniture and Equipment for Engineer's Core Team Office	Lump Sum
1.20(11)	Supply and Servicing of Housing in Hanoi for the Engineer's Core Team	Lump Sum
1.20(12)	Supply of Furniture and Equipment for Core Team Housing	Lump Sum
1.20(13)	Supply and Servicing of Transport for Engineer's Core Team	Lump Sum
1.20(14)	Other Obligations under Mobilisation and Demobilisation, not covered by 1.20(1) to 1.20(13) above	Lump Sum



S1.21 Half-Width Construction

S1.21 (1) Where, in the opinion of the Engineer, a detour is not feasible, construction on existing public roads shall be undertaken only over half of the full width of the roadway. The length of such half-width construction shall be kept as short as possible.

S1.21 (2) Where half-width construction is necessary, work on culverts commenced in the dry season must be completed and the embankments adjacent to them must be reinstated so that at least half the full width shall be available for use by the public throughout the next rainy season.

S1.21 (3) Where single-lane traffic becomes necessary over a particular length of the works or over the approaches thereto, the Contractor, in maintaining through traffic, shall provide a single lane at least three and a half meters wide on the roadway or embankment to be kept open to traffic.

The Contractor shall so conduct his operations as to offer the least possible obstruction, inconvenience, and delay to traffic and shall be responsible for the adequate control of the traffic using such lengths of single lane.

S1.22 Filling in Holes and Trenches

The Contractor, upon completion of any part of the work, shall immediately, at his own expense, fill up all holes and trenches, or carry out the work to them as required by the Engineer, that he may have dug or excavated and are no longer required for the Project, and he shall clear away all rubbish and material that is no longer required for the execution of the Work.

S1.23 Contractor's Responsibility for the Work

Where the approval of the Engineer is required under these Specifications, approval shall not relieve the Contractor of his duties or responsibilities under the Contract.

S1.24 Standards of Workmanship

All workmanship shall be the best of its particular kind, and shall be carried out to the satisfaction of the Engineer.

S1.25 Protection of Works from the Weather

The Contractor shall, at his own expense, carefully protect all work and materials from injury by the weather.

S1.26 Working In and Dealing With Water

S1.26 (1) The Contractor shall take all necessary measures to remove water from the area of his work when, in the opinion of the Engineer, this is necessary to allow satisfactory execution of work in progress or for the protection of completed work.

S1.26 (2) Payment shall be by lump sum which will be considered to be full compensation for all expenses involved in the work and the Contractor's estimate will be assumed to be based on a thorough study of the work required and shall include, but not be limited to, the provision of pumps, temporary dams, temporary realignment of the flow, the construction of temporary water courses, ditches and drains and shall be deemed to cover the cost of working in any season of the year and for working in flows of both storm water and sewage contaminated flows.

S1.26 (3) Payment of the lump sum will be made in such installments as the Engineer considers reasonable and will be based on the total amount of such work in the Contract.

Pay Item No.	Name	Unit of Measurement
1.26	Working In and Dealing With Water	Lump sum

S1.27 Units of Measure

All units of measure used in these Specifications and in the Bid Schedule and Schedule of Rates and Prices are according to standard metric measure unless otherwise noted. When the Bid Schedule calls for payment on a ton basis, the unit shall be the tonne of 1,000 kilograms.

S1.28 Location and Protection of Utilities

Before commencing construction work the Contractor shall undertake a survey to establish the detailed location of all utilities affected by the Works. Survey results shall be recorded in plan form to the satisfaction of the Engineer and surface pegs fixed on the site to indicate the location of all underground utilities. These pegs shall remain for the duration of the contract.

Where works of either a temporary or permanent nature are to be undertaken by the Contractor in the vicinity of utilities, the Contractor shall adopt appropriate construction methods, provide adequate protective devices and take precautionary measures, without additional payment, in order to avoid damage to the utilities. Any damage to utilities caused directly or indirectly by the Contractor's work will be considered the Contractor's responsibility.

The costs of the requirements of this Clause shall be paid for as provided in Clause S15.01 "Diversion and Protection of Existing Utilities" of the Bid Schedule under the Contract.

S1.29 Templates and Straightedges

S1.29 (1) Sufficient metal templates shall be supplied by the Contractor and used by the Contractor or the Engineer to check the finished surface of the pavement structure. These templates shall be submitted to the Engineer for his approval. The templates used to control the work shall be maintained at all times in a condition to produce the correct cross-sectional profile, and shall be checked at intervals and, if necessary, repaired or adjusted as directed by the Engineer.

S1.29 (2) The Contractor shall make available sufficient straightedges, including one rolling straight edge, to check the surface of the pavement and other surfaces.

S1.29 (3) The furnishing of templates and straightedges will not be paid for directly, but all costs shall be deemed to have been included in the various relevant items of the Bid Schedule.

S1.30 Orders to Foreman

Whenever the Contractor or his Site Engineer is not present on any part of the work where the Engineer may decide to give orders or directions, such orders or directions shall be received and obeyed by the Foreman or other person who is in charge of the particular work concerned. All Foremen shall clearly understand and be proficient in the use of written and spoken English, or the

Contractor shall at all times provide interpreters on that job site who are proficient in English to the satisfaction of the Engineer.

S1.31 Work and Material included in the Contract Prices

S1.31 (1) The work to be performed and material to be furnished under the various clauses of these Specifications, or shown on the Drawings, or the supplementary or explanatory drawings, or ordered by the Engineer, shall include and be considered compensation for the costs incurred for all labour, materials, Construction Plant, organization of work, overheads, profits, royalties, taxes, custody of completed works, payment to third parties for land or the use of land, or for damage to property, incidental work where herein specified for the proper completion of the work and which is not paid for separately; temporary drainage to protect the work during construction, haulage, tools, explosives and material for blasting, placing of material where herein specified or where directed; sheeting, shoring, staging, centering and supports, where no separate payment is provided for; and all other costs necessary or usual for the proper performance of the work.

S1.31 (2) In cases where the "basis of payment" clause or part of any clause in these Specifications relating to any item requires that the Contract Price therefor cover and be compensation for certain work or material essential to the item, this same work or material shall not be measured or paid for under any other item that may appear elsewhere in these Specifications.

S1.31 (3) In certain areas of the work the Contractor will be required to undertake his work on or adjacent to existing pavements, in order to allow them to be incorporated in the new pavement. Where this results in working in restricted areas, this will not be accepted as a justification for a claim for increased cost or time. Before inserting his unit prices for relevant items the Contractor is understood to have studied the plans and profiles in order to make allowance for such restricted working.

S1.32 Workshop

The Contractor shall have on the Site a suitable workshop, adequately equipped and provided with utilities, to allow for repairs of the equipment employed to carry out the Works. He shall also provide a warehouse for the equipment spare parts, mainly for the parts that frequently fail or are difficult to procure. The workshop must be managed by a chief foreman qualified for mechanical repairs, with an adequate labour force. The furnishing of the Workshop, including all equipment and facilities, will be paid for as provided in Clause S1.20.

S1.33 Drawings

It shall be anticipated that some minor revision of alignment, location, section and details may be made during the Work. The Contractor shall perform the Work in accordance with the intent of the drawings and specifications, and shall take no advantage of any error or omission in the drawings or discrepancy between the Drawings and Specifications. The Engineer will give instructions regarding interpretations deemed necessary for the fulfillment of the Specifications and Drawings.

Where dimensions on Drawings are given or can be computed, scaled measurements shall not be used except when approved by the Engineer. Any deviation from the Drawings due to field conditions not anticipated will be determined by the Engineer and authorized in writing. Finished surfaces in all cases shall conform with the lines, grades, typical sections and dimensions shown on the Drawings, except when otherwise directed by the Engineer. Any deviation of a character not provided for in the Drawings and Specifications or working drawings that may be required by the exigencies of construction or otherwise will in all cases be determined by the Engineer and authorized by him in writing.

Drawings prepared by the Contractor and submitted to the Engineer for his approval shall be of A3 size, conform to the format of the project drawings and be produced using an approved version of " Auto-Cad" (Presently Version 14.0 for Windows).

After the Engineer has give approval to a drawing, he shall require that the original together with any subsequent amendments be plotted in A3 size and submitted together with a disk to his office in order to form part of the permanent record of the Works.

S1.34 Project Information Signs

The Contractor shall within the mobilization period erect project information signs at all major roads crossing or joining the project area and at the beginning and end of the contract. The size of the project information signs and the message thereon shall be determined by the Employer and the Engineer. Payment for information signs and their proper maintenance during the entire construction period shall be considered as included in the lump sum payment as provided in Clause S1.20 - Mobilization.

S1.35 Contractor's Weigh-House and Scale

The Contractor shall provide a weigh-house and acceptable scales or other weighing devices which shall be part of the Construction Plant. Payment for scales and weighing devices shall be considered as included in the lump sum payment as provided in Clause S1.20 - Mobilization.

Scale platform shall be of sufficient length to permit simultaneous weighing of all axle loads of each hauling vehicle. Each weighing device shall be accurate within 0.5 percent throughout the range of use, and shall be inspected, tested, and sealed as often as the Engineer may deem necessary to assure continued accuracy. The Engineer may permit the use of weighing devices for a reasonable period prior to sealing, provided field testing indicates consistent compliance with the limits of accuracy specified herein. The Contractor shall have on hand not less than ten (10) standard weights of twenty-five (25) kilograms each and shall assist the Engineer in testing the scales.

Standard scales, certified by the Government, or owned by a responsible local authority, may be used subject to the approval of the Engineer. Truck platform scales for weighing bituminous products shall be equipped with automatic printing devices to record time and weight, and one copy of each weight ticket

shall become the property of the Engineer after each measurement of weight. The Engineer may waive the above requirement for the provision of automatic weight printing devices for bituminous materials if this item is considered unnecessary for the project under consideration. If the devices are considered unnecessary, the Contractor will be advised at the pre-bid conference.

S1.36 Specifications

Where any material or equipment is specified as being in accordance with a non-Vietnamese standard it should be understood that these should automatically be substituted by such equivalent by the Vietnam Standards-Institute (VSI) if this is available at the time of bidding. In the case where application of VSI publications are found unsuitable from a technical point of view at the implementation stage, the Employer will take appropriate measures based on the recommendation of the Engineer.

The Contractor shall obtain copies of all VSI publications relevant to the Contract and relevant to materials or equipment specified, and provide translations in the English language. Except for material specified by VSI, any materials specified by Japanese standards may be substituted by the equivalent from the United States of America, and vice versa, subject to approval by the Employer. Any request relating to such substitution must be made within 30 days of the Notice of Award of contract, and before any orders have been placed for laboratory testing equipment.

In these specifications materials or tests specified as being in accordance with VSI, AASHTO or ASTM shall refer to the last revision of the specifications or method of test at the time of project bidding, unless otherwise nominated.

S1.37 Tolerances

All work executed under this Contract shall be carried out in accordance with the tolerances given in the Special Specifications, and such other tolerances as are given elsewhere.

S1.38 Maintenance of Existing Drainage

The Contractor shall maintain the existing drainage entering, crossing or affecting the Works. This shall include where required by the Engineer the cleaning of all existing channels, ditches and pipes upstream and down-stream to an extent of 100 m beyond the construction limits and the right-of-way.

These requirements shall be met without additional payment and all costs thereof shall be included in the various items of the Bid Schedule under the Contract. However, should the maintenance work necessitate, in the opinion of the Engineer, repair, remedial or reconstruction work to the existing drainage, except where such work is due to damage caused by the Contractor, the Engineer will instruct the extent of such work required and the Contractor will be entitled to payment under the appropriate pay item or items.

S1.39 Dayworks

If, in the opinion of the Engineer, it is necessary or desirable to execute any additional or substituted work or furnish any additional or substituted materials, such work or supply shall be regarded as being on a Daywork basis after a written order from the Engineer. The Contractor shall therefore be paid for such work and supply according to the Schedule of Rates and Prices.

The measurements shall be taken jointly and recorded and agreed at the time such work is executed or such material is furnished. The Contractor's measurements will not otherwise be recognised by the Engineer.

The Engineer shall always have full access to the Contractor's time records, and may check daily with the Contractor's timekeeper, or otherwise, the time taken in executing any Daywork, but the fact of his agreeing upon any time shall in no way bind the Engineer to the value of work other than by measurement.

S1.40

Major Supplementary Obligations of the Contractor.

As described throughout the contract documents, the Contractor has a number of supplementary obligations in respect of surveying and drawing work. The cost of meeting these obligations is generally included in the unit price for the individual work item involved or else the Contractor has been instructed to include the costs in his overheads. For the following major supplementary obligations an additional pay item has been provided as described below.

1) Survey Work	The scope of this work is described in detail in Clause S1.11 of this Specification
2) Location and General Protection of Utilities	The scope of this work is described in detail in Clause S1.28 of this Specification. The work under this item excludes any permanent protection or relocation work as this will be paid for under Clause S15 of this General Specification
3) Working Drawings	The scope of this work is described in detail in Clause G.07(4) of the General Conditions of Contract and other relevant clauses of this Specification.
4) As-Built Drawings	The scope of this work is described in detail in Clause G.07(4) of the General Conditions of Contract and other relevant clauses of this Specification.

Any of the Contractors obligations not included in the above scope of work will continue to be covered by the original basis of payment as described elsewhere in these documents.

The payment for the above major supplementary obligations will be made by a single lump sum as described below.

Pay Item No.	Name	Unit of Measurement
1.40	Major Supplementary Obligations	Lump Sum

Payment for this work will be made 30% on approval of the submitted road cross sections, 40% in equal installments during the construction period and 30% sum on acceptance of the Contractor's submission of the as-built drawings.

## SECTION 2 SITE CLEARING

### S2.01 Site Clearing

#### S2.01 (1) Description

This work shall consist of clearing, grubbing, removing of top soil, and removing and disposing of all vegetation and debris within the limits except such objects as are designated to remain in place or are to be removed in accordance with other Clauses of these Specifications.

This work shall also include the preservation from injury or defacement of all vegetation and objects designated to remain.

#### S2.01 (2) Construction Requirements

##### (a) General

The Engineer will establish the limits of work and designate all trees, shrubs, plants and other things to remain. The Contractor shall preserve all items designated to remain.

##### (b) Clearing and Grubbing and Tree Removal

All surface objects and all trees, down timber, rotten wood, stumps, roots, snags, brush, other vegetation, rubbish, and other protruding obstructions, not designated to remain, shall be cleared and/or grubbed, including disposal as required.

In areas under roadway embankments, from which top soil or unsuitable materials are to be removed or which are designated to be compacted, all stumps and roots shall be removed to a depth at least 40 cm below the original ground surface and at least 50 cm below the bottom of the lowest pavement layer.

In roadway cut areas, all stumps and roots shall be removed to a depth of not less than 50 cm below the finished sub-grade level.

Clearing and grubbing of pits, channel changes, and ditches will be required only to the depth necessitated by the excavation within those areas.

Voids left after removal of roots shall be filled with suitable compacted material.

##### (c) Topsoil Stripping

In areas under roadway embankments or where designated by the Engineer, the Contractor shall remove the topsoil and dispose of it as directed by the Engineer.

In general the removal of topsoil shall include only the removal of soil which is sufficiently fertile to encourage or sustain a growth of vegetation.

Removal of topsoil over any designated area shall be executed to the depth as directed by the Engineer, and the topsoil shall be kept separate from other excavated material.

When the topsoil will be used for dressing of the slopes of the embankment or other areas as directed by the Engineer or as indicated on the drawings, the work of topsoil stripping will be deemed to include stockpiling the topsoil when necessary and removing therefrom and the placing and spreading of the topsoil in areas designated by the Engineer. After spreading, the topsoil shall be raked to form a smooth surface free from weeds, roots, sods and large stones.

(d) Protection of Areas Designated to Remain

In areas designated by the Engineer, the Contractor will be responsible for the protection and routine maintenance of existing shrubs, trees and grassed areas. On completion of the Works these areas will be returned to the Employer in the same condition as before and any damage due directly or indirectly to the Contractor's operations shall be made good at his own expense.

S2.01 (3) Disposal of Cleared Material

In the first instance all cleared material is the property of the Employer and shall be used or disposed of as the Employer sees fit.

The Contractor may however, have the right to use unsaleable timber (or saleable timber when permission is granted in writing by the appropriate Government agency or authority) for his own purposes in connection with the Contract always provided that he has ascertained and complied with the requirements of the appropriate Government agency or authority.

Saleable timber shall be neatly stored in an approved accessible place within or near the right-of-way as directed and shall be trimmed and stacked in accordance with the requirements of the appropriate Government agency.

All other timber, except timber to be used, and all brush, stumps, roots, logs, and other refuse from the clearing and grubbing operation shall be disposed of at locations provided by the Contractor.

The roadway and adjacent areas shall be left with a neat and finished appearance. No accumulation of debris shall remain on or adjacent to the right-of-way.

S2.01 (4) Method of Measurement

Clearing and grubbing, topsoil stripping and protection of designated areas, will together be considered as Site Clearing, and will be paid for by the square meter. Tree removal and protection of trees designated to remain in place will be considered as Removal of Existing Trees and will be paid for by number of trees removed of minimum diameter 200 mm. The work of Site Clearing and Tree Removal for disposal sites, material sites, imported borrow pit sites, haul roads and all temporary construction shall not be paid for when such sites are outside the areas designated for clearing and grubbing and the Contractor is



permitted to exercise his own option as to whether he elects to use such disposal sites or borrow pit sites.

S2.01 (5) Basis of Payment

The work measured as provided above shall be paid for as undermentioned. The payment shall be full compensation for furnishing all labour, materials, tools, equipment and incidentals necessary to do the work and for doing all the Site Clearance and Tree Removal in the designated areas as specified in these Specifications and as directed by the Engineer including if necessary, removal and disposal of the resulting material.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
2.01	Clearing and Grubbing	square metre



### SECTION 3 DEMOLITION

S3.01 Demolition

S3.01 (1) Description

This work shall consist of the removal, wholly or in part and satisfactory storage or disposal of blocks of masonry of an individual size greater than 1 cubic meter, of all remaining parts of buildings, hedges, fences, structures, pavements, curbs, and any other obstructions which are not designated or permitted to remain, except for the obstructions to be removed and disposed of under other items in the Contract Documents. It shall also consist of the salvaging of designated materials and backfilling the resulting trenches, holes and pits.

S3.01 (2) Work Requirements

(a) General

The Contractor shall perform the above work adjacent to the roadway and within the cleared area between the demarcations, as shown on the Drawings or as directed by the Engineer. All materials recovered from demolition shall remain the property of the Employer unless specifically instructed otherwise by the Engineer or provided in the Contract Documents. Materials shall be removed, without unnecessary damage, in sections or pieces which may be readily transported, and shall be stored by the Contractor at specified places as directed by the Engineer. Basements or cavities left by structure removal shall be filled with acceptable material to the level of the surrounding ground and, if within the prism of construction, shall be compacted in accordance with Clause S5.01.

Performance of these works under the Contract shall include salvage of materials removed, their custody, preservation, storage on the right-of-way or any other places as may be designated by the Engineer or the Employer, or disposal as provided herein.

(b) Removal of Bridges, Culverts, and other Structures

Bridges, culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic.

Unless otherwise directed, the substructures of existing water structures shall be removed to the extent necessary to avoid influence on new works.

In this regard where portions of the existing structures lie wholly or in part within the limits for a new structure, they shall be removed to accommodate the construction of the proposed structure. Where only a section of the existing structure is to be demolished, the Contractor shall execute this work in such a way as to avoid damage to the section designated to remain. All details of the Contractor's proposed working method shall be submitted to the Engineer for approval prior to commencement.

For measurement of bridge demolition the area for payment shall be calculated by multiplying the actual length of bridge between front faces of the abutment walls by the width of bridge deck measured between the outer faces of the deck slab and shall include footpaths and/or curbs. While measurement of bridge length is taken between abutments it shall be clearly understood that the rate for demolition shall include for the removal of the whole of the bridge including abutments, superstructures and substructures.

Unless waived in writing by the Engineer, all concrete removed that is of suitable size for rip-rap and not needed for such use on the Project, shall be stockpiled at locations designated by the Engineer, for use by the Employer.

Usable components of steel, wood and concrete bridges shall remain the property of the Employer and when directed by the Engineer to be salvaged, shall be carefully dismantled without damage. Steel members shall be match marked, unless such match marking is waived by the Engineer. All salvaged material shall be stored as requested by the Engineer.

(c) Removal of Curbs

Existing curbs designated for removal, including their bases, shall be broken into pieces and shall be removed and stockpiled at designated locations on the site for use of the Employer, or shall be otherwise disposed of as directed by the Engineer.

Removal of existing curbs shall be undertaken in such a manner as to avoid damage to existing pavements and curbs which are designated to remain.

(d) Removal of Pavements, Footpaths, etc.

Irrespective of thickness, all asphalt or concrete pavements, footpaths, or other hard surfaces designated for removal, shall be broken into pieces, and shall be removed and stockpiled at designated locations on the Site for use of the Employer, or otherwise disposed of as directed by the Engineer. Removal of pavement shall be carefully undertaken to avoid damage to abutting sections of pavement or structures designated to remain. If removal of sections of pavement, footpaths or other hard surfaces of an individual size less than 10 cubic meters or excavation of ballast, gravel or similar sub-base or base material is necessary, this work shall be considered as Common Excavation, and shall conform to the requirements of Clause 4.03 of these Specifications, for construction, measurement and payment.

(e) Removal of Traffic Signs

Where directed, traffic signs including steel frames shall be carefully dismantled, removed and stored where directed by the Engineer.

Concrete foundations shall be broken into pieces removed and stockpiled at designated locations on the site for use of the Employer or shall be otherwise disposed of as directed by the Engineer.

S3.01 (3) Method of Measurement

The quantities to be paid for according to these Specifications or as directed by the Engineer, shall be cubic meter or square meter or linear meter depending upon the nature of structure and obstructions demolished acceptably within the limits as directed by the Engineer.

Demolition required for the Permanent Works will be measured for payment, while demolition for haul roads, borrow areas and all the Temporary Works will not be measured for payment.

S3.01 (4) Basis of Payment

The work measured as provided above shall be paid as under-mentioned. The payment shall be full compensation for furnishing all labour, materials, tools, equipment and incidentals necessary to do the work and for doing all the demolition in the designated locations or areas as specified in these Specifications, including back-filling if necessary. The unit price for any work under this clause will be deemed to include any precautions or special working methods necessary to avoid damage to abutting material designated to remain. Any such damage shall be rectified by the Contractor at his own expense. All work shall be as directed by the Engineer including the removal and disposal of all the resulting material.

Pay Item No.	Name	Unit of Measurement
3.01(1)	Removal of masonry and concrete structures including any remaining parts of housing	cubic metre
3.01(2)	Removal of existing curb	linear metre
3.01(3)	Removal of existing asphalt pavement	cubic metre
3.01(4)	Removal of existing lighting pole	each
3.01(5)	Removal of Existing Bridge (Steel bridge)	square metre



## SECTION 4 ROAD EARTHWORK

### S4.01 Scope

Road earthwork shall consist of all necessary work for the excavation and placing or disposal of earth or rock or other material from or to the roadway or adjacent thereto, for construction of waterways, ditches, laybys and approaches, for the removal of unsuitable material, the removal of landslides, all in accordance with the lines, grades, cross-sections shown on the Drawings or as established by the Engineer. Structure excavation shall not be included in Section 4, but in Section 5 "Structure Excavation".

### S4.02 General

#### S4.02 (1) Soil Information

Any information of the properties of the soil that may be shown on the Drawings or obtained by the Contractor as a result of discussion with the Engineer shall alone not be considered as a sufficient basis for the Contractor's Bid Prices.

The Contractor is responsible for his interpretation of information supplied by the Employer and shall visit the Site and possible Borrow Pits prior to making his Bid and shall ascertain the nature of the soil, its quantity, locations, and suitability to meet the specified requirements.

He shall base his Bid estimates on the Employer's soil data (if any) supplemented by his own soil investigations.

#### S4.02 (2) Classes of the Work

This work will be divided into the following classes, which are hereinafter described in detail under separate headings :

- 4.03 Common Excavation
- 4.04 Borrow Material
- 4.05 Formation of Embankment and Areas of Fill
- 4.06 Unsuitable Material
- 4.07 Sand Fill Material
- 4.08 Granular Backfill
- 4.09 Permeable Backfill
- 4.10 Vertical Soil Drains
- 4.11 Geo-Textile Material
- 4.12 Underdrains

All road earthwork shall be carried out in accordance with the Specifications for the classes as named above, and the specifications for other work items involved, and in conformity with the lines, grades, sections and dimensions, shown on the Drawings or required by the Engineer.

S4.02 (3) Horizontal and Vertical Alignment

The Engineer will supply the Contractor with the locations of the Points of Intersection of Tangents and Grade lines. The Drawings will indicate the properties of horizontal and vertical curves, together with the rates of super-elevation where required. The Contractor shall prepare cross-sections based upon the above properties, secure the Engineer's approval of his cross-sections and stake out before proceeding with construction. If, in the opinion of the Engineer, any modification of the line or grade is advisable, either before or after stake-out, the Engineer will issue detailed instructions to the Contractor for such modifications and the Contractor shall revise the stake-out for further approval. These requirements shall be met without additional payment and all costs thereof shall be included in the Bid Prices for pay items under the Contract.

S4.02 (4) Quantities

The quantities of the various classes of excavation and embankment to be measured for payment under the Contract will be based on the lines shown on the approved profiles and cross-sections or as instructed by the Engineer. The Engineer may decide the angle of the slope of cut and fill or the formation of benches in the slopes as the work proceeds on the basis of his evaluation of the soil characteristics.

The cross-sections will form the basis of the earthworks calculations but they will be supplemented by such site measurements as are necessary to accurately determine the quantity for each pay item. In particular, the procedures described in Clause S4.02(13) will be adopted to determine any additional materials which have been placed by the Contractor to compensate for settlement of the underlying soil. Where the Engineer orders the placing of temporary filling such as above future abutments or as embankment surcharge, this will be paid as Borrow and Common Excavation or such other pay items as are relevant and applicable. The actual lines of the cut and fill as made shall be duly measured and recorded by the Contractor. The Engineer will check these records and will approve the measurements, if correct, as a basis of payment. Excavation and fill in excess of the approved cross-section will not be paid for.

Suitable excavated material surplus to the requirements of Section 5 (Structure Excavation) of these Specifications, shall be considered as available for incorporation in fill areas, and should be stockpiled if not required at the time of excavation.

Excess excavation shall be backfilled, as directed by the Engineer, with sub-base or other suitable material without extra payment.

S4.02 (5) Method of Measurement

The quantities of earthwork to be paid for shall be the number of cubic meters of material measured and computed by calculations incorporating the average end-area method, except where the error may exceed plus or minus five percent as compared with the prismoidal formula, in which case the Engineer will authorize the use of the more accurate method. However, the Contractor shall request such authority before he submits his quantities for approval. Quantities measured on the average end-area basis, once they have been submitted and approved, shall not be subject to review for the purpose of applying a more accurate method.



S4.02 (6) Removal of Existing Obstructions

The Bid Prices for the classes of excavation shall include the cost of removal of all material, regardless of its nature, encountered within the approved limits for excavation, including the removal and disposal, as required by the Engineer, of sections of existing brick, stone, concrete or masonry, rock boulders or fragments of old pavements encountered during earthwork.

Only boulders or bricks of masonry of individual size greater than 1 cubic meter, or sections of old pavement of an individual size greater than 10 cubic meters will be paid for under the respective pay item from Section 3 of these Specifications.

S4.02 (7) Removal or Diversion of Water

Removal or Diversion of Water will be paid for in accordance with Clause S1.26 of these Specifications and no additional payment will be made for this work under this Section 4.

The Contractor shall provide necessary facilities for de-watering, and for draining or diverting water-courses when necessary for the execution and protection of the Work or where required by the Engineer.

The Contractor shall provide such temporary or permanent drainage outlet ditches as may be necessary to effect proper drainage before rain is to be expected. Payment will only be made for the permanent work.

S4.02 (8) Use and Disposal of Excavated Material

All surplus suitable material excavated within the limit and scope of the Project shall, unless provision is expressly made to the contrary in these Specifications, be used in the most effective manner for the formation of the embankment. Any material surplus to these requirements, or any material declared in writing by the Engineer to be unsuitable, shall be disposed of by the Contractor outside the right-of-way or as directed by the Engineer in accordance with the provisions of these Specifications, and shall be considered as Waste, which shall be subject to the provisions of Clause S4.06.

S4.02 (9) Ditches

The Contractor shall construct channels, side and interception ditches, inlet and outlet ditches as shown on the Drawings or where ordered by the Engineer, whether for temporary or permanent drainage. In order to keep water away from the embankment, sub-grade, sub-base, and/or base during construction, the Contractor shall at all times ensure adequate drainage is operative before work is begun on the embankment and pavement structure. He shall clean and trim all such drainage ditches from time to time so that there may be a free flow of water throughout the whole Construction Period and Period of Warranty.

Damage to the work attributable to wetting through failure to provide adequate drainage will result in an order to repair the damage at the Contractor's expense. Ditches shall first be trimmed short of the approved cross-sections, and final trimming, including the repair of any damage that may have been done during the construction work, shall be carried out after the completion of the construction work and shall be a condition for final approval and acceptance.

Irrigation of areas on which earthworks are to be executed shall have been halted at least two months in advance of the construction. All surface water shall be drained off and temporary and permanent ditches constructed in good time to allow the area to dry out.

S4.02 (10) Relocation of Stream Channels

Where indicated on the Drawings or where required by the Engineer, the Contractor shall take cross-sections of existing stream channels and, in collaboration with the Engineer, mark them with details of the excavation required for the relocation of the stream channel. The Contractor shall also take levels to allow the profile levels of box culverts and their extensions to be accurately fixed by the Engineer. Work shall not proceed without approval of the marked cross-sections by the Engineer. The work of stream-channel excavation shall be considered as Common Excavation and paid for at the Contract unit prices for this item, subject to the provisions of Clause S4.03.

S4.02 (11) Loose Earth or Rock, Landslides, Benches, Flattening of Slopes

Loose earth or loose rock shall be removed from slopes when required by the Engineer. He may also order the removal of material resulting from landslides, the construction of benches in or above the cut slopes, or, where in his opinion the slope, after cutting, shows signs of instability, the flattening of the slope.

Performance of this work under the contract is not payable directly but shall be considered as a subsidiary obligation of the Contractor covered under the unit rate for Common Excavation or Borrow Material.

S4.02 (12) Filling Existing Watercourses

Where watercourses have to be diverted from sites of embankments or other works, the original channels shall be cleared of all vegetable growths and soft deposits and carefully filled with suitable materials deposited and compacted as specified in Clause S4.05.

S4.02 (13) Rate of Settlement of Embankments

In areas of sub-soils with low bearing capacity as shown elsewhere in these documents the rate of settlement shall be monitored and controlled by control of the rate of placing of fill material. At the direction of the Engineer and in accordance with the provisions of Section S10.08 (Test Drilling) the Contractor may be required to undertake investigations of existing soft ground conditions along the Project alignment. These will be used to confirm the results of the existing soil investigations and to support the Engineer in his determination of areas, other than those already identified in the Drawings, that may require special controls on the rate of settlement. The Contractor will include in his staff an experienced Geotechnical Specialist who will assist the Engineer in the work of settlement monitoring and control.

Unless otherwise proposed by the Contractor and approved by the Engineer, this will be done by means of settlement plates installed as shown on the drawings or as instructed by the Engineer. The plates shall be installed on the existing sub-soil before placing any embankment and a 30 cm thick layer of sand material shall be placed on the settlement plate base to eliminate bedding errors. The Engineer will inspect the completed installation and together with the Contractor will take initial elevations on the top of the base plate and the top of the rod. As embankment construction proceeds the rods and their protection pipes shall be extended in 180 cm extensions as necessary.

As an additional check on the stability of embankments, the Contractor will install line and level stakes to the sides of embankments at locations shown on the drawings or instructed by the Engineer. The number of these stakes and their spacing shall also be shown on the drawings. The Contractor will be responsible for arranging with the land owners for regular access to the monitoring stakes and if necessary paying any expenses arising from this access.

During the period of settlement the Engineer may instruct additional material to be placed at the toe of the embankment to improve stability. Any such material may be removed after the settlement is complete and this work will be measured and paid for under the other Clauses of this Specification. The site management control of the rate of material placing shall be such as to stay within the values of deformation of 1cm / day vertical movement and 2 mm / day horizontal movement as specified in the Vietnamese Standard 22TCN 244-98.

Unless there is a pay item under Section S4.05, the work of installing, maintaining and monitoring the settlement monitoring devices will not be measured directly for payment but will be deemed to be included in the Contractors unit price for the material used in the embankment.

Where the Engineer has instructed the use of settlement plates to monitor the rate of embankment settlement, the measured total settlement will also be used to determine the additional material to be placed by the Contractor to compensate for the total amount of the settlement. In areas where the rate of settlement is not critical in the formation of the embankment the Engineer will not instruct the provision of settlement monitoring devices. However, in such areas the Contractor may elect at his own expense to install approved settlement measurement devices. Subject to the Engineer's approval, measurements from these additional devices will be used in the calculation of the quantities of embankment as given in Clause S4.02(4).

S4.03 Common Excavation

S4.03 (1) Description

Common Excavation shall consist of all excavation within the limits of the cleared area between the demarcations, as shown on the drawings or as directed by the Engineer except for Structure Excavation and rock as defined, the removal, handling and proper utilization or disposal of all excavated materials and shaping of excavation and preparation of exposed surface of excavation for the entire length of the roadway and approaches, in accordance with these Specifications and the lines, levels, grades, dimensions and cross-sections shown on the Drawings and as required by the Engineer.

S4.03 (2) Applicable Provisions

The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.03 "Common Excavation".

S4.03 (3) Use of Excavated Material

Suitable material excavated under this clause shall be incorporated in the permanent works in accordance with Clause S4.05, or excavated material shall, if directed by the Engineer, be considered as Waste and dealt with in accordance with Clause S4.06.

S4.03 (4) Removal and Disposal of Unsuitable Material

When so directed in writing by the Engineer, the Contractor shall remove material unsuitable for use in the embankment and shall dispose of it as provided in Clause S4.06. Where the excavation reveals a combination of suitable and unsuitable materials the Contractor shall unless otherwise agreed by the Engineer, carry out the excavation in such a manner that the suitable materials are excavated separately for use in the Works without contamination by the unsuitable materials. When unsuitable material below sub-grade level in cut or below embankment foundation level is ordered to be removed, the soil left in place after the removal of the unsuitable material shall be compacted, to a depth of 20 cm, to a density of 95 percent of the maximum dry density determined according to AASHTO T99. Payment for such compaction shall be included in the unit rate for Common Excavation.

S4.03 (5) Method of Measurement

The quantity to be paid for shall be the number of cubic meters of material acceptably excavated as hereinbefore prescribed. The material shall be measured in the original position in the natural ground after Site Clearing.

The volume of material excavated for temporary diversion roads constructed by the Contractor that fall outside the width effected by the excavation of the road will not be measured for direct payment, since this work is covered by the price tendered for "Maintenance and Protection of Traffic".

S4.03 (6) Basis of Payment

Where the Engineer orders the use of material obtained from Common Excavation for the execution of other works the Common Excavation shall not be paid for separately but shall be considered as a subsidiary obligation of the Contractor covered under the unit rates paid for the other works in which the material is employed.

The quantity of Common Excavation measured as specified above shall be paid for at the Contract unit price per cubic meter listed in the Bid Schedule. The price and payment shall be full compensation for all work involved in performing excavation including excavating, removal, haulage, placing and compaction or satisfactory disposal of roadway excavation, for shaping and completion of all surfaces and for furnishing all labour, materials, tools, equipment and incidentals to complete the work as shown on the Drawings and as specified in these Specifications and as directed by the Engineer.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
4.03	Common Excavation	cubic meter

S4.04 Borrow Material

S4.04 (1) Description

This work shall consist of the clearing and stripping of borrow pits, the excavating and hauling spreading and compacting of materials obtained from approved sources for constructing embankment and general filling as required by the Contract or by the Engineer.

S4.04 (2) Applicable Provisions

The applicable provisions of Clause S4.02 shall be read into and become part of this Clause.

S4.04 (3) Materials

Borrow material shall be selected to meet the requirements and conditions of the particular fill or embankment for which it is to be used as shown on the Drawings. Materials shall be free from detrimental quantities of organic material such as leaves, grass, roots and sewage.

Any material classified by the Unified Soil Classification System as OL, OH or Pt shall not be used. Materials classified as GW, GP, GM, GC, SW, SP, SM and SC shall be accepted as Borrow suitable provided that the material is shown to be sound and has no peculiar characteristics. Unless otherwise indicated on the Contract Drawings or elsewhere, materials classified as CH or MH may be used as embankment fill. However, it may not be used in the fill to be placed within one meter of the finished sub-grade level unless it is possible to obtain the design CBR as shown on the drawings.

S4.04 (4) Use of Borrow Pits

Borrow material shall be obtained from approved private sources. Permission to open borrow pits, including advice as to suitability, shall first be obtained in writing from the Engineer. Nevertheless, the total amount of surplus material from excavation under Sections 4 and 5 of these Specifications, after deduction of the material declared unsuitable by the Engineer, shall be considered to be available for use in the embankment, and any borrow material resulting from the Contractor having used pit borrow in place of surplus material shall not be measured for payment under these Specifications.

The distance of borrow pits from the work site shall not be grounds for extra payment or revision of the Contract Price. In making his Bid the Contractor shall visit the site and form his estimate of the haulage costs on the basis of his own survey of the possible nature and locations of the borrow pits.

Where suitable material for embankments is available adjacent to the embankment the Engineer may order the excavation of drainage channels wider and than nominally required in which case such excavation will be measured and included in cross-sections as Common Excavation.

S4.04 (5) Placing and Compaction

Suitable borrow material shall be incorporated in the permanent works in accordance with the requirements of Clause S4.05.

Surcharge material need not be compacted in place but the material should be broken into smaller lumps and given preliminary rolling to remove major voids. The depth of material to be placed may be varied by the Engineer considering the density of the installed surcharge material.

S4.04 (6) Payment to Others

The consent of the landowner and tenant for the digging and taking of material for borrow shall be secured by the Contractor, who shall, if required, pay for such concession. The pit shall be left in a condition acceptable to the owner and to the Engineer. Any fees payable for permission to cut or haul the borrow material will be at the Contractor's expense and will be deemed to be included in the unit price for this pay item.

S4.04 (7) Method of Measurement

Borrow Material: The quantity to be measured and paid for shall be the balance of the earthworks remaining after applying to the volume of embankment the quantity of all suitable material excavated within the site. The volume of embankment to be measured will be the net volume, after Site Clearing, of required and accepted embankment, actually constructed and completed to the lines, grades, and cross-sections shown on the Drawings and as directed by the Engineer. To calculate the balance of the earthworks it shall be assumed that the shrinkage factor for all suitable material excavated within the site is 0.95. This factor is fixed for all such material and claims on the basis of a variation to this factor will be rejected. No allowance will be made for shrinkage in the borrow material between cutting at the borrow pit and incorporation in the permanent work.

Surcharge with Borrow Material: The quantity to be measured for payment will be measured and paid for on the basis of the volume as ordered by the Engineer and no allowance will be made for any swelling or shrinkage.

S4.04 (8) Basis of Payment

This work measured as provided above shall be paid for at the Contract unit price for the pay items listed below, which price and payments shall be full compensation for the cost of searching for and finding borrow pits, for acquiring the right to occupy the sites and extract materials, for the cost of any negotiation right of access, for the cost of establishing and maintaining access, for any fees, licenses, or royalties in connection with borrow pits, for clearing, grubbing, sloping, draining and cleaning up of pits, for furnishing, excavating, hauling, placing and compacting material from borrow pits and for providing all labour, equipment, tools and incidentals necessary to the works.

The work of removal of the surcharge will be measured and paid for under Section 4.03 (Common Excavation) or Section S4.06 (Unsuitable Material). Where the material from Surcharge is to be hauled within the site for use under Section S4.05 (Formation of Embankment and Areas of Fill) no additional payment will be allowed for any hauling material or scheduling of the works so as to incorporate the re-used surcharge.

Pay Item No.	Name	Unit of Measurement
4.04(1)	Borrow Material	cubic metre
4.04(2)	Surcharge with Borrow Material	cubic metre

S4.05 Formation of Embankment and Areas of Fill

S4.05 (1) Description

This work shall consist of the construction of embankment and backfill not specified elsewhere by furnishing, placing, compacting and shaping suitable material of acceptable quality obtained from approved sources in accordance with these Specifications, and to the lines, levels, grades, dimensions and cross-sections shown on the Drawings and as required by the Engineer. The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.05 "Formation of Embankment and Areas of Fill". In particular the Contractor will be required to control the rate of placing of fill material as described in Clause S4.02(13).

S4.05 (2) Sources and Use of Material

Material for embankment shall consist of suitable material approved by the Engineer, excavated under any other clause of this Specification. Borrow material, however, shall only be used under the provisions of Clause S4.04 (4). Surplus or unsuitable material shall be disposed of as provided in Clause S4.02 (8) and Clause S4.06.

S4.05 (3) Construction

(a) Compaction of Foundation of Embankment

When ordered by the Engineer, the Contractor shall excavate turf, decayed vegetable matter, or other unsuitable matter to such depth as the Engineer may require. This work shall be considered as Site Clearing or Common Excavation and paid for as provided in Clause S2.01 or S4.03.

Before beginning the construction of Embankment, the Contractor shall fill all holes, etc. within all the areas which have been cleared and grubbed, and such areas shall be suitably leveled at the level resulting after the removal of the topsoil. Fill material shall be approved by the Engineer. This work shall not be paid for directly, but shall be considered a subsidiary obligation of the Contractor covered by the Contract price for item 2.01.

Before the construction of the embankment is begun, the Engineer may order the compaction of the cleared surface or that resulting after removal of the topsoil, in which case the density after compaction shall conform to the requirements of Clause S4.05 (3) (d).

(b) Placing and Compaction

(i) Material for embankment, obtained and approved as provided above, shall be placed in horizontal layers of uniform thickness over a width determined by the Engineer and in conformity with the lines, grades, sections, and dimensions shown on the Drawings. The layer of loose material other than rock shall be not more than 20 cm thick, unless the compacting equipment used is capable of compacting a depth greater than 20 cm to a uniform density through the full depth which is acceptable to the Engineer, in which case the Contractor may place and compact the material other than rock, in layers of thickness approved by the Engineer.

After adjustment of the moisture content to that required to obtain maximum density, the loose material shall be compacted to the required density.

- (ii) If the material deposited as fill subsequently reaches a condition such that it cannot be compacted in accordance with the requirements of the Contract, the Contractor shall at his own expense either :
- i. make good by removing the material either to tip or elsewhere until it is in a suitable physical condition for re-use and replace it with suitable material; or
  - ii. make good the material by mechanical or chemical means; or
  - iii. cease work in the material until its physical condition is again such that it can be compacted as described in the Contract.

- (iii) Where embankments are located on hillsides, or where new fill is to be compacted against existing embankments or where fill is constructed on half width at a time, the original slope of the hillside, of the old or of the first half width fill, shall be cut into a distance sufficient to accommodate the width of the compacting equipment as the new fill is placed in horizontal layers, and this material cut shall be incorporated and compacted with the new fill.

In the measurement of the work no allowance will be made for the volumes of material cut from the hillside or from the old or from the first half width fill to accommodate the compacting equipment, but will be calculated only on the net volume of fill placed against the original hillside, the old embankment or the first half width fill.

- (iv) To avoid interference with the construction of bridge abutments, wing walls and box culverts, the Contractor shall, at points to be determined by the Engineer, suspend work on embankment forming the approaches to any such structure until such time as the construction of the latter is sufficiently advanced to permit the completion of the approaches without the risk of interference or damage to the bridge works. The cost of suspension of work shall be included in the Contract unit price for "Common Excavation", and "Borrow Material".
- (v) Material for embankment at points inaccessible to normal compacting equipment shall be placed in horizontal layers of loose material not more than 10 cm thick and thoroughly compacted by the use of mechanical rammers.
- (vi) In carrying embankments up to or over culverts and where required in the Contract up to or over bridges, the Contractor shall bring the embankments up equally on both sides. If conditions require placing backfill or embankment appreciably higher on one



side than on the opposite side, the additional material on the higher side shall not be placed until permission shall have been given by the Engineer and preferably not until the structure has been in place 14 days, and tests made by the laboratory under the supervision of the Engineer establish that the structure has attained sufficient strength to withstand any pressure created by the methods used and materials placed without damage or strain beyond a safe factor.

Where special materials for filling adjacent to structures are described in the Contract, filling may proceed over widths less than the full width of the embankment and in steps not exceeding the depth of one layer above the adjoining area of fill. In rock fill embankments the materials shall be carefully packed for such distance from the structure as is described in the Contract.

Special care shall be taken to prevent any wedging action against the structure and all slopes bounding or within the areas to be filled shall be benched or serrated to prevent wedge action. The placing of embankment and the benching of slopes shall continue in such a manner that at all times there shall be a horizontal berm of thoroughly compacted material for a distance at least equal to the height of the abutment or wall to be back-filled against except in so far as undisturbed material intrudes upon the areas.

(c) Compaction Trials

- i. Before starting the formation of the embankment the Contractor shall construct trial lengths for compacting as directed by the Engineer. The soils used in the trials shall be those encountered along the roadway and the compacting equipment shall be the same equipment that the Contractor will use for the main work accepted by the Engineer.
- ii. The object of these trials will be to determine the optimum moisture content and the relationship between the number of passes of compacting equipment and density obtained for the soil types under trial. No separate payment will be made for this work, which will be regarded as a subsidiary obligation of the Contractor covered under the other clauses of this Specification.

(d) Required Density

The required density to which embankment shall be compacted are as follows :

- i. The embankment shall be compacted to 95% of the maximum dry density as determined by AASHTO T99.
- ii. For all soils, except rock fill materials, containing more than 10 percent oversize material retained on a 19.0 mm (3/4 inch) sieve, the maximum dry density thus obtained shall be adjusted for such oversize material as directed by the Engineer. Subsequent layers shall not be placed and compacted unless the previous layer has been properly compacted and accepted by the Engineer.

(e) Moisture Content

Embankment material that does not contain sufficient moisture to obtain the required compaction shall be given additional moisture by means of approved sprinklers and mixing. Material containing more than the amount of moisture necessary to obtain the required compaction may not, without approval of the Engineer, be incorporated in the embankment until it has been sufficiently dried out. The drying of wet material may be expedited by discing or other approved methods.

The compaction of the embankment shall be carried out at the optimum moisture content. In forming the embankment the Contractor shall take steps to ensure that the work can be drained free of rain water, and he shall make due allowance in the height and width of the work of swelling or shrinkage.

(f) Rock Fill

Prior to placing any rock fill, the Contractor must have discussed the detailed work procedures with the Engineer and secured the latter's approval.

Where rock fill is used as a method of treating soft ground, the material shall include large sized rock. It shall be placed in loose layers and compaction will be limited in the lower layers so as to establish a working platform from which the normal embankment construction can proceed.

(g) Mixed Material in Fill

When materials of widely divergent characteristics, such as clay and chalk or sand, drawn from different sources, are to be used in the embankment, they shall be deposited in alternate layers over the full width of the embankment to depth approved by the Engineer.

When material used for fill is of variable quality, the Contractor shall schedule and execute his works so that the material designated as better quality by the Engineer, is used in the upper layers of the fill.

Rock, clay or other material shall be broken up, and no accumulation of lumps or boulders at the toe of the embankment will be permitted.

(h) Levelling of Existing Embankment

Before fill is placed and compacted on an existing roadway, the existing embankment and/or pavement may be leveled by cutting, rooting, or scarifying with approved mechanical means to a level to be determined by the Engineer. The earth, asphalt, or other material obtained as a result of this operation will be declared by the Engineer to be either suitable or unsuitable for use in the embankment. In the first case it shall be used in the adjacent embankment as directed by the Engineer, subject to the provisions in Clause S4.03 "Common Excavation". In the second case the material shall be disposed of as provided in Clause S4.06 "Waste".

(i) Finishing Roadbed

- (i) Final Grade Level - When an embankment requires the addition of material to a depth of not more than 20 cm to bring it up to the required grade level, the top of the embankment shall be thoroughly scarified and re-compacted before the additional material is placed.

The final grade level, to the profile indicated and adjusted for super-elevation where required, shall conform to the provisions of Clause S4.02 (3) of these Specifications, and to the tolerances given in the Special Specifications. Prior to adding any material to raise the level of any low spots, the existing surface shall be scarified.

- (ii) Slopes - Side slopes shall be neatly trimmed to the lines and slopes shown on the Drawings as directed by the Engineer, and finished work shall be left in a neat and acceptable condition.
- (iii) Stability - The Contractor shall be responsible for the stability of all embankments and shall replace any portions that have been damaged or displaced due, in the opinion of the Engineer, to carelessness or neglect on the part of the Contractor, or to such natural causes as storms. The Contractor will not be responsible for damage caused by unavoidable movements of the natural ground upon which the embankment is made. During construction the roadway shall be kept shaped to drain at all times. When unsuitable material has been placed in the embankment by the Contractor, he shall remove it and replace it using suitable material, and without extra payment therefore.

S4.05 (4) Embankments on Subsoils with Low Bearing Capacity.

In addition to the above and Clause S4.02(13), the following additional requirements shall apply for all embankments constructed on subsoils with low bearing capacity.

In locations of sub-soils with low bearing capacity the existing soil under the embankment shall be treated according to the Engineer's assessment on a case-by-case basis. To assist in this assessment, the Contractor will carry out filling in trial areas using the detailed construction techniques as instructed by the Engineer. Based on the results from these trial areas the Engineer will then instruct on the working methods to be adopted in each area, and these may include, but not be limited to, on or more of the following:

- removal of the unsuitable material and its disposal as Waste.
- the use of a Sand Fill blanket or strengthening of the sub-soil by placing of large size rock material.
- the use of Geo-textile to separate the fill from the sub-soil material and / or to strengthen the sub-soil against slip failure.
- the use of Vertical Soil Drains and a Sand Fill material to accelerate the settlement of the sub-soil. This may include the provision of Under-drains to control the removal of water from the sand fill material.

- controlling of the rate of embankment placing to eliminate the risk of slip failure in the sub-soil below the embankment. This will include periods in which the placing of the embankment is suspended entirely.
- control on the weight of fill equipment to that which can safely be operated considering the condition of the ground and the material already placed.
- Surcharge of embankment and subsequent removal.

When filling in areas of weak sub-soil, the Contractor will provide all personnel necessary to install and monitor the settlement measurement devices. Recordings shall be made at least three times weekly by an experienced Geotechnical Specialist provided by the Contractor and the results reported directly to the Engineer in writing. Based on these results, the Engineer will give instructions to control the work.

S4.05 (5) Method of Measurement

The work under this Clause S4.05 on Formation of Embankments and Areas of Fill is measured and paid for under the separate Clauses under which the materials are excavated or procured. Any special requirements described in this Clause S4.05 are considered as a subsidiary obligation of the Contractor covered under the contract prices for performance of the works under these other Clauses in this Section 4.. Payment under Clause S4.05 is limited to a lump sum under which the Contractor shall allow for all expenses associated with monitoring of the settlement and stability of the works done on Formation of Embankments and Areas of Fill.

S4.05 (6) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract unit price for the pay item as listed below. The prices and payment shall be full compensation for all costs associated with the settlement and stability monitoring described in Clause S4.02(13) of these Specifications.

Pay Item No.	Name	Unit of Measurement
4.05	Monitoring of Settlement	Lump Sum

S4.06 Unsuitable Material

S4.06 (1) Description

This item shall consist of excavating, ripping, loading, hauling and spreading in waste areas, soil material designated by the Engineer as "Unsuitable". The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.06 "Unsuitable Material".

S4.06 (2) Material shall be known as "Unsuitable" in the following cases :

- (a) When the material resulting from the excavation made for the construction of the road is declared in writing by the Engineer to be unsuitable for use in the embankment or other work.

Normally, highly organic clays and silts, peat, soil containing large amounts of roots, grass and other vegetable matter, domestic or industrial waste, are to be unsuitable. Materials that are soft or unsuitable merely because they are too wet or dry are not to be classified as unsuitable unless otherwise directed by the Engineer.

- (b) When the material resulting from the excavation made for the construction of the road is surplus to the amount required for the construction of the embankment, provided, however, it is not material rendered surplus by reason of the Contractor having opened borrow pits solely for his own convenience as provided in Clause S4.04 of these Specifications.

The material proposed for wasting shall not be wasted until approved or directed in writing by the Engineer.

S4.06 (3) Work Requirements

Unsuitable material shall be excavated below sub-grade level in cut and below embankment foundation level to the depth shown on the Drawings or directed by the Engineer. Where unsuitable material is excavated below the normal sub-grade level or below embankment foundation or for benching under embankments, the excavation shall be backfilled with material and in a manner that conforms with Clause S4.05

Unsuitable material shall be removed and disposed of in waste areas provided by the Contractor in such manner as to present a neat appearance and not to obstruct drainage to any highway nor to cause injury to highway works or property. If it becomes necessary for the Contractor to locate or relocate any waste areas, they shall be approved by the Engineer prior to spreading any waste.

Waste areas shall be left in a smooth, neat and drainable condition, as directed by the Engineer, and all waste material shall be placed in such manner that adjacent property will not be damaged or endangered.

S4.06 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract unit price for the pay item as listed below. The prices and payment shall be full compensation for all costs including excavating, ripping, loading, hauling and spreading in waste areas, soil material designated by the Engineer as "Unsuitable"

Pay Item No.	Name	Unit of Measurement
4.06	Unsuitable Material	cubic metre

S4.07 Sand Fill Material

S4.07 (1) Description

The work under this item shall consist of the supply and placing of a sand material in areas where shown on the drawings or directed by the Engineer.

S4.07 (2) Applicable Provisions

The applicable provisions of Clauses S4.02 and S4.05 shall be read into and become part of this Clause.

S4.07 (3) Construction

Before carrying out the work described in this clause, all applicable work under Clauses S2.01 (2)(b), S4.02 (12) and S.4.11 shall be completed to the satisfaction of the Engineer. The material to be used for the fill material shall be free from lumps of dirt, organic matter or any other deleterious matter and shall conform to the following requirements :

ASTM Standard Sieve (mm)	Percentage Passing by Weight
25.0	100
9.5	90 - 100
4.75	70 - 100
2.00	35 - 90
0.850	12 - 70
0.425	4 - 40
0.180	2 - 8
0.075	0 - 3

The material to be used shall be approved in advance by the Engineer and shall be placed in conformity with the elevation and cross-sections shown on the Drawings or ordered by the Engineer. The method of spreading and compaction will be instructed by the Engineer considering the condition of the sub-soil being covered and to assist in this work the Contractor will carry out tests areas to determine the optimum methods to be adopted in each area. Where Vertical Soil Drains or Underdrains Piles are to be installed under this contract, the Engineer may instruct that the placing of the Sand Fill Material may be carried out in distinct stages to allow these other works to be more easily installed. On completion of the work as described in this Clause, any remaining works required under the other Clauses shall be carried out before filling is continued in accordance with Clause S4.05.

S4.07 (4) Method of Measurement

The material placed under this clause will be calculated in cubic meters measured after placing and compaction. Material placed outside the profiles indicated on the drawings or instructed by the Engineer, will be not measured for payment.

S4.07 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract unit price for the pay item as listed below. This price and payment shall be full compensation for all costs including furnishing of suitable sand fill material, its hauling, placing and compaction under whatsoever conditions are encountered, provision of test areas, labour, tools, equipment and incidentals necessary to complete the works as described in this Clause. No additional payment will be made for any suspension of Sand Filling work which is instructed to allow other works to be done.

Pay Item No.	Name	Unit of Measurement
4.07	Sand Fill Material	cubic metre

S4.08 Granular Backfill

S4.08 (1) Description

This item shall consist of furnishing, placing and compacting granular backfill adjacent to structures. The areas in which this material is to be placed is the "Influence Zone" of certain structures and this will be shown on the Drawings. The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.08 "Granular Backfill".

S4.08 (2) Material

The material shall be well graded crushed or uncrushed gravel, stone, rock-fill or natural sand or a well mixed combination of any of these. Grading requirements for the material are as follows :

Maximum size	10 cm
Passing 4.75 mm sieve	25% to 90%
Passing 0.075 mm sieve	0% to 10%
Plasticity Index	10 max

S4.08 (3) Construction

The granular back-fill shall be placed in layers not exceeding 15 cm and compacted to a density of 95% of the maximum dry density determined according to AASHTO T180.

S4.08 (4) Method of Measurement

The quantity of granular back-fill to be measured and paid for, will be the number of cubic meters of suitable material supplied and compacted to the Engineer's satisfaction and in accordance with this Specification. This material is required to be placed when filling within the influence zone of certain structures and any material placed outside the specified zone will not be measured for payment. Any existing material within the influence zone which is removed because of the Contractor's method of working must be replaced by granular backfill at the Contractor's expense. Where excavation within the influence zone is instructed under any Clause of these Specifications, then the backfilling will be carried out with granular backfill and the work will be measured for payment under this clause.

S4.08 (5) Basis of Payment

The accepted quantities of granular backfill, measured as provided above, will be paid for at the Contract unit price for the pay item as below. The price and payment will be full compensation for the work described in this clause, including furnishing, hauling, placing and compacting the material.

Pay Item No.	Name	Unit of Measurement
4.08	Granular Backfill	cubic metre

S4.09 Permeable Backfill

S4.09 (1) Description

This work shall consist of supplying and installing selected backfill material adjacent to structures in accordance with these Specifications and in locations as shown on the Drawings or instructed by the Engineer. The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.09 "Permeable Backfill".

S4.09 (2) Material

Material shall be hard, clean, crushed rock or gravel complying with the following grading.

Sieve Size	% Passing by Weight
63 mm	100
37.5 mm	85 – 100
19 mm	0 – 20
9.5 mm	0 – 5

S4.09 (3) Construction

The method of construction will be at the discretion of the Contractor, but details must be submitted for the Engineer's approval before commencement of the work. All details of the permeable backfill shall be as shown on the Drawings and the degree of compaction shall be as instructed by the Engineer.

S4.09 (4) Method of Measurement

Unless this material is specified as included in another pay item, the quantity of permeable backfill to be measured and paid for will be the number of cubic meters of suitable material supplied, placed and compacted in accordance with the details shown on the Drawings. Any material placed beyond the dimensions shown on the Drawings will not be measured for payment.

S4.09 (5) Basis of Payment

The work measured as provided above will be paid for at the Contract price per unit of measurement for the item listed below, which price and payment will be full compensation for furnishing and placing all materials, and for all labour, equipment and other incidentals necessary to complete the work in accordance with the Drawings, Specifications and as directed by the Engineer.

Pay Item No.	Name	Unit of Measurement
4.09	Permeable Backfill	cubic metre



S4.10 Vertical Soil Drains

S4.10 (1) Description

This work shall consist of the installation of vertical soil drains in areas where shown on the Drawings or directed by the Engineer. The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.10 "Vertical Soil Drains".

The work shall be carried out in close conformity with the requirements which will be established by the Engineer after the Contractor has carried out any necessary soft ground investigations as instructed by the Engineer under Clause 10.08 Test Drilling, of these specifications.

The vertical soil drains will be formed of either sand drains or fibre drains as shown in the drawings.

S4.10 (2) Materials

(a) Sand Drains shall be formed of coarse sand of high permeability and shall be free from lumps of dirt, organic matter or any other deleterious matter. Unless otherwise approved by the Engineer, it shall conform to the following requirements :

ASTM Standard Sieve (mm)	Percentage Passing by Weight
25.0	100
9.5	90 – 100
4.75	70 – 100
2.00	35 – 90
0.850	12 – 70
0.425	4 – 40
0.180	2 – 8
0.075	0 – 3

(b) Fibre Drains

Unless otherwise shown on the Drawing or instructed by the Engineer, the basic material shall consist of a continuous band-shaped core enclosed in a filter jacket. The core shall form a three dimensional open labyrinth structure. The filter jacket shall be a non-woven polyester fabric or similar with effective opening size not bigger than 80 µm and minimum filter velocity of  $6.5 \times 10^{-4}$  m/sec. The drain shall have a minimum water discharge capacity of  $40 \times 10^{-6}$  m<sup>3</sup>/sec after being compressed under 350 kN/m<sup>2</sup> for four weeks, and sufficient strength-elongation characteristic to withstand the installation operation and due forces.

4.10 (3) General Requirements

a) Sand Drains

Sand Drains will be installed by inserting a pipe of suitable diameter into the soil. When it has penetrated to the required depth, the inside of the pipe is filled with suitable dry sand and the valve at the lower end of the pipe is opened. The pipe is slowly withdrawn from the ground, simultaneously

expelling the sand from the lower end of the pipe by vibration, compressed air or other suitable means. The depth, diameter, spacing and pattern of the vertical sand drains shall be as shown on the Drawings or instructed by the Engineer and the Contractor shall take these into consideration when preparing his proposed equipment and construction method. All details of the installation method shall be approved before the start of the work.

b) Fibre Drains

Fibre Drains shall be installed with approved equipment to the specified depth in the spacing and arrangement as shown on the plans or as otherwise directed by the Engineer.

The drains installation equipment shall be the type which will cause a minimum disturbance to the subsoil during the installation operation. Constant load or constant rate of advancement method or the so-called 'static' method are preferred. Vibrator, falling weight impact hammers, and jetting will not be allowed unless otherwise approved by the Engineer and restricted only for assistance in penetration in areas where the design depths cannot be achieved by static method. The drains shall be installed using a mandrel or steel sleeve that will be advanced through the soil to the required depth. The mandrel shall protect the drain material from tears, cuts and abrasions during installation and shall be withdrawn after installation of the drain. The mandrel shall be rectangular or rhombic in shape and of maximum cross sectional area not to exceed 110 cm<sup>2</sup>.

Prior to the installation, the Contractor shall submit details of the sequence and method of installation to the Engineer for review and approval. The equipment shall be carefully checked for plumbness prior to the advancing of each drain. Drains that are out of their proper location by more than 150 mm, drains that are damaged in construction, and drains that are improperly completed shall not be accepted, and no compensation will be allowed for any materials furnished or for any works performed on such drains. During installation of the drains, the Contractor shall provide suitable means for determining the depth of the drain at any given time. Joins or connections in the drain material shall be made in an approved workmanlike manner so as to ensure continuity of the material. Minimum length of overlap in the join shall be 300 mm. The drain material shall be cut neatly at its upper end and there shall be a 200 mm top cutting tip length of drain material protruding above the working ground at each installation.

c) Quality Control

The Contractor shall keep an accurate record of each drain driven, including location, date, starting and finishing time, installation number, grid coordinate and length of the drain being driven. Information regarding penetration of any harder layer which requires the use of equipment other than that approved shall also be recorded.

S4.10 (4) Method of Measurement

Vertical soil drains will be measured by the linear meter for the type of soil drain and diameter as given in the Pay Item Name and as installed in accordance with the drawings .

Any work of boring, sampling and testing will be measured and paid for under Clause S10.08 of these General Specifications but any special laboratory testing required will be the Contractors responsibility and any additional costs will be deemed to be included in the Contract unit price for the vertical sand drains.

S4.10 (5) Basis of Payment

The work measured as provided above will be paid for at the Contract price per unit of measurement for the item listed below, which price and payment will be full compensation for furnishing and placing all materials, and for all labour, tools, equipment and other incidentals necessary to complete the work in accordance with the Drawings, Specifications and as directed by the Engineer.

Pay Item No.	Name	Unit of Measurement
4.10 (1)	Vertical Soil Drains (Sand, 40 cm diameter)	linear metre
4.10 (2)	Vertical Soil Drains (Fibre )	linear metre

S4.11 Geo-textile Material

S4.11(1) Description

This item shall consist of supplying and installing approved geotextile material as a part of the road earthworks. The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.11 "Geo-textile Material".

S4.11(2) Materials

Unless otherwise shown on the Drawings or instructed by the Engineer, the materials to be used shall be as follows:

a) Geo-textile Sheet: Woven

The geo-textile sheets shall be UV-stabilized and made of polypropylene yarns woven in the same strength for both warp and weft directions. The permeability (BS 6906:Part 3 - 100mm head) shall be more than 30 litre/m<sup>2</sup>/s.

The ultimate tensile strength shall be more than 40 kN/m in both directions at the breaking elongation of minimum 20%.

b) Geo-textile Sheet: Non-woven

Non-woven geo-textile sheets shall be UV-stabilized, made of 100% polypropylene yarns which may be mechanically or thermally bonded from continuous filament.

The tensile strength shall be more than 15 kN/m in both directions at the breaking elongation of maximum 40%. Dynamic Puncture - by drop cone method (BS6906/6) shall be more than 23 mm.

S4.11(3) Construction

Geo-textile sheets shall be installed at the specified locations in the arrangement as shown on the Drawings. Prior to laying of the geo-textile all preceding works shall have been completed and the ground surface shall be cleared of all sharp materials that could puncture or tear the fabric. The ground surface shall be flat and level and any unevenness shall not exceed 100mm and the inclination shall be less than 5%.

Laps in the geo-textile material sheets shall be made by either overlapping each sheet by a minimum of 300mms or by stitching using a 30mm double overlocking seam. If vertical soil drains are to be installed after the laying of the geo-textile, the Engineer may require the use of stitched joints to minimize the disturbance to the geo-textile during the subsequent work on the soil drains.

S4.11 (4) Method of Measurement

Geo-textile sheet shall be measured by square meters for the net area of geo-textile shown on the Drawings or instructed by the Engineer. No measurement will be made for joints or for surplus material laid outside the requirements of the Engineer.

S4.11 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract unit price for the pay items as listed below. The prices and payment shall be full compensation for all costs including furnishing, hauling, placing joining and for all materials, labour, tools, equipment and incidentals necessary to complete the works as described in this Clause.

Pay Item No.	Name	Unit of Measurement
4.11(1)	Geo-textile - Woven Sheet	square metre
4.11(2)	Geo-textile - Non-woven Sheet	square metre

S4.12 Underdrains

S4.12 (1) Description

This work shall consist of the installation of a system of under-drains, using pipe and granular filter material, under-drain pipe outlets, and blind drains using granular material in accordance with this Specification and in reasonably close conformity with the lines and grades shown on the Drawings or as directed by the Engineer.

S4.12 (2) Materials

Unless otherwise shown on the Drawings, the materials shall meet the following requirements:

- (i) Zinc Coated (galvanised) corrugated iron or steel culverts and under-drains. (AASHTO M36).
- (ii) Extra strength and standard strength clay pipe and perforated clay pipe. (AASHTO M65).
- (iii) Perforated concrete pipe. (AASHTO M175).
- (iv) Porous concrete pipe. (AASHTO M176).

- (v) Bituminised-fibre non-pressure sewer drain and under-drainage pipe systems. (AASHTO M177).
- (vi) Asbestos cement perforated under-drain pipe. (AASHTO M189).
- (vii) Un-plasticised Poly-vinyl-chloride ( $\mu$  PVC) drainage pipe-work. (AASHTO M267). Perforated or un-perforated.
- (viii) Granular filter material shall be in accordance with the requirements of Clause 4.09 of these Specifications.

S4.12 (3) Construction

(i) Pipe Installation

Trenches shall be excavated to the dimensions shown on the Drawings or as directed by the Engineer. A minimum of 150 mm bedding layer of granular backfill material shall be placed and compacted at the bottom of the trench for its full width and length. Sub-drainage pipe of the type and size specified shall be embedded firmly in the bedding material.

Perforated pipe shall normally be placed with the perforations down and the pipe sections shall be joined securely with the appropriate coupling, fitting or bands. Pipes jointing shall be as recommended by the manufacturer or instructed by the Engineer.

After the pipe installation has been approved, granular filter material shall be placed to a height of 200 mm above the top of the pipe. During compaction of the remainder of the backfilling with approved material, care shall be taken not to damage the pipes already laid.

(ii) Blind Drains.

These are under-drains which contain only approved granular filter material without any pipe for discharge. Trenches for blind drains shall be excavated to the width and depth shown on the drawings and the trench shall be then be filled with granular back-fill material to the depth required by the Drawings. The material shall be loosely rammed and then the upper portion of trench shall be filled with either granular or impervious material as directed.

4.12 (4) Method of Measurement

Under-drains, outlets and blind drains shall be measured by the linear metre for the type and size of drain specified.

S4.12 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract unit price per linear meter for the pay item as listed below. The prices and payment shall be full compensation for all costs including hauling and placing granular material, pipe and for all other materials, labour, tools, equipment and incidentals necessary to complete the works as described in this Clause.

Pay Item No.	Name	Unit of Measurement
4.12 (1)	Perforated PVC Under-drain (dia.100 mm.)	linear metre
4.12(2)	Blind Drain	linear metre

S4.13 Sand Compaction Piles

S4.13 (1) Description

This work shall consist of the installation of sand compaction piles in areas where shown on the Drawings or directed by the Engineer. The applicable provisions of Clause S4.02 shall be read into and become part of this Clause S4.13 "Sand Compaction Piles".

The work shall be carried out in close conformity with the requirements which will be established by the Engineer after the Contractor has carried out any necessary soft ground investigations as instructed by the Engineer under Clause 10.08 Test Drilling, of these specifications.

S4.13 (2) Materials

Sand Compaction Piles shall be formed of coarse sand of high permeability and shall be free from lumps of dirt, organic matter or any other deleterious matter. Unless otherwise approved by the Engineer, it shall conform to the following requirements :

ASTM Standard Sieve (mm)	Percentage Passing by Weight
25.0	100
9.5	90 - 100
4.75	70 - 100
2.00	35 - 90
0.850	12 - 70
0.425	4 - 40
0.180	2 - 8
0.075	0 - 3

4.13 (3) General Requirements

A) Installation

Sand Compaction Piles will be installed using special equipment designed and manufactured specifically for this purpose. Details of the equipment to be used will be submitted to the Engineer for approval before the equipment is mobilized to the site, but the main features of the installation are as follows:

- a) A closed pipe of suitable diameter (d) is penetrated into the soil by vibration or compaction to the required depth. The diameter of the casing is selected by the Contractor as described in c) below.
- b) The inside of the pipe is filled with suitable sand and the valve at the lower end of the pipe is opened. The pipe is slowly withdrawn from the ground, while at the same time the sand is compacted by impact or vibration so as to produce a finished sand compaction pile of minimum diameter D.
- c) The Drawings and pay item refer only to the finished diameter of D and the ratio of final to initial diameters ( D / d ) shall be between 1.4 and 1.75 depending on the equipment proposed by the Contractor.

- d) The equipment used will include for monitoring of the sand level and the sand volume used. This data will be automatically included in a printout which the Contractor must submit at the end of every sand pile installation to serve as a record of the satisfactory completion of the work. Where it is necessary to determine any sand loss to confirm the actual minimum diameter of the finished sand compacted pile, this will be decided by the Engineer based on consideration of the equipment used.
- e) The depth, minimum finished diameter, spacing and pattern of the installed sand compaction piles shall be as shown on the Drawings or instructed by the Engineer and the Contractor shall take these into consideration when preparing his proposed equipment and construction method.

**B) Quality Control**

All details of the installation method shall be approved before the start of the work. The Contractor shall keep an accurate record of each sand compaction pile installed, including location, date, starting and finishing time, installation number, grid coordinate and length of the pile as installed. The submitted record should include the print-out from the automatic monitor installed in the equipment. Information regarding penetration of any harder layer which requires the use of equipment other than that approved shall also be recorded.

**S4.13 (4) Method of Measurement**

Sand compaction piles will be measured by the linear meter for the type and diameter of sand pile installed in accordance with this specification and the Drawings. The diameter of sand compaction pile given in the Pay Item Name is the finished diameter after installation.

Any work of boring, sampling and testing will be measured and paid for under Clause S10.08 of these General Specifications but any special laboratory testing required will be the Contractors responsibility and any additional costs will be deemed to be included in the Contract unit price for the sand compaction piles.

**S4.13 (5) Basis of Payment**

The work measured as provided above will be paid for at the Contract price per unit of measurement for the item listed below, which price and payment will be full compensation for furnishing and placing all materials, and for all labour, equipment and other incidentals necessary to complete the work in accordance with the Drawings, Specifications and as directed by the Engineer.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
4.13(D)	Sand Compaction Piles ( of D cm diameter)	linear metre





## SECTION 5 STRUCTURE EXCAVATION

### S5.01 Structure Excavation

#### S5.01 (1) Definition

Structure Excavation shall consist of excavation in earth, within the limits of the work as specified herein or as shown on the Drawings, that is made for structures. Any excavation which can be defined under any other Clause of this Specification shall not be considered to be Structure Excavation.

Structure Excavation shall be limited to excavation for the foundations of bridges or concrete retaining walls, box culverts, wing walls and other structures, unless otherwise noted in these Specifications. It shall include backfilling with suitable material accepted by the Engineer; incorporating surplus material in the fill areas as described in Clause S4.05; disposing of waste material, and all necessary materials and equipment for keeping the excavation free of surface run-off and groundwater. Removal or diversion of existing water flows shall not be paid for under this Section but will be considered to be covered by Clause S1.26 of these Specifications.

#### S5.01 (2) Classification

Structure Excavation shall be classified for measurement and payment as :

##### (a) Structure Excavation

The rate per cubic metre for this item shall be understood to include for any excavation, that is not classified as Structure Excavation in River, requiring the use of any type of equipment in any type of material or ground water conditions encountered.

##### (b) Structure Excavation in River.

The rate per cubic metre for this item shall include for the following;

- all expenses involved in providing, pumps, cofferdams, braced sheet piling or any other methods approved by the Engineer,
- all expenses resulting from the Contractor's observance of all rules and regulations of the appropriate waterway management authorities regarding the interference or maintenance of flow in the appropriate rivers or canals.
- Payment under this item will only be allowed in cases where the excavation is taking place in major moving water flows. Payment will not be allowed in cases where the Contractor's obligations for working or dealing with the water are covered under Clause S1.26 of these Specifications. The decision as to whether the free-surface water is a major moving water flow will be at the absolute discretion of the Engineer.

#### S5.01 (3) Groundwater

- (a) Whenever groundwater is encountered during structure excavation, the Contractor shall take such measures as are described in sub-clause S5.01 (3)(c) to ensure that the excavation and footing are kept free of water.
- (b) When the excavation is taking place in or directly adjacent to free-surface water, which does not come into the category of a River, removal or dealing with this water will be deemed to be covered by S1.26 of these Specifications.
- (c) Suitable and practically watertight cofferdams shall be used wherever water bearing strata are encountered above the elevation of the bottom of

the excavation. Upon request, the Contractor shall submit drawings showing his proposed method of cofferdam construction to the Engineer for his approval.

Cofferdams or cribs for foundation construction shall, in general, be carried out well below the bottoms of the footings and shall be well braced and as nearly water-tight as practicable. In general, the interior dimensions of cofferdams shall be such as to give sufficient clearance for the construction of forms and the inspection of their exteriors, and to permit pumping outside of the forms. Cofferdams or cribs which are tilted or moved laterally during the process of sinking shall be righted or enlarged so as to provide the necessary clearance.

When conditions are encountered which, as determined by the Engineer, render it impractical to de-water the foundation before placing the footing, the Engineer may require the construction of a concrete foundation seal of such dimensions as he may consider necessary, and such seal shall be placed as shown on the Drawings or as directed by the Engineer. The foundation shall then be de-watered and the footing placed. When weighted cribs are employed and the weight is utilized to overcome partially the hydrostatic pressure acting against the bottom of the foundation seal, special anchorages such as dowels or keys shall be provided to transfer the entire weight of the crib to the foundation seal. When a foundation seal is placed under water, the cofferdam shall be vented or ported at low water level as directed.

Cofferdams shall be constructed so as to protect green concrete against damage from sudden rising of the water and to prevent damage to the foundation by erosion. No timber or bracing shall be left in cofferdams or cribs, without the approval of the Engineer.

Any pumping that may be permitted from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of any portion of the concrete materials being carried away. Any pumping required during the placing of concrete, or for a period of at least 24 hours thereafter, shall be done from a suitable pump located outside the concrete forms. Pumping to de-water shall not commence until the seal has set sufficiently to withstand the hydrostatic pressure.

Unless otherwise provided, cofferdam or cribs, with all sheeting and bracing involved therewith, shall be removed by the Contractor after the completion of the substructure. Removal shall be effected in such a manner as not to disturb or damage any finished work.

(d) Preservation of Channel

Unless otherwise permitted, no excavation shall be made outside of caissons, cribs, cofferdams, or sheet piling, and the natural stream bed adjacent to the structure shall not be disturbed without the approval of the Engineer. If any excavation or dredging is made at the site of the structure before caissons, cribs, or cofferdams are in place, the Contractor shall, after the foundation base is in place, backfill all such excavations to the original ground surface or stream bed with material satisfactory to the Engineer. Material deposited within the stream area from foundation or

other excavation or from the filling of cofferdams shall be removed and the stream area freed from obstruction.

S5.01 (4) Excavation

Prior to starting excavation operations in any area, the Contractor shall :

- take steps on his own initiative to regulate the natural drainage of the water flowing on the surface of the ground, to prevent flooding of excavations; payment for this work shall be included under Pay Item 1.26,
- ensure that all necessary Site Clearance and Demolition in that area has been performed in accordance with these Specifications,
- notify the Engineer sufficiently in advance of the beginning of any excavation so that cross-sectional elevations and measurements can be taken of the undisturbed ground. The existing ground adjacent to the structures shall not be disturbed without the permission of the Engineer.

Trenches or foundation pits for structures or structure footings shall be of sufficient size to permit the placing of structures or structure footings of the full width and length shown. The sides of trenches or pits shall be adequately supported at all times. The elevations of the bottoms of footings as shown on the Drawings shall be considered as approximate only and the Engineer may order, in writing, such changes in dimensions or elevations of footings as may be deemed necessary to secure a satisfactory foundation.

Boulders, logs, and any other unsuitable material encountered in excavation shall be removed from the site and shall not be used for backfilling purposes.

After each excavation is completed, the Contractor shall notify the Engineer to that effect, and no footing or bedding material shall be placed until the Engineer has approved the depth of excavation and the character of the foundation material.

All rock or other hard foundation material shall be cleaned of all loose material and cut to a firm surface, either level, stepped or serrated as directed by the Engineer. All seams or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed.

When the footing is to rest on material other than rock, excavation to final grade shall not be made until just before the footing is to be placed. When the foundation material is soft or mucky or otherwise unsuitable, in the opinion of the Engineer, the Contractor shall remove the unsuitable material and replace it with granular backfill, as specified in Clause S4.08. This foundation fill shall be placed and properly compacted in 15 cm layers up to the foundation elevation at the density required by the Engineer.

If, in the opinion of the Engineer, the foundation material is unsuitable solely because of the Contractor's failure to fulfill his obligations under Clause S1.26 or S5.01 (3), then the Contractor may either :

- carry out at his own expense the removal and replacement described above; or
- suspend works in that excavation until such time as the foundation material becomes suitable.

When foundation piles are used, the excavation of each pit shall be completed before the piles are driven or cast(in-place) and any placing of blinding stone

shall be done after the piles are completed. However if for any reason it is impossible to instal the piles after excavation, piles shall be constructed from the natural ground level, as directed by the Engineer. Surplus length of piles in this case will not be measured for payment.

After both the piling and the excavation are completed, all loose and displaced material shall be removed, leaving a smooth, solid bed to receive the footing.

All excavated material, so far as suitable, shall be utilized as backfill or embankment, or shall be removed from the site if surplus to requirements.

Where a box culvert is to be located in embankment the Engineer may instruct that the excavation shall be performed after the embankment has been constructed to the proposed sub-grade level and compacted sufficiently. Also, in the case of soft ground conditions, the Engineer may instruct that the construction of the box culvert be deferred until such times as consolidation of the soft ground is substantially complete.

S5.01 (5) Blinding Stone

Blinding stone for use as a foundation for structures shall be provided as shown on the Drawings or instructed by the Engineer.

The main component of the blinding stone shall be approved cobble-stone or crushed rock, of the maximum size compatible with the thickness of blinding stone as shown on the Drawings. The minimum height of any stone as placed shall be 7 cm. Stone shall be closely packed by hand placing, to the dimensions shown on the Drawings, and then thoroughly rammed by mechanical rammer. Smaller stone pieces of minimum size 3 mm shall then be placed between the larger stones and the upper surface brought up to the finished level shown on the Drawings or instructed by the Engineer. The completed surface shall then be thoroughly compacted to the satisfaction of the Engineer using a mechanical rammer or vibrating roller.

The Contractor may propose an alternative to the above process, based on the use of graded, crushed stone of maximum size less than 5 cm. The Engineer's acceptance of this alternative, and the maximum thickness to be laid in one layer will be dependent on the proposed compacting equipment and its suitability for the restricted working area available.

S5.01 (6) Backfill and Embankments for Structure

On completion of the structure, excavated areas if not to be backfilled in accordance with Clause S4.08 or S4.09, shall be backfilled with approved material to the level of the finished ground surface. Unless otherwise approved by the Engineer, all backfill shall be carried out in accordance with the requirements of Clause S4.05 of these Specifications.

All material surplus to the requirement of this Clause shall be utilized for the formation of areas of fill or shall, if instructed by the Engineer, be considered as waste and treated in accordance with Clause S4.06.

S5.01 (7) Method of Measurement

Structure Excavation and Blinding Stone will not be measured for payment under any item in which the Basis of Payment states that such work is included in the pay item.

Payment for working and dealing with water flows will be in accordance with Clause S1.26 of these Specifications.

The quantity of structure excavation to be paid for shall be the number of cubic meters of material measured in its original position and shall be computed as follows.

The volume of earth or rock to be measured for structure excavation shall consist of a prismoid bounded by the following planes :

- upper plane; that plane reproduced by the projection of the perimeter of the base of the structural member and passing through the cleared ground along the perimeter above which plane excavation shall be considered as site clearing and below which excavation shall be considered as structure and shall be measured and paid for accordingly;
- lower plane; the horizontal plane at the base of the foundation; which will be taken as the lower surface of the structural concrete, leveling concrete or blinding stone as shown on the Drawings or instructed by the Engineer;
- the vertical planes coinciding with the perimeter of the base of the structural member. Any additional width of excavation necessary for the installation of blinding stone or class G leveling concrete or structural concrete exceeding area of lower plane will not be measured for payment and the cost of this excavation will be deemed to be included in the unit price for the measured quantity as described above.

Except as described previously in Clause S5.01(4) of these Specifications measurement for structure excavation shall not include material removal below the footing grade and beyond the specified limits of the excavation, or to compensate for anticipated swell or as a result of effective swell during pile driving or additional material resulting from slides, slips, cave-ins, silting or filling whether due to the action of the elements or to the operations by the Contractor.

Where the Engineer orders the excavation after the embankment has been placed, this extra excavation in the embankment will be measured for payment as structure excavation as otherwise provided in these Specifications.

The area of Blinding Stone measured for payment will be the number of square meters of stone completed in accordance with these Specifications and calculated using the dimensions shown on the drawings or instructed by the Engineer.

S5.01 (8)

Basis of Payment

The quantities, determined as provided above shall be paid for at the Contract Price per unit of measurement, respectively, for each of the particular pay items listed below that is shown in the Bid Schedule, which prices and payment shall be full compensation for all costs necessary or usual for the proper completion of the work described in this Section 5.

Pay Item No.	Name	Unit of Measurement
5.01(1)	Structure Excavation	cubic metre
5.01(2)	Structure Excavation in the Red River Channel	cubic metre
5.01(3)	Blinding Stone	square metre



## SECTION 6 DRAINAGE

### S6.01 Scope

This work shall consist of the construction of drainage pipes and culverts, box culverts and other drainage facilities in accordance with these Specifications and the specifications for other work items involved, all in conformity with the lines, grades and dimensions instructed by the Engineer.

The applicable provisions of Clause S1.26 shall be read into and become part of this Clause. The cost of working in, or dealing with all ground water encountered in executing the work of this section will be deemed to be included in the unit price for the pay item being installed or constructed.

The Engineer reserves the right to inspect and test all pre-cast concrete items before their delivery to the site and at any time prior to and during laying.

### S6.02 General

The types and characteristics of the drainage pipes and culverts, box culverts and other drainage structures shown on the Drawings and their estimated total quantities entered in the Bid Schedule are not to be taken as final.

To assist the Engineer in his review of the contract drawings, the Contractor will undertake a survey of all sites to determine the location, pipe, culvert or channel size, invert level and estimated discharge of all storm water, foul sewer or irrigation flows entering the Site.

On the basis of the results of this survey the final types, lines, characteristics and quantities will be decided by the Engineer, who will inform the Contractor of them in writing in due time in relation to the approved schedule of work submitted by the Contractor. Responsibility for accurately locating all existing flows will rest with the Contractor and the cost of this survey will be deemed to be included in the various pay items of this Section.

### S6.03 Sequence of Work

In areas where significant settlement is expected below new embankments, the Engineer may instruct that work on the permanent drainage below such embankments be delayed until the settlement is substantially completed. This delay shall be considered by the Contractor when preparing his schedule of site works and temporary drains shall be provided as necessary. Any additional or special conditions relating to this matter will be given in the Special Specifications. The Contractor shall at all times so schedule the construction of drainage works that the discharge of runoff from rain or other sources, both during and after construction, is properly provided for. To avoid damage to works in course of construction the Contractor shall provide in due time adequate means of protection, including all necessary temporary outlet ditches, dams, or diversion channels.

Culverts or other drainage works for the discharge of runoff water either during or after construction shall not be built until adequate facilities for the inflow and outflow of the water have been completed, and they shall be kept clear of all obstructions that might impede the flow of water. All culverts, ditches and

other drainage works shall be fully operative before work is begun on the construction of sub-grade, sub-base or shoulders.

These requirements shall be met without additional payment and all costs thereof shall be included in Pay Item 1.26.

S6.04 Box Culverts

S6.04 (1) Description

Box culverts and associated wing-walls will generally be measured and paid for on the basis of individual pay items described elsewhere in these Specifications. However, this will not apply in cases where the Schedule of Rates includes a pay item for specific works on box culverts. The work shall consist of reinforced concrete box culverts furnished and installed in accordance with the relevant Clauses of this Specification in conformity with the lines, levels, grades and dimensions shown on the Drawings or instructed by the Engineer. The relevant provisions of Clauses S6.01, S6.02 and S6.03 will be deemed to be applicable to all work on box culverts.

S6.04 (2) Materials

All materials shall comply with the relevant requirements of these Specifications and details shall be as shown on the Drawings. Where the drawings show the use of pre-cast units these shall be factory manufactured and before the Contractor places any orders for the supply of the culverts, the factory must be inspected and approved in writing by the Engineer. In cases where the supply of factory produced units is not possible, then the Contractor shall submit for the Engineer's approval, full details of his proposed arrangements for the manufacture, curing and handling of the pre-cast units. Formwork used in the manufacture shall be steel and of rigid construction.

S6.04 (3) Construction

All details shall be in accordance with the appropriate requirements of S6.05 (3) below and as shown on the drawings.

S6.04 (4) Method of Measurement

The quantity of reinforced concrete box culvert to be paid for, shall be the number of linear metres measured along the centre-line of the box culvert, between the inside faces of the headwalls, including construction of headwalls and wingwalls for each type of box culvert as indicated on the Drawings.

S6.04 (5) Basis of Payment

The price and payment will be full compensation for furnishing and installing each type of box culvert and for providing all related facilities as shown on the Drawings including excavation to any depth and backfilling, maintaining the excavation free of groundwater, breaking in to any existing channels to form a connection, reinforcement and for all labour, tools, equipment and incidentals necessary to complete the work as described in this Specification.

Pay Item No.	Name	Unit of Measurement
6.04(1)	Box Culvert – Type A (2 x 5.0m x 2.0m)	linear metre



S6.05 Drainage Pipes

S6.05 (1) Description

The work shall consist of reinforced concrete drainage pipes furnished and installed in accordance with these Specifications and in conformity with the lines, levels and other details decided by the Engineer as a result of the Contractor's survey mentioned in Clause S6.02. The relevant requirements of Clauses S6.02, and S6.03 shall be read into and considered part of this clause.

S6.05 (2) Materials

All drainage pipes shall be factory manufactured and before the Contractor places any orders for the supply of pipes, the factory must be inspected and approved in writing by the Engineer. In cases where the supply of factory made pipes is not possible then pipe details shall be as shown on the Drawings and the Contractor shall submit for the Engineer's approval, full details of his proposed arrangements for the manufacture, curing and handling of reinforced concrete pipes. Form-work used in the manufacture shall be steel and of rigid construction. All details shall comply with the relevant requirements of Section 10 of these Specifications.

S6.05 (3) Construction

(a) Excavation

Prior to starting excavation the Contractor shall take all necessary measures to keep the excavation free from free-surface water or surface water run-off.

Except as otherwise instructed by the Engineer, in areas of fill, filling shall be completed at least to a depth of one pipe diameter above the top of the pipe, before excavation begins. All excavation shall be carried out so as to minimize damage to existing surfaces.

The sides of pits and trenches shall be adequately supported at all times. Except where otherwise described in the Contract, they shall not be battered. The supports shall be left in pits or trenches only where described in the Contract. Excavated material not required for back-filling shall be dealt with in accordance with Section 4 of these Specifications.

Soft spots in the bottom of drainage excavation shall be removed and the resulting void immediately back-filled with Granular Backfill to Clause S4.08. When the Engineer instructs this additional treatment it will be paid for under the relevant clauses of this Specification.

Where the Engineer considers that soft spots are due to the Contractor's failure to fulfill his obligations under any clause of these Specifications then the Contractor shall, at his own expense, undertake the additional excavation and replacement with Granular Backfill to the satisfaction of the Engineer.

Any suitable material below the level of the concrete pipe bed which is removed unnecessarily shall be replaced at the Contractor's expense with Granular Backfill in accordance with Clause S4.08 of these Specifications.

(b) Bedding, Laying and Surrounding of Pipes

All pipes shall be laid, using cradles if necessary, to the true line and level as directed by the Engineer. Joints shall be sealed with 1:2 cement mortar, except where otherwise specified, so that water will not leak. The inside of the joint shall be wiped and finished smooth and the outside shall be protected for two days or as otherwise directed by the Engineer to prevent cracking. The external face of the joint shall then be treated / sealed as shown on the Drawings. After the Engineer has checked and approved the pipes and joints, the Contractor will complete the concrete bedding and haunching or surrounding as instructed by the Engineer. Concrete shall be thoroughly compacted to the dimensions shown on the Drawings, but special care should be taken to avoid dislodging the pipes or damaging the joints.

(c) Backfilling and Reinstatement

Back-filling shall not commence until in the opinion of the Engineer, the concrete has achieved sufficient strength. Backfilling shall be carried out in accordance with the requirements of Clause S4.05, except that the material used for backfill around and above the culvert for a minimum distance of 50 cm shall be sand in place or excavated material. Where insufficient suitable material is available from any particular pipe excavation, surplus material from any other excavation shall be used. On completion of backfilling, the area excavated shall be reinstated to its original condition but the Engineer may waive or modify this requirement if the area is to be overlaid or reconstructed under other Clauses of this Contract.

S6.05 (4) Method of Measurement

The quantity of reinforced concrete drainage pipe to be paid for, shall be the number of linear meters measured along the centre-line of the pipe, between the inside faces of the headwalls, catch-basins or manholes, as installed in accordance with these Specifications and the Engineer's instructions.

In case of large size culvert, diameter more than 100 cm, type A is a single pipe culvert and Type B is a double pipe culvert. Pipes will be measured and paid for by the linear metre according to the pipe diameter, culvert type and method of bedding, surrounding or cradling. All costs associated with the two pipes included in a Type B installation will be included in the one rate per linear metre.

S6.05 (5) Basis of Payment

The price and payment will be full compensation for furnishing, hauling and installing each type of pipe installation as shown on the Drawings including jointing, concrete foundation or surround, reinforcement, excavation to any depth and backfilling, maintaining the excavation free of groundwater, breaking in to any existing manholes or channels to form a connection, and for all labour, tools, equipment and incidentals necessary to complete the work as described in this Specification.

If the Engineer instructs that the area of excavation should be completely or partially reinstated, this will be measured and paid for under the other clauses

of this Specification. Any extra costs resulting from working on small areas will be deemed to be included in the Pay Items below.

Pay Item No.	Name	Unit of Measurement
6.05 (1)	RC Pipe, D=40cm, Type A	linear metre
6.05 (2)	RC Pipe, D=40cm, Type B	linear metre
6.05 (3)	RC Pipe, D=60cm, Type A	linear metre
6.05 (4)	RC Pipe, D=75cm, Type A-1	linear metre
6.05 (5)	RC Pipe, D=75cm, Type A-2	linear metre
6.05 (6)	RC Pipe, D=80cm, Type B	linear metre
6.05 (7)	RC Pipe, D=125cm, Type A-2	linear metre
6.05 (8)	RC Pipe, D=125cm, Type B-2	linear metre
6.05 (9)	RC Pipe, D=150cm, Type A-2	linear metre
6.05 (10)	RC Pipe, D=150cm, Type B-2	linear metre

S6.06 Ditches (Concrete U-Diches), Catch basins, Headwalls and Joint Boxes, etc

S6.06 (1) Description

This item shall consist of all work in connection with the construction of ditches, catch-basins, pipe headwalls and joint boxes along the shoulders, footpaths and where shown on the Drawings or where instructed by the Engineer.

All work shall be done in accordance with these Specifications and in conformity with the lines, levels, grades and dimensions shown on the Drawings or as directed by the Engineer. The applicable provisions of Clauses S6.01, S6.02 and S6.03 shall be read into and become part of this clause. If the work required is not covered by these Specifications then the relevant Vietnamese standards shall be adopted.

S6.06 (2) Materials

Materials shall be as shown on the Drawings and shall comply with the relevant clauses of this Specification. Information about any concrete units which require reinforcement will be shown on the drawings.

S6.06 (3) Construction

All work on ditches, inlets, pipe headwalls and joint boxes shall be carefully set out and constructed with due recognition being taken of the fact that the upper surfaces must be incorporated exactly into curbs, footpaths, etc. The Engineer may reject any item of work under this Clause when the upper surfaces do not meet the tolerances for curb and footpath given elsewhere in these Specifications.

Bottom surface of ditches shall be smoothly and neatly finished. Where the Engineer considers that any ditch, inlet or catch basin is likely to carry foul sewage, he may instruct that the 150 mm sand trap as shown on the Drawings be deleted and replaced by benching formed in Class F concrete. All details regarding the shape of benching and method of construction shall be in accordance with the Engineer's instructions.

Unless otherwise specified, joints of pre-cast blocks shall be carefully constructed using cement mortar of 1 part cement and 2 parts sand so as to prevent leakage. Hook shaped ditches along steep slopes shall be constructed so as to effectively resist sliding, by excavating soil to the shape of the hook and placing the concrete without disturbing the surrounding soil.

For drainage ditches lined with mortared stonework, earthworks shall be completed and the foundation tamped prior to placing a blinding stone foundation at the invert of the ditch. Stone shall be securely placed by hand, and voids shall be avoided. The face surfaces of all stones shall form a smooth regular surface conforming to the shape of the ditch. No stone surface shall extend more than one centimeter above or below the general level of the ditch. These structures shall be located and constructed as shown on the Drawings for this work. The works of Mortared Stonework, riprap etc. shall be carried out in accordance with Section S12 of these Specifications.

To ensure uniformity in the horizontal and vertical alignment of the curb, the Engineer may instruct that work on the upper sections of inlets, catch basins and ditches be deferred and carried out immediately before or during work on the adjacent curb. Any additional expense incurred in complying with this instruction will be deemed to be already included in the unit price for this work.

Backfill shall be performed in accordance with the requirements of Clause S5.01 of these Specifications. Backfill shall be carefully made so as to obtain a bearing capacity equal to the adjacent sub-grade. In compacting sub-base or base course in contact with drainage structures, rammers or small compactors shall be used and care taken to prevent damage to the adjacent structures. On completion of backfilling, the area excavated shall be reinstated to its original condition, but the Engineer may waive or modify this requirement if the area is to be overlaid or reconstructed under other Clauses of this Contract.

S6.06 (4) Method of Measurement

The quantities of ditches, catch-basins, manholes, inlets or outlets, pipe headwalls and joint boxes completed and accepted in accordance with the Drawings, these Specifications and as directed by the Engineer, will be measured as follows :

The quantities of each type of ditch to be paid for will be the number of linear metres measured along the centre-line of the completed ditch. The length will be measured to the outside face of any inlet or outlet or catch-basin. The quantities of catch-basins, manholes and joint boxes to be paid for, will be the number of each type of structure furnished and installed complete in place and accepted in accordance with the drawings and the Engineer's instructions.

The quantities of inlets or outlets to be paid for, will be the number of each type of structure including headwalls and mortared rubble scour protection as shown on the Drawings.

The measurement for ditches, inlets and catch-basins, manholes and inlet or outlet will be independent of the depth and the unit price will be deemed to cover any depth within the range shown on the Drawings. Where ditches are formed with vertical walls of different heights, the combined height of walls will be compared with the combined height of walls on standard ditches as shown on the Drawings, when determining the compliance with this method of measurement. No additional measurement will be made for joints between inlets or catch-basins and ditches or drainage pipes. Any additional expense involved in forming joints or junctions between individual pay items, will be deemed to be included in the cost of the pay items.

S6.06 (5) Basis of Payment

Ditches, catch-basins, inlets or outlets and joint boxes measured as provided above shall be paid at the Contract unit price for each pay item as described below. The price and payment will be full compensation for all the work in accordance with the Drawings, these Specifications and the instructions of the Engineer and will include for excavation, foundation construction and backfill. No separate payments will be made for steel or concrete covers, step irons, jointing, benching or any such similar work which is shown in the Drawings or described in these Specifications. The payment for inlets and outlets will be deemed to include the headwalls, wing walls, mortared stonework apron and all associated works as detailed on the Drawings.

Pay Item No.	Name		Unit of Measurement
6.06 (1)	U-Ditch,	Type U-1	linear metre
6.06 (2)	U-Ditch,	Type U-2	linear metre
6.06 (3)	U-Ditch,	Type U-3	linear metre
6.06 (2A)	U-Ditch,	Type U-4	linear metre
6.06 (5)	Mortared Stone Channel	Type C-1	linear metre
6.06 (6)	Mortared Stone Channel	Type C-2 & C-4	linear metre
6.06 (7)	Mortared Stone Channel	Type C-3	linear metre
6.06 (8)	Catchbasin,	Types R1,R2 and R4	each
6.06 (9)	Catchbasin,	Type R3	each
6.06 (10)	Catchbasin,	Type F	each
6.06 (11)	Catchbasin,	Type S1	each
6.06 (13)	Headwall,	for 125-A	each
6.06 (14)	Headwall,	for 125-B	each
6.06 (15)	Headwall,	for 150-A	each
6.06 (16)	Headwall,	for 150-B	each



## SECTION 7 SUBGRADE

### S7.01 Subgrade Preparation

#### S7.01 (1) Description

The subgrade shall be that part of the work which is prepared for the sub-base or, if there is no sub-base, the base of the pavement. It shall extend to the full width of the roadbed including the shoulders and laybys or such limited areas as shown on the Drawings or as instructed by the Engineer. Work on subgrade preparation shall only be carried out immediately prior to laying the sub-base.

#### S7.01 (2) Construction

##### (a) Templates and Straightedges

The Contractor shall provide and use straightedges to check the accuracy of the work and to ensure adherence to the requirements of these Specifications.

##### (b) Prior Works

Culverts, drain pipes and any other minor structures below the subgrade level, including fully compacted backfill shall be completed before work is begun on the subgrade. Ditches, drains, outlets for drainage, and headwalls for culverts shall be in such operative condition as to ensure prompt and effective drainage and to avoid damage to the subgrade by surface water.

Any subgrade areas failing to meet the planned elevation due to settlement or any other cause, or which have become damaged since completion of earthwork, shall be removed, material replaced or added, re-compacted and finished to the specified lines, grades and cross-sections as directed by the Engineer.

No work shall be started on the preparation of the subgrade before the prior works herein described have been approved by the Engineer.

##### (c) Degree of Compaction

All material to a depth of 200mm below the subgrade surface level shall be compacted to 95 percent of the maximum dry density as determined according to AASHTO T99. The minimum CBR required for subgrade material in pavement works in this contract shall be 6%.

##### (d) Subgrade in Earth Cut

When the subgrade is in earth cut it shall be formed to the correct transverse and longitudinal profiles as provided in Clause S4.02 (3) but at a grade level higher than the final grade in order to allow for the effect of compaction. The soil shall be compacted with approved rollers and prior to compaction the moisture content shall be adjusted by watering with approved sprinkler trucks or by drying out, as may be required, in order that the degree of compaction specified in Clause S7.01 (2) (c) may be attained.

If the natural characteristics of the soil are such that it is impossible to obtain the minimum CBR as given in the Special Specifications, when compacted as specified in Clause S7.01 (2) (c), the Engineer will specify remedial works or instruct its removal. The removal and disposal of unsuitable material in earth cuts shall be considered as in Clause S4.06.

(e) Subgrade on Embankment

When the subgrade is to be formed on embankment, the material to be placed in the upper part of the embankment down to a depth of 20 centimeters below the grade level shall meet the CBR requirements of Clause S7.01 (2) (c).

(f) Protection of Completed Work

Any part of the subgrade that has been completed shall be protected against drying out and cracking, and any damage resulting from default of the Contractor shall be repaired as directed by the Engineer without additional payment.

(g) Traffic and Repairs

The Contractor shall be responsible for all the consequences of traffic being admitted to the subgrade, and he may prohibit such traffic if he has provided a detour or is operating half-width construction. He shall repair any ruts or ridges occasioned by his own traffic or that of others by re-shaping and compacting with rollers of the size and type necessary for such repair. He shall arrange for subgrade preparation and sub-base or base placing to follow each other closely.

The subgrade, when prepared too soon in relation to the laying of the sub-base, is liable to deteriorate, and in such case the Contractor shall, without additional payment, repair, re-roll, or compact the subgrade as may be necessary to restore it to the state specified herein.

S7.01 (3) Method of Measurement

The quantities to be paid for shall be the number of square meters of subgrade in cut or in fill, prepared as hereinbefore prescribed, tested and accepted. The area to be measured for payment will be limited to the subgrade below sub-base, in areas of new pavement construction. For the purpose of payment no differentiation is made between subgrade in cut or fill areas. Areas to be sodded or laid with interlocking concrete paving will not be measured for payment under this Clause.

S7.01 (4) Basis of Payment

The quantities, determined as provided in Clause S7.01 (3) shall be paid for at the pay item listed below. This payment shall be full compensation for furnishing all labour, equipment and material necessary to complete the work including scarifying, reworking, wetting or drying, compacting, proof rolling, testing, shaping and finishing, maintenance and other incidental items of work prescribed in this Clause.

Pay Item No.	Name	Unit of Measurement
7.01	Subgrade Preparation	square meter



**SECTION 8: SUB-BASES AND BASES**

S8.00 General Description

This work shall consist of supplying, processing, hauling, spreading, watering and compacting graded aggregate on a prepared and accepted surface, in accordance with the details shown on the Drawings or as directed by the Engineer. Processing shall include, where necessary, crushing, screening, separation, blending, and any other operation necessary to produce a material conforming to the requirements of this Specification.

S8.01 (1) Sub-base Material Requirements

PROPERTIES	SUB-BASE
Abrasion of Aggregate retained on 2.00 mm sieve (AASHTO T96)	50% max.
Plasticity Index of Aggregate passing the 0.425 mm sieve (AASHTO T90)	12 max.
Percent by Mass of Aggregate retained on 2 mm sieve with one fractured face.	-
Liquid Limit of Aggregate passing the 0.425 sieve (AASHTO T89)	35 max.
Soaked CBR (AASHTO T193) at maximum dry density (AASHTO T180 Method D)	35% min

Materials shall be crushed stone or crushed or natural gravels. The sub-base grading shall conform to grading A of AASHTO M 147 and the aggregate shall not show a loss greater than 10% when subjected to 5 cycles of the sodium sulphate soundness test.

When crushed gravel is used, not less than 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face.

S8.01 (2) Construction

(a) Preparation of Subgrade

The subgrade shall be constructed, prepared, and finished as provided under Section 7 of these Specifications before placing aggregate sub-base course material. The thickness of the sub-base shall be as shown on the Drawings or as instructed by the Engineer.

(b) Spreading

The Contractor's method of spreading granular material shall be subject to the approval of the Engineer. If the Engineer is not satisfied with the Contractor's method of spreading, he may require the use of a spreader box at no extra cost. Spreader boxes shall be self propelled wheel type or tracked vehicles and adjustable to place the material in layers of the specified thickness without undue disturbance to the prepared surface.

The granular material shall be placed in uniform layers so that the compacted depth does not exceed 15 cm.

(c) Compaction

Immediately following final spreading and smoothing, each layer shall be compacted to full width by means of smooth-wheel power rollers, pneumatic-tyred rollers or other approved compaction equipment. Rolling shall progress gradually from the low to the high point of the cross section parallel to the centreline of the road, and shall continue until all the surface has been rolled.

Any irregularities or depressions that develop shall be corrected by loosening the material at these places and adding or removing material until the surface is smooth and uniform. At all places not accessible to the roller, the material shall be compacted thoroughly with approved tampers or compactors. The material shall be both bladed and rolled until a smooth, even surface has been obtained. Where surfaces fail to meet the tolerance requirement the Contractor shall remove and replace the material as directed by the Engineer without any additional cost.

Granular material shall be compacted to produce the required density through the full depth of each layer of at least 100 percent of the maximum density determined in accordance with AASHTO T180, method D. In place field density determinations will be made in accordance with AASHTO T191. The Engineer will make measurements of test holes at random during progress of the work to confirm compliance with the Specification and to determine the depth of un-compacted layers required to produce the designated nominal depth of material placed.

Cutting the test holes and refilling with materials properly compacted shall be done by the Contractor under the supervision of the Engineer, at the Contractor's expense.

S8.01 (3) Method of Measurement

The quantities to be paid for shall be the number of cubic meters of sub-base course, as laid according to the Drawings or as instructed by the Engineer, compacted, tested and accepted by the Engineer. The quantity to be paid for will be based on the nominal dimensions and shape shown on the plans and the actual length measured along the centreline of survey. During the performance of the work, the thickness of each course shall be accurately controlled to attain the required thickness after compaction.

S8.01(4) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price per cubic meter for sub-base as listed below. The payment shall be full compensation for furnishing all materials, hauling, placing, compacting, sprinkling, proof rolling, finishing and shaping, and for all labour, equipment, tools and other incidentals necessary to complete the work as specified herein.

Pay Item No.	Name	Unit of Measurement
8.01	Sub-base	cubic metre

S8.02 (1) Granular Base Course Material Requirements

- (a) Aggregate Base Course shall consist of hard durable particles or fragments of stone or gravel crushed to the size and the quality requirements of this Specification. Aggregate Base shall be cleaned and free from vegetable matters, lumps or balls of clay and other deleterious substances. The material shall be of such nature that it can be compacted to form a firm, stable base.

Table of Grading Requirements for Aggregate Bases.

SIEVE DESIGNATION (mm)	MASS PERCENT PASSING
37.5	100
25	80-100
19	50-85
4.75	25-45
0.425	8-22
0.075	2-9

- (b) The portion of the material passing the 0.075 mm sieve shall not be greater than 0.66 (two thirds) of the fraction passing the 0.425 sieve.
- (c) If filler, in addition to that naturally present, is necessary for meeting the grading requirements or for satisfactory bonding, it shall be uniformly blended with the crushed base course material as approved by the Engineer. Filler shall be obtained from sources approved by the Engineer, free from hard lumps and shall not contain more than 25 percent of material retained on the 4.75 sieve according to AASHTO T 112.
- (d) Aggregate base course material shall conform, using wet sieve testing to the following properties;

PROPERTIES	BASE
Abrasion of Aggregate retained on 2.00 mm sieve (AASHTO T96)	45% max.
Plasticity Index of Aggregate passing the 0.425 mm sieve (AASHTO T90)	6 max.
Percent by Mass of Aggregate retained on 2 mm sieve with one fractured face.	50% min.
Liquid Limit of Aggregate passing the 0.425 sieve (AASHTO T89)	25 max.
Soaked CBR (AASHTO T193) at maximum dry density (AASHTO T180 Method D)	For material passing 19mm sieve 90% min

S8.02 (2) Preparation of Sub-base Surface

The sub-base shall be constructed, prepared, finished and tested as provided under clauses S8.01(1) and (2) of these Specifications before placing base course aggregate.

S8.02(3) Placing of Base Course

The thickness of the base course shall be as shown on the Drawings or as instructed by the Engineer. The base course material shall be placed as a uniform mixture on the prepared sub-base in a quantity which will provide the

required compacted thickness. Spreading and compaction shall be in accordance with clauses S8.01(2) (b) and (c) of this specification. Where more than one layer is required, each layer shall be compacted in accordance with clause S8.01(2)(c).

The area sub-base being prepared for laying base course material shall be completed and the approval of the Engineer obtained for at least 200 metres ahead of the placing of base course.

S8.02 (4) Method of Measurement

The quantities to be paid for shall be the number of cubic metres of base course, as laid according to the Drawings or as instructed by the Engineer, compacted, tested and accepted by the Engineer. The quantity to be paid for will be based on the nominal dimensions and shape shown on the plans and the actual length measured along the centreline of survey. During the performance of the work, the thickness of each course shall be accurately controlled to attain the required thickness after compaction.

S8.02 (5) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price per cubic meter for base course material as listed below. The payment shall be full compensation for furnishing all materials, hauling, placing, compacting, sprinkling, proof rolling, finishing and shaping, and for all labour, equipment, tools and other incidentals necessary to complete the work as specified herein.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
8.02	Granular Base Course	cubic metre

## SECTION 9 PAVEMENTS

### S9.01 Bituminous Pavements-General

#### S9.01 (1) Description

The work described in this section covers the treatment and repair of existing bituminous pavements together with the supplying and laying of new construction to form the completed pavements as shown on the Drawings and as instructed by the Engineer.

The extent and treatment of existing pavement to be incorporated in the new works will be instructed by the Engineer following a study of cross-sections prepared by the Contractor. The Contractor shall cooperate in the study and will be required to prepare additional cross-sections or levels to supplement those used in the earthworks calculations and provide experienced staff to assist the Engineer in his work.

#### S9.01 (2) Equipment

Unless specified elsewhere or approved by the Engineer, equipment used in the work for bituminous pavements shall comply with the following specifications.

##### (a) Bitumen Distributor

The distributor shall be self-powered and have pneumatic tyres of such width and number that the load produced on the road surface shall not exceed 100 kilograms per centimeter of tyre width. It shall be so designed, equipped, maintained, and operated that bituminous materials at even heat may be applied uniformly on variable width of surface up to 5 meters at readily determined and controlled rates of from 0.2 to 3.0 lt per square meter with uniform pressure, and with an allowable variation from any specified rate not to exceed 0.1 lt per square meter.

Distributor equipment shall include an instrument for measuring the speed of travel accurately at low speeds, the rate of flow of asphaltic material through nozzles, the temperature of the contents of the tank, and the pressure. These instruments shall be so located that the operator can easily read them whilst operating the distributor.

The distributor shall be equipped with a separate power unit for the pump, and full circulation spray bars which shall be adjustable laterally and vertically. The spray bars on the distributor shall be controlled by a man riding at the rear of the distributor in such a position that the operation of all sprays is in his full view. The distributor shall incorporate one or more hand operated lances but these shall only be used in areas inaccessible to the main spray bars.

##### (b) Bitumen Heater

This shall be of the oil jacket type or else incorporate an automatic agitator to prevent local overheating of the material. The heater should incorporate a thermometer.

(c) Bituminous Mixing Plant

Sufficient storage space shall be provided for each size of aggregate. The different aggregate sizes shall be kept separated until they have been delivered to the cold aggregate feeding system. The storage yard shall be maintained neat and orderly and the separate bins shall be readily accessible for sampling.

Plants used for the preparation of bituminous mixtures shall conform to all requirements under (i) except that scale requirements shall apply only where weight proportioning is used. In addition, batch mixing plants shall conform to the requirements under (ii); and continuous mixing plants shall conform to the requirements under (iii).

(i) Requirements for all plants

Mixing plants shall be of sufficient capacity and coordinated to adequately handle the proposed bituminous constructions.

Plant scales : Scales shall be accurate to 0.5 percent of any load that may be required and sensitive to one half the minimum gradation, which shall not be greater than 3.5 kg. Poises shall be designed to be locked in any position to prevent unauthorized change of position. In lieu of plant and truck scales, the Contractor may provide an approved automatic printer system which will print the weights of the material delivered, provided the system is used in conjunction with an approved automatic batching and mixing control system. Such weights shall be evidenced by a weight ticket for each load. Public weighing facilities may be used if tested and sealed by the local authority, subject to approval by the Engineer of the weighing procedures.

Equipment for preparation of bituminous material:

Tanks for the storage of bituminous material shall be equipped to heat and hold the material at the required temperatures. The heating shall be accomplished by steam coils, electricity, or other approved means so that no flame shall be in contact with the tank. The circulating system for the bituminous material shall be designed to assure proper and continuous circulation during the operation period. Provision shall be made for measuring and sampling storage tanks.

Feeder for drier : The plant shall be provided with accurate mechanical means for uniformly feeding the aggregates into the drier so that uniform production and uniform temperature will be obtained.

Drier : The plant shall include a drier or dryers which continuously agitate the aggregates during the heating and drying process. For cold-type bituminous mix, equipment for mechanical cooling of the dried aggregate to the temperature prescribed for cold mixtures shall be provided, if required, and shall be capable of supplying prepared material for the mixer to operate at full capacity.

**Screens** : Plant screens, capable of screening all aggregates to the specified sizes and proportions and having normal capacities in excess of the full capacity of the mixer, shall be provided.

**Bins** : The plants shall include storage bins of sufficient capacity to supply the mixer when it is operating at full capacity. Bins shall be divided into at least 3 compartments and shall be arranged to assure separate and adequate storage of appropriate fractions of the mineral aggregates. Separate dry storage shall be provided for filler or hydrated lime when used and the plant shall be equipped to feed such material into the mixer or weighing hopper. Each bin shall be provided with overflow pipes, of such size and at such location as to prevent backing up of material into other compartments or bins. Each compartment shall be provided with its individual outlet gate, constructed so that when closed there shall be no leakage. The gates shall cut off quickly and completely. Bins shall be so constructed that samples can be readily obtained. Bins shall be equipped with adequate tell-tale devices to indicate the position of the aggregates in the bins at the lower quarter points.

**Bituminous control unit** : Satisfactory means, either by weighing or metering, shall be providing to obtain the proper amount of bituminous material in the mix within the tolerance specified. Means shall be provided for checking the quantity or rate of flow of bituminous material into the mixer.

**Thermometric equipment** : An armoured thermometer of adequate range in temperature reading shall be fixed in the bituminous feed line at a suitable location near the charging valve at the mixer unit. The plant shall also be equipped with either an approved dial-scale, mercury-actuated thermometer, an electric pyrometer, or other approved thermometric instrument so placed at the discharge chute of the drier as to register automatically or indicate the temperature of the heated aggregates. The Engineer may require replacement of any thermometer by an approved temperature-recording apparatus for better regulation of the temperature of aggregates.

**Dust collector** : The plant shall be equipped with a dust collector constructed to waste or return uniformly to the hot elevator all or any part of the material collected as directed, without the escape of objectionable dust into the atmosphere.

**Truck scale** : If required by the Engineer the bituminous mixture shall be weighed on approved scales furnished by the Contractor or on public scales at the Contractor's expense. Such scales shall be inspected and sealed as often as the Engineer deems necessary to assure their accuracy.

**Safety requirements** : Adequate and safe stairways to the mixer platform and sampling points shall be provided and guarded

ladders to other plant units shall be placed at all points where accessibility to plant operations is required. Accessibility to the top of truck bodies shall be provided by a platform or other suitable device to enable the Engineer to obtain sampling and mixture temperature data. A hoist or pulley system shall be provided to raise scale calibration equipment, sampling equipment and other similar equipment from the ground to the mixer platform and return. All gears, pulleys, chains, sprockets, and other dangerous moving parts shall be thoroughly guarded and protected. Ample and unobstructed space shall be provided on the mixing platform. A clear and unobstructed passage shall be maintained at all times in and around the truck loading area. This area shall be kept free from drippings from the mixing platform.

Field laboratory : The Contractor shall provide a weatherproof building for use as a field laboratory by the Engineer. The structure shall have adequate work space for required testing operations and be provided with necessary heat, water supply, lighting and any other utilities as directed by the Engineer. This laboratory shall be maintained for the exclusive use of the Engineer, and shall be so located that details of the Contractor's plant are plainly visible from one window thereof. If conditions permit, this laboratory shall be adjacent to the weight-house.

(ii) Requirements for batching plants

Weigh box or hopper : The equipment shall include a means for accurately weighing each size of aggregate in a weigh box or hopper suspended on scales and of ample size to hold a full batch without hand raking or running over. The gate shall close tightly so that no material is allowed to leak into the mixer while a batch is being weighed.

Bituminous control : The equipment used to measure the bituminous material shall be accurate to plus or minus 0.5 percent of any load that may be required, and be sensitive to one half the minimum gradation, which shall be not greater than 2 kg. The bituminous material bucket shall be a non-tilting type with a loose sheet metal cover.

The length of the discharge opening or spray bar shall be not less than 3/4 the length of the mixer and it shall discharge directly into the mixer in the manner specified below. The bituminous material bucket, its discharge valve or valves, and spray bar shall be adequately heated. Steam jackets, if used, shall be efficiently drained and all connections shall be so constructed that they will not interfere with the efficient operation of the bituminous scales. The capacity of the bituminous material bucket shall be at least 15 percent in excess of the weight of bituminous material required in any batch. The plant shall have an adequately heated quick-acting, non-drip, charging valve located directly over the bituminous material bucket. The indicator dial shall have a capacity of at least 15 percent in excess of the quantity of bituminous material used in



a batch. The controls shall be constructed so that they may be locked at any dial setting and will automatically reset to that reading after the addition of bituminous material to each batch. The dial shall be in full view of the mixer operator. The flow of bituminous material shall be automatically controlled so that it will begin when the dry mixing period is over. All of the bituminous material required for one batch shall be discharged in not more than 15 seconds after the flow has started. The size and spacing of the spray bar opening shall provide a uniform application of bituminous material the full length of the mixer. The section of the bituminous line between the charging valve and the spray bar shall be provided with a valve and outlet for checking the meter when a metering device is substituted for a bituminous material bucket.

Mixer : The batch mixer shall be an approved type capable of producing a uniform mixture within the job-mix tolerance. If not enclosed, the mixer box shall be equipped with a dust hood to prevent loss of dust. The clearance of blades from all fixed and moving parts shall not exceed 2.5 cm unless the maximum diameter of aggregate in the mix exceeds 3.0 cm, in which case the clearance shall not exceed 3.8 cm.

Control of mixing time : The mixer shall be equipped with an accurate time lock to control the operations of a complete mixing cycle. It shall lock the weight box gate after the charging of the mixer until the closing of the mixer gate at the completion of the cycle. It shall lock the bituminous material bucket throughout the dry and wet mixing periods. The dry mixing period is defined as the interval of time between the opening of the weigh box gate and the start of introduction of bituminous material. The wet mixing period is the interval of time between the start of introduction of bituminous material and the opening of the mixer gate. The control of the timing shall be flexible and capable of being set at intervals of 5 seconds or less throughout a total cycle of up to 3 minutes. A mechanical batch counter shall be installed as a part of the timing device and shall be so designed as to register only completely mixed batches. The setting of time intervals shall be performed in the presence and at the direction of the Engineer who will then lock the case covering the timing device until such time as a change is to be made in the timing periods.

(iii) Requirements for continuous mixing plants

Aggregate proportioning : The plant shall include means for accurately proportioning each size of aggregate. The plant shall have a feeder mounted under each compartment bin. Each compartment bin shall have an accurately controlled individual gate to form an orifice for volumetrically measuring the material drawn from each compartment. The feeding orifice shall be rectangular with one dimension adjustable by positive mechanical means provided with a lock. Indicators shall be provided for each gate to show the respective gate opening in inches or centimeters.

Weight calibration of aggregate feed : The plant shall include a means of calibration of gate openings by weighing test samples. Provision shall be made so that materials fed out of individual orifices may be bypassed to individual test boxes. The plant shall be equipped to conveniently handle individual test samples weighing not less than 75 kg. Accurate scales shall be provided by the Contractor to weigh such test samples.

Synchronization of aggregate feed and bituminous material feed : Satisfactory means shall be provided to afford positive interlocking control between the flow of aggregate from the bins and the flow of bituminous material from the meter or other proportioning device. This control shall be accomplished by interlocking mechanical means or by any other positive method satisfactory to the Engineer.

Mixer : The plant shall include a continuous mixer of an approved type, adequately heated and capable of producing a uniform mixture within the job-mix tolerances. It shall be equipped with a discharge hopper with dump gates which will permit rapid and complete discharge of the mixture. The paddles shall be adjustable for angular position on the shafts and reversible to retard the flow of the mix. The mixer shall have a manufacturer's plate giving the net volumetric contents of the mixer at the several heights inscribed on a permanent gauge. Charts or other approved means shall be provided showing the rate of feed of aggregate per minute at the plant operating speed.

(d) Hauling Equipment

Trucks used for hauling bituminous mixtures shall have tight, clean, smooth metal beds which have been thinly coated with approved material to prevent the mixture from adhering to the beds. Each truck shall have a cover of canvas or other suitable material of such size as to protect the mixture from the weather. When necessary, so that the mixture will be delivered on the road at the specified temperature, truck beds shall be insulated and covers shall be securely fastened. The Engineer will determine the tare weight for each vehicle used in hauling mixtures to the road, as often as necessary, but in no case less than once during each work shift.

(e) Bituminous Pavers

Bituminous pavers shall be self-contained, power-propelled units, provided with an adjustable activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thickness shown on the Drawings. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of bituminous plant mix material in widths shown on the Drawings. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper

shall be equipped with a distribution system to place the mixture uniformly in front of the screed.

The pavers shall employ mechanical devices such as equalizing runners, straightedge runners, evener arms, or other compensating devices, to maintain trueness of grade and to confine the edges of the pavement to true lines without the use of stationary side forms. The equipment shall include blending or joint leveling devices for smoothing and adjusting longitudinal joints between lanes. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture.

The Contractor shall furnish all necessary small tools and provide means for keeping them free from accumulation of bituminous material. He shall provide and have ready for use at all times enough tarpaulins or covers, as may be necessary, for use in any emergency such as rain, chilling wind, or unavoidable delay, for the purpose of covering or protecting any material that may have been dumped, or spread but not compacted.

(f) Rollers

Rollers shall be of the steel wheel and pneumatic tyre types and shall be in good condition, capable of reversing without back-lash, and shall be operated at speeds slow enough to minimize displacement of the bituminous mixture. The number and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. The use of equipment which results in excessive crushing of the aggregate will not be permitted.

(g) Aggregate Spreader

The aggregate spreader shall be self-propelled, of approved design, and supported by at least 4 wheels equipped with pneumatic tyres on two axles. The aggregate spreader shall be equipped with positive controls so that the required amount of material will be deposited uniformly over the full width of the bituminous material. Other types of aggregate spreaders may be used provided they accomplish equivalent results and are approved by the Engineer.

(h) Power Broom and Blower

A rotary power broom and power blowers shall be provided, and maintained in good working order, including regular cleaning of surfaces in contact with bituminous material.

S9.01 (3) General Requirement

Unless specified elsewhere or approved by the Engineer, all work utilizing new bituminous material shall comply with the following for the purposes of construction and measurement.

(a) Weather

Bituminous material shall not be laid in rain or in foggy weather and unless specified elsewhere, the surface being covered shall be clean and dry. Bituminous plant mix shall not be placed when weather conditions prevent the proper handling or finishing of the material.

(b) Protection of Existing Work

Construction equipment used on pavements under construction shall be suitable in relation to the material, condition and thickness of the courses it traverses so that damage is not caused to the pavement courses already constructed. Bituminous material shall be kept clean and uncontaminated for so long as it remains uncovered by succeeding layers or surface treatment. The only traffic permitted access to bituminous material shall be that engaged in laying and compacting the next course. At his own risk, the Contractor may allow traffic to use the binder course but this will be subject to the Engineer's approval and he may require the Contractor at his own expense, to seal or otherwise protect the binder course. Should any bituminous material become contaminated, the Contractor shall make good by cleaning it to the satisfaction of the Engineer and if this proves impractical, he shall remove and replace the layer at his own expense.

Before undertaking any bituminous spraying, the surfaces of structures, curbs, trees, etc., adjacent to the areas being treated shall be protected in such a manner as to prevent their being spattered or marred.

(c) Layers of Bituminous Courses

A bituminous pavement shall be laid so that the compacted thickness of each layer does not exceed 105 mm. Where any course of material exceeds this thickness, it shall be laid in 2 or more layers of equal thickness.

(d) Measurement

Method of Measurement of the various plantmix materials shall be in accordance with Clause S9.07 (4).

(e) Overlay

When the contract calls for the overlay of existing pavement, any regulating required shall be carried out using the lowest layer(s) of material possible. All remedial works to the pavement shall be executed before commencement of overlay operations.

(f) Finished Work Samples

Plant-Mix : The Contractor shall cut full depth samples as directed, from the finished course, for testing by the Engineer. Samples shall be neatly cut by a saw, core drill, or other approved equipment.

Each sample shall be one slab of at least 15 cm by 15 cm, or a number of cores, each with a minimum 10 cm diameter totaling at least 230 square cm. At least one, but not more than three samples shall be taken for each full day's operations. The Contractor shall supply and finish with new material to backfill voids left by sampling. Extra samples will be taken whenever a substantial change has been approved and made in the job-mix formula.

**Bituminous Spray** : To check the rate of bituminous material actually applied, sheets of building paper 50 cm by 50 cm previously weighed, shall be laid on the surface to be treated and weighed again after application of the coat. The Contractor will supply the material for this check and will re-spray the areas from which the paper is lifted.

Based on the results of the above checks and subsequent laboratory analysis, the Engineer may instruct the removal and replacement at the Contractor's expense, of any material which does not fully comply with these Specifications. The Engineer may also instruct an additional coat of material, or removal of excess material and/or may reduce the quantity of material approved for payment.

S9.02 **Scarify Pavement**

S9.02 (1) **Description**

This work shall consist of the removal of the upper layer or layers of an existing asphalt pavement where this is necessary to allow resurfacing or to allow formation of a joint between existing and new work. Scarifying necessary solely because of the Contractor's method of working will not be measured for payment.

S9.02 (2) **Construction**

The work shall be done by machine or by hand in such a manner that the area scarified does not exceed that instructed by the Engineer. Any damage to asphalt or curb designated by the Engineer to remain will be made good to the Engineer's satisfaction at the Contractors' own expense. All material removed shall be stockpiled on the site for use of the Employer, or otherwise disposed of as directed by the Engineer.

S9.02 (3) **Method of Measurement**

The quantity measured for payment will be the number of square meters of existing asphalt scarified in accordance with the Engineer's instructions. Where the Engineer orders the removal of more than one layer in separate operations, each layer removed will be measured and paid for separately. Where the Engineer instructs that the full depth of existing asphalt shall be removed, the work shall conform to the requirements of Clause S3.01 of these Specifications for removal, measurement and payment.

S9.02 (4) **Basis of Payment**

The work measured as provided above shall be paid for at the Contract price per unit of measurement for the pay item below. The Contract unit price will be full compensation for furnishing all labour, tools, equipment and incidentals necessary to do the work as directed by the Engineer, including removal and disposal of all the resulting material.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
9.02	Scarify Pavement	square meter

S9.03 Patching of Existing Pavements

S9.03 (1) Description

This work will consist of removal and replacement of damaged existing pavement in localized areas. The Engineer will designate the areas of pavement to be so treated and all work shall be carried out as specified below and will be paid for on the basis of the number of square meters so treated.

S9.03 (2) Material

All material and work furnished under this pay item shall comply with the requirements of the following Clauses, with the exception that machine laying of asphalt treated base course is not compulsory, and all compaction equipment may be varied to suit the size of the area being treated :

Removal of pavement	- Clause S3.01
Subgrade preparation	- Clause S7.01
Sub-base	- Clause S8.01
Prime coat	- Clause S9.04
Tack coat	- Clause S9.05
Asphalt treated base course	- Clause S9.07
Asphalt cement	- Clause S9.07

S9.03 (3) Construction

The area to be treated shall be marked on the surface and the existing pavement and subgrade removed to a depth of 50 cm. Pavement to remain shall be cut to form a vertical face and the edges of the excavation shall be straight and in neat lines. After preparation of the subgrade in accordance with Clause S7.01(2)(d), 30 cm of the sub-base as used for new construction shall be laid in accordance with Clause S8.01. The sub-base shall then be primed in accordance with Clause S9.04 and asphalt treated base course laid in accordance with Clause S9.07. Bituminous material in the existing pavement which will abut with the new base course shall be tack coated in accordance with Clause S9.05 or else lightly brushed with hot asphalt cement. The finished level of the patched area shall be carefully formed to leave a smooth surface level with the adjacent existing pavement.

S9.03 (4) Method of Measurement

The quantities to be paid for under this Clause will be the number of square meters of existing pavement removed and replaced in accordance with this Specification and the Engineer's instructions. The maximum area of a single patch treated under this Clause will be 40 square meters. When any single area exceeds this quantity it will be dealt with on the basis of the other individual pay items in this Specification for the purpose of measurement and payment.

Any pavement damaged by the Contractor's work under other Clauses of the Specification shall be replaced in accordance with the requirements of this Clause, but will not be measured for payment and replacement will be at the Contractor's own expense.

S9.03 (5) Basis of Payment  
The accepted quantity of pavement replaced as determined above, will be paid for at the Contract price per square meter, for the pay item as shown below. Such price and payment will be considered as full compensation for the work of this Clause, including any special working methods due to the restricted area being repaired.

Pay Item No.	Name	Unit of Measurement
9.03	Patching of Existing Pavements	square meter

S9.04 Bituminous Prime Coat

S9.04 (1) Description

This work shall consist of furnishing and applying bituminous material to a previously prepared subgrade, sub-base or base course surface in accordance with these Specifications and to the width shown on the typical cross sections or instructed by the Engineer.

S9.04 (2) Material

(a) Bituminous Material

Bituminous material shall be of type and grade called for in the Drawings and shall conform to the requirements of the specifications listed below.

Medium-curing cut back asphalt	:	AASHTO M 82
Rapid-curing cut back asphalt	:	AASHTO M 81

The grade (with temperatures of application in degrees C) shall be MC-70 (43 - 85 degrees) or RC-250 (60 - 100 degrees).

(b) Blotter Material

Blotter material shall be approved clean, dry sand or stone screenings free from any cohesive material. It shall contain no organic matter.

S9.04 (3) Construction

(a) Weather Limitations

Prime coat shall be applied only with the approval of the Engineer who will specify the grade to be used. The surface to be treated shall be dry or slightly damp, and the atmospheric temperature in the shade above 13 degrees Celsius and rising or above 15 degrees Celsius if falling.

(b) Equipment

The equipment shall meet the requirements of Clause S9.01 (2).

(c) Preparation of Surface

Immediately before applying the bituminous material all loose dirt and other objectionable material shall be removed from the surface with a power broom and/or blower as required. If the Engineer so orders, the surface shall be lightly bladed and rolled immediately prior to the application of bituminous material, in which case brooming or blowing will not be required. When so ordered by the Engineer a light application of water shall be made just before the application of bituminous material. The area to be treated shall be approved by the Engineer prior to application.

(d) Application of Bituminous Material

Bituminous material shall be applied to the width of the section to be primed by means of a bitumen distributor in a uniform, continuous spread. The rate of application will usually be in the range of 1.0 to 2.5 kg/sq.m. and the Engineer will determine the rate and material grade to be used for each material being covered. Care shall be taken that the application of bituminous material at the junction of spreads is not in excess of the specified amount. Excess bituminous material shall be sponged from the surface. Skipped areas or deficiencies shall be corrected. Building paper shall be placed over the end of the previous applications and the joining application shall start on the building paper. Building paper used shall be removed and satisfactorily disposed of.

(e) Application of Blotter Material

In order to minimize possible damage by rain before the surface has completely dried, the Engineer may instruct that blotter material should be spread to cover any wet bituminous material. Blotter material shall be spread so that no wheels or tracks will travel on uncovered wet bituminous material.

(f) General

The relevant requirements of Clause S9.01 shall be read into and considered part of this Clause.

S9.04 (4) Method of Measurement

The quantity of prime coat to be paid for shall be the number of kilograms of bituminous material, laid in accordance with this Specification and the Engineer's instructions.

S9.04 (5) Basis of Payment

The accepted quantities of prime coat, determined as provided above, will be paid for at the Contract price per kilogram for bituminous material which price and payment will be full compensation for the work of this Clause, irrespective of the grade of material selected by the Engineer.



Blotter material will not be payable directly but shall be considered as a subsidiary obligation of the Contractor covered under the Contract price for this Clause.

Pay Item No.	Name	Unit of Measurement
9.04	Bituminous prime coat	kilogram

S9.05 Bituminous Tack Coat

S9.05 (1) Description

This work shall consist of preparing and treating an existing bituminous or concrete surface with bituminous material in accordance with these Specifications and in conformity with the details shown on the Drawings or instructed by the Engineer.

S9.05 (2) Materials

Bituminous material shall conform to the requirements of the Specification listed below.

Rapid-curing cut back asphalt : AASHTO M 81

The grade (with temperatures of application in degrees C) shall be RC-250 (60 - 100 degrees).

S9.05 (3) Construction

(a) Equipment

The equipment shall meet the requirements of Clause S9.01(2).

(b) Preparation of Surface to be Treated

The existing surface shall be patched and cleaned and shall be free of irregularities to provide a reasonably smooth and uniform surface to receive the treatment. Unstable, corrugated or damaged areas shall be removed and replaced or repaired as instructed by the Engineer. The edges of existing pavements, which are to be adjacent to new pavement, shall be cleaned to permit the adhesion of bituminous materials. The area to be treated shall be approved by the Engineer prior to application.

(c) Application of Bituminous Material

The bituminous material shall be uniformly applied with a pressure distributor within the 24 hours preceding placement of the covering course. The Engineer will specify the rate of the application which will usually be in the range of 0.4 to 0.8 kg/sq.m. Care shall be taken that the application of bituminous material at the junction of spreads is not in excess of the specified amount.

Excess bituminous material shall be sponged from the surface. Skipped areas or deficiencies shall be corrected.

The surface shall be allowed to dry until it is in a proper condition of tackiness to receive the covering course. Tack coat shall be applied only so far in advance of covering course placement as is necessary to obtain this proper condition of tackiness. Until the covering course is placed, the Contractor shall protect the tack coat from damage.

(d) General

The relevant requirements of Clause S9.01 shall be read into and considered part of this Clause.

S9.05 (4) Method of Measurement

The quantity of tack coat to be paid for shall be the number of kilograms of bituminous material, laid in accordance with this Specification and the Engineer's instructions.

S9.05 (5) Basis of Payment

The accepted quantities of tack coat, determined as provided above, will be paid for at the Contract unit price per kilogram for bituminous material complete in place, which price and payment will be full compensation for the work of this Clause.

Pay Item	No. Name	Unit of Measurement
9.05	Bituminous tack coat	kilogram

S9.06 Seal Coat

S9.06 (1) Description

This work shall consist of an application of bituminous material with an application of cover coat material in accordance with these Specifications in conformity with the lines shown on the Drawings or established by the Engineer.

The approximate amounts of materials per square meter for seal coats shall be as follows :

Bituminous material ..... 0.7 - 1.5 lt. per sq.m.  
Cover aggregate ..... 6.5 - 14.0 kg per sq.m.

The exact spread rates will be instructed by the Engineer.

S9.06 (2) Materials

(a) Bituminous Material

Bituminous material shall conform to the requirements of the following specification:

Rapid-curing cut back asphalt : AASHTO M 81

The grade (with temperatures of application in degrees C) shall be RC-250 (60 - 100 degrees) or that directed by the Engineer.

(b) Cover Coat Material

Cover coat material shall be crushed stone, or crushed gravel and shall meet the requirements for surface course material in Clause S9.07 (2) (b). When crushed gravel is used, not less than 50 percent by weight of the particles retained on the No. 4 sieve shall have at least one fractured face. Aggregates shall meet the gradation requirements of the following table.

Sieve Designation (mm)	Percentage Passing by Weight
12.5	100
9.5	85 - 100
4.75	10 - 30
2.36	0 - 10
0.300	- 0

9.06 (3) Construction

(a) Weather Limitations

Seal coat shall be applied only when the surface to be treated is dry or slightly damp, when the temperature of the road surface is 21 degrees Celsius or more.

(b) Equipment

The equipment shall meet the requirements of Clause S9.01(2).

(c) Preparation of Surface

Seal coating operations shall not be started until the surface is thoroughly compacted by rolling and traffic. Bituminous material shall not be spread until the surface has been cleaned as required, and the section to be sealed has been approved by the Engineer.

(d) Applying Bituminous Material

Bituminous material shall be applied by means of a pressure distributor in a uniform, continuous spread over the section to be treated and within the temperature range specified by the Engineer. The quantity of bituminous material to be used per square meter shall be as directed by the Engineer. If the texture of the surface is such that bituminous material penetrates too rapidly, a preliminary application of from 0.2 to 0.5 liter per square meter of surface may be required. A strip of building paper, at least 100 cm in width and with a length equal to that of the spray bar of the distributor plus 30 cm, shall be used at the beginning of each spread. If the cut-off is not positive, the use of paper may be required at the end of each spread. The paper shall be removed and disposed of in a satisfactory manner. The distributor shall be moving forward at proper application speed at the time the spray bar is opened. Any skipped areas or deficiencies shall be corrected. Junction of spreads shall be carefully made to assure a smooth riding surface. The length of bituminous material shall not be in excess of that which approved spreading equipment can immediately cover with approved material.

The spread of bituminous material shall not be more than 15 cm wider than the width covered by the cover coat material from the spreading device. Under no circumstances shall operations proceed in such manner that bituminous material will be allowed to chill, set up, or otherwise impair retention of the cover coat.

The distributor, when not spreading, shall be parked so that the spray bar or mechanism will not drip bituminous materials on the surface of the traveled way.

(e) Application of Cover Coat Material

Immediately following the application of the bituminous material, cover coat for seal shall be spread in quantities as designated. Spreading shall be accomplished in such a manner that the tyres of the approved aggregate spreader at no time contact the uncovered and newly applied bituminous material.

If directed, the cover coat material shall be moistened with water to eliminate or reduce the dust coating of the aggregate. Moistening shall be done the day before the use of the aggregate.

Immediately after the cover coat material is spread, any deficient areas shall be covered by additional material. Initial rolling shall begin immediately behind the spreader and shall consist of one complete coverage with a power roller. Pneumatic tyre rolling shall begin immediately after completion of the initial rolling and shall be completed the same day the bituminous material and cover coat materials are applied.

After the application of the cover coat material, the surface shall be lightly broomed or otherwise maintained as directed for a period of 4 days or as directed by the Engineer. Maintenance of the surface shall include the distribution of cover coat material over the surface to absorb any free bituminous material and to cover any area deficient in cover coat material. The maintenance shall be conducted so as not to displace embedded material. Excess material shall be swept from the entire surface by means of rotary brooms. The surface shall be swept at the time determined by the Engineer. The Contractor shall furnish a pilot car and driver to conduct traffic over completed seal coat at a maximum speed of 10 kilometers per hour for the first 24 hours after cover aggregate is applied, if so directed by the Engineer.

S9.06 (4) Method of Measurement

Seal coat will be measured by the square meter. No measurement or payment will be made of areas "sealed" outside the limits shown on the Drawings or ordered

by the Engineer. No measurement or payment will be made for material used in excess of those specified by the Engineer nor shall they form the basis of a claim for additional payment.

S9.06 (5) Basis of Payment

The accepted quantities of seal coat determined as provided above, will be paid for at the Contract price per square metre which price and payment will be full compensation for the work of this Clause and for any specified spread rates within the ranges given in S9.06 (1).

Pay Item No.	Name	Unit of Measurement
9.06	Seal Coat	square metre

S9.07 Bituminous Plant-mix Material

S9.07 (1) Description

This work shall consist of aggregate and bituminous material mixed in a central plant and spread and compacted on a prepared surface in accordance with these Specifications and in close conformity with the lines, grades, thicknesses and typical cross sections shown on the Drawings or established by the Engineer.

The relevant sections of Clause S9.01 (2) and S9.01 (3) shall be read into and considered as part of this Clause.

S9.07 (2) Material

(a) Composition of Mixtures

The bituminous material shall be composed of a mixture of aggregate, filler and hydrated lime if required, and asphalt cement. The several aggregate fractions shall be sized, uniformly graded and combined in such proportions that the resulting composite blend meets the job-mix formula and the following index of retained strength as determined in accordance with AASHTO T245.

Description	Base Course	Surface & Binder Course
Stability : kg	700 min.	900 min.
Flow : mm	2.5 - 4.0	2.5 - 4.0
Voids in total mix : %	4 - 6	3 - 5
Voids filled with asphalt : %	65 - 75	75 - 85

In calculating the void characteristics of the mixture the Contractor shall allow for the asphalt absorbed by the aggregate and use the effective specific gravity of aggregate and the maximum specific gravity of the loose paving mixture (AASHTO T209).

The several aggregate and filler fractions for the mixture shall be sized, graded, and combined in such proportions that the resulting composite blend meets one of the grading requirements of Table 9.07 (1).

Grade A shall be used for asphalt treated base course.

Grade B shall be used for asphalt concrete binder course.

Grade C shall be used for asphalt concrete surface course.

Table 9.07 (1)

Sieve Designation (mm)	Percentage Passing by Weight		
	Grade A	Grade B	Grade C
50.0	100	-	-
37.5	95 - 100	-	-
25.0	70 - 90	100	-
19.0	-	95 - 100	100
12.5	45 - 70	68 - 86	95 - 100
9.5	-	56 - 78	74 - 92
4.75	25 - 50	38 - 60	48 - 70
2.36	17 - 40	27 - 47	33 - 53
1.18	-	18 - 37	22 - 40
0.600	7 - 22	11 - 28	15 - 30
0.300	-	6 - 20	10 - 20
0.075	0 - 6	0 - 8	4 - 9

Before stockpiling aggregate, the Contractor shall submit a proposed job-mix formula in writing, for use by the Engineer in setting the job-mix to be used with the proposed materials. The formula submitted shall propose definite single values for :

- The percentage of aggregate passing each specified sieve.
- The percentage of bituminous material to be added, on the total aggregate basis.
- The temperature of the mixture leaving the mixer.
- The temperature of the mixture delivered on the road.
- The grade of bituminous material.

Values shall be proposed within the limits specified for the particular type of bituminous concrete called for. The Engineer will determine a job-mix formula with single values for the above-mentioned and so notify the Contractor in writing.

The mixture furnished by the Contractor shall conform to this job-mix formula, within the following range of tolerances and within the grading ranges of Table 9.07 (1).

- \* Aggregate passing the 4.75 mm and larger sieve ..... ± 7 percent
- \* Aggregate passing the 2.36 mm through the 0.150 mm sieve ..... ± 4 percent
- \* Aggregate passing the 0.075 mm sieve .. ± 2 percent
- \* Bituminous material ..... ± 0.4 percent
- \* Temperature leaving the mixer ..... ± 6 degrees C
- \* Temperature delivered on the road . ± 6 degrees C

When unsatisfactory results make it necessary, the Engineer may establish a new job-mix formula and so notify the Contractor in writing. Should a change in sources of material be proposed, a new job-mix formula will be established by the Engineer before the new material is used.

The plant mixed material will be tested after blending or mixing at the plant or prior to final incorporation in the work.

(b) Coarse Aggregate

The coarse aggregate (retained on the 2.36 mm sieve) shall consist of clean, tough, durable fragments free from an excess of flat, elongated, soft or disintegrated pieces and free from stone coated with dirt or other objectionable material. The percentage of wear when tested according to AASHTO T96, shall be as follows :

- \* For use in asphalt treated base course - not more than 50
- \* For use in asphalt concrete binder and surface course - not more than 40.

The sodium sulphate soundness loss shall not exceed 9 percent and the magnesium sulphate soundness loss shall not exceed 12 percent. When crushed gravel is used, not less than 50 percent of the particles by weight retained on the 4.75 mm sieve shall have at least one fractured face.

(c) Fine Aggregate

The fine aggregate (passing a 2.36 mm sieve), shall have General Characteristics and Soundness in accordance with AASHTO M 29.

(d) Filler

Mineral filler, when required, shall consist of limestone dust, portland cement or other non plastic mineral matter from sources approved by the Engineer. Mineral filler shall be dry, free flowing, free from lumps and other objectionable material and when tested by means of laboratory sieve, shall meet the following gradation requirements :

Sieve Designation (mm)	Percentage Passing by Weight
0.600	100
0.180	95 - 100
0.075	65 - 100

(e) Asphalt Cement

Asphalt Cement shall be of penetration grade 60-80, and shall conform with the requirements of AASHTO M 20.

S9.07 (3) Construction

(a) Equipment

The mixing plant and all equipment used for hauling and laying the bituminous mixture shall comply with requirements of Clause S9.01(2). The Contractor shall provide suitable means for keeping all small tools clean and free from accumulation of bituminous material. He shall provide and have ready for use at all times enough tarpaulins or covers, as may be directed by the Engineer, for use in any emergency such as rain, chilling wind, or unavoidable delay, for the purpose of covering or protecting any material that may have been dumped, or spread but not compacted.

(b) Preparation of Bituminous Material

The bituminous material shall be heated to the specified temperature in a manner that will avoid local overheating and provide a continuous supply of the bituminous material to the mixer at a uniform temperature at all times. The maximum temperature of asphalt cement delivered to the mixer shall not be more than 2 degrees celsius above the temperature as specified in (c) hereof for aggregate. Asphalt cement shall not be used while it is foaming nor shall it be heated above 175 degrees celsius at any time.

(c) Preparation of Aggregates

The aggregates for the mixture shall be dried and heated to the required temperature. Flames used for drying and heating shall be properly adjusted to avoid damage to the aggregate and to avoid soot on the aggregate. Immediately after heating and drying, the aggregates shall be screened into three or more fractions as specified and conveyed into separate compartments ready for batching and mixing with bituminous material. When asphalt cement is used, the temperature of the aggregates as introduced into the mixer, including the tolerance permitted by the job-mix formula, shall not exceed that at which the asphalt cement has a Saybolt Furol viscosity of 100 seconds, determined by AASHTO T72. It shall not be lower than is required to obtain complete coating and uniform distribution of the aggregate particles and to provide a mixture of satisfactory workability.

(d) Mixing

The dried aggregate shall be combined in the mixer in the amount of each fraction of aggregates required to meet the job-mix formula. The bituminous material shall be measured or gauged and introduced into the mixer in the amount specified by the job-mix formula.

After the required amounts of aggregate and bituminous material have been introduced into the mixer, unless otherwise specified, the materials shall be mixed until a complete and uniform coating of the particles and a thorough distribution of the bituminous material throughout the aggregate is secured. Wet mixing time will be determined by the Engineer for each plant and for each type of aggregate used.

For plant mix bituminous pavement, the mixture shall be produced as closely as practicable to the lowest temperature that will produce a workable mix within the specified temperature range.

(e) Transporting, Spreading and Finishing

The mixture shall be transported from the mixing plant to the point of use in vehicles conforming to the requirements of Clause S9.01 (2). No loads shall be sent out so late in the day as to prevent completion of the spreading and compaction of the mixture during daylight hours unless with the Engineers approval and satisfactory illumination is provided.



Each vehicle shall be weighed after each loading at the mixer and a record shall be kept of the gross weight, tare, net weight, and time of day of each load operation. The mixture shall be delivered at a temperature between 125 degrees celsius and 160 degrees celsius for asphalt mix.

The mixture shall be laid upon an approved surface, spread and struck off to the grade and elevation established. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practical.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 15 cm; however, the joint in the top layer shall be at the centre line of the pavement if the roadway comprises two lanes in width, or at lane lines if the roadway is more than 2 lanes in width, unless otherwise directed.

On areas where irregularities or unavoidable obstacles make the use of mechanical spread and finishing equipment impracticable, the mixture shall be spread, raked and luted by hand tools. For such areas the mixture shall be dumped, spread and screeded to give the required compacted thickness.

When production of the mixture can be maintained and when practical, pavers shall be used in echelon to place the wearing course in adjacent lanes.

The Contractor shall carry out such tests as are necessary to determine the uncompacted thickness of mixture to be laid for compaction to conform to the required finished depths. The uncompacted material immediately behind the paver shall then be measured at frequent intervals and adjustments made to ensure conformity with the nominal depths.

(f) Compaction

After the bituminous mixture has been spread, struck off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling. The specific gravity of the consolidated mixture, as determined by AASHTO T 230 shall be not less than 95 percent of the specific gravity of laboratory compacted specimens composed of the same materials in like proportion.

Laboratory specimens will consist of cylinders of the mixture compacted by the procedures of AASHTO T 167. For aggregates containing particles with diameters over 25 mm, 150 x 150 mm cylinders will be used and the procedures of T 167 modified to employ 10 repetitions of a moulding load of 85 kg per square cm with no appreciable holding time after each application of the full load.

The surface shall be rolled when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking or shoving.

The number, weight and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. The sequence of rolling operations and the selection of roller types shall provide the specified pavement density.

Unless otherwise directed, rolling shall begin at the sides and proceed longitudinally parallel to the road centre line, each trip overlapping one-half the roller width, gradually progressing to the crown of the road. When paving in echelon or abutting a previously placed lane, the longitudinal joint should be rolled first followed by the regular rolling procedure. On super-elevated curves the rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the centre line.

Rollers shall move at a slow but uniform speed with the drive roll or wheels nearest the paver. Rolling shall be continued until all roller marks are eliminated and at least the minimum density indicated above has been attained. Care shall be exercised in rolling not to displace the line and grade of the edges of the bituminous mixture.

To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted. Along forms, headers, walls and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons or with mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with a fresh hot mixture, which shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of bituminous material shall be removed and replaced. No traffic shall be permitted on the final course in less than 12 hours after completion unless authorized by the Engineer.

(g) Joint, Trimming Edges and Clean-up

Placing of the bituminous paving shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the Engineer. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. Where pavers are not used in echelon to place the wearing course in adjacent lanes and where the edges of the previously laid wearing course are, in the opinion of the Engineer, in such condition that the quality of the completed joint will be affected, longitudinal joints shall be trimmed to a vertical face and to a neat line. The exposed edges of the completed mat shall be cut off true to the required lines. Material trimmed from the edges and any other discarded or rejected bituminous mixture shall be removed from the roadway and disposed of by the Contractor as instructed by the Engineer. When directed by the Engineer, a brush coat of bituminous material shall be used on contact surfaces of joints just before additional mixture is placed against the previously rolled material.

(h) Surface Tolerance

The variation of the surface from the testing edge of a straightedge between any two contacts with the surface shall not exceed the allowable tolerances. For base course and binder course, the test for conformity shall be made immediately after initial rolling and variation shall be

corrected by removing or adding materials as may be necessary. Rolling shall then be continued as specified. Removal or addition of material to the surface course will not be permitted after rolling has commenced. Work on surface course shall be carefully controlled to ensure that material as laid will conform with the allowable tolerance.

(i) Overlay and Regulating

Where the contract requires the overlay of an existing pavement this shall be carried out strictly in accordance with the Engineer's instructions. The Engineer may instruct that a layer of the pavement be laid over a partial width or to a restricted length if this is necessary to facilitate the regulation of levels.

(j) Frequency of Tests

Control of bituminous mixture and acceptance sampling and testing shall be carried out in accordance with the Engineer's instructions.

S9.07 (4) Method of Measurement

Plant mix bituminous material will be measured by the ton as described in Clause S9.01 (3) (d).

The quantity of base course, binder and surfacing to be paid for will be the weight of the completed plant-mix bituminous material less the quantity of asphalt cement, which will be paid for separately. No adjustment in contract unit price will be made for variation in quantity due to differences in the specific gravity of material actually used. The quantity of asphalt cement to be paid for will be based on the delivery weight of bituminous treated aggregate using the actual percentage of asphalt cement (as verified by tests) in the mixture.

S9.07 (5) Basis of Payment

The accepted quantities of asphalt treated base course, asphalt concrete binder and surface courses and asphalt cement, determined as provided above, will be paid for at the Contract unit price per tonne for each pay item shown below, completed in place and accepted, which price and payment will be full compensation for the work of this Clause including any extra costs due to regulating or over-laying existing pavements.

Pay Item No.	Name	Unit of Measurement
9.07(1)	Asphalt Treated Base Course	ton
9.07(2)	Asphalt Concrete Binder Course	ton
9.07(3)	Asphalt Concrete Surface Course	ton
9.07(4)	Asphalt Cement	ton

S09.08 Concrete Pavement

S9.08 (1) Description

This work shall consist of constructing a Portland cement concrete pavement, constructed in accordance with the thickness and typical cross sections shown on the Drawings or as instructed by the Engineer.

S9.08 (2) Applicable Provisions

The applicable provisions of Clause S10.01 and S10.02 shall be read into and become part of this Clause S09.08 "Concrete Pavement".

Materials

(a) Pavement Quality Concrete (P.Q.C)

The constituent materials for P.Q.C shall comply with Clause S10.01 of the General Specifications except that Course Aggregate shall be crushed stone.

(b) Reinforcing Steel

Reinforcing steel shall be in accordance with Clause S10.02 of these Specifications and such further details as are shown on the Drawings.

(c) Joint Filler

Poured filler for joints shall conform to the requirements of AASHTO M173.

Performed fillers for joints shall conform to the requirements of AASHTO M 33, AASHTO M 153, AASHTO M 213, or AASHTO M 220, as specified on the Drawings or by the Engineer and shall be punched to admit dowels where called for on the Drawings. The filler for each joint shall be furnished in a single piece for the depth and width required for the joint unless otherwise authorized by the Engineer. When the use of more than one piece is authorized for a joint, the abutting ends shall be fastened securely, and held accurately to shape, by stapling or other positive fastening satisfactory to the Engineer.

(d) Slip Sheet Membrane

Membrane for waterproof underlay below the slab shall be polythene sheeting 125 microns thick or as specified by the Engineer. When an overlap of underlay materials is necessary this shall be at least 300mm.

(e) Curing Materials

Curing materials shall conform to the following requirements as specified or other materials satisfactory to the Engineer:

Liquid Membrane-Forming

AASHTO M 148

Compounds for Curing

Concrete – Type 2 white pigmented

(f) Concrete

(i) Constituents of the Mix

The approval of mix constituent proportions shall be made on the basis of trial mixes developed by the Contractor in accordance with Clause S10.01 of these Specifications.

The mass of cement incorporated in each cubic meter of fully compacted concrete shall not be less than 300kg. The use of very high cement contents is depreciated and the Contractor shall base his mix design on the leanest mix that meets all specified requirements.

The coarse and fine aggregate shall be as specified in Clause S10.01 of the General Specifications. In determining the coarse aggregate/fine aggregate ratio the fine aggregate proportion shall be kept to a minimum. Once the appropriate total grading has been determined and approved, it shall be varied only with the permission of the Engineer.

The Contractor is allowed a choice of coarse aggregate up to a maximum size of 40mm providing that suitable workability for the plant being used can be achieved and the surface regularity required maintained. The Engineer at his discretion, may order a change in the size of the Contractor's choice of coarse aggregate. The ratio of free water to cement for surface dry aggregate shall be determined by strength requirements but shall in no case exceed 0.50 by mass.

The use of plasticisers or water reducing agents shall not be permitted except with the written permission of the Engineer. Accelerating admixtures and those containing calcium chloride shall not be used.

(ii) Concrete Strength

The minimum site working flexural strength shall not be less than 45kg/cm<sup>2</sup> at 28 days when tested by the third point method in accordance with AASHTO T 97.

The laboratory trial mix shall be so designed by the Contractor that the resultant flexural strength result shall show adequate working strength margin so that the probability of the working strength test values falling below the minimum specified site working flexural strength is reduced to a value not exceeding 1%.

(iii) Sampling of Concrete

Concrete will be sampled in accordance with the requirement of Clause S10.01 of the Specifications.

(iv) Compliance

The provisions of Clause S10.01 of the Specifications apply.

In respect of the minimum 7 days working strength this is provisionally specified as 80% of the minimum site working flexural strength. The Engineer may, at his discretion, at any time before or during concrete pavement operations, increase or decrease the minimum 7 days working strength.

(v) Characteristic Strength

The provisions of Clause S10.01 of the Specifications apply.

S9.08 (4) Equipment

(a) General

Equipment shall conform to the requirements of Clause S10.01 (3) of these Specifications.

(b) Spreading and Finishing Machines

Spreading machines shall be designed so as to reduce to the minimum segregation of the mixed concrete. Finishing machines shall be equipped with at least two oscillating type transverse screeds or other comparable means of striking off concrete as required by sub-clause S09.08 (6).

(c) Vibrator

Vibrator, or full width vibration of concrete paving slabs, may be either the surface pan type or the internal type with either immersed tube or multiple spuds. They may be attached to the spreader or the finishing machine, or may be mounted on a separate carriage. They shall not come in contact with the joint, load transfer devices, subgrade, or side forms. The frequency of the surface vibrators shall not be less than 3,500 impulses per minute (58Hz) and the frequency of the internal type shall not be less than 5,000 impulses per minute (83Hz) for tube vibrators and not less than 7,000 impulses per minute (117Hz) for spud vibrators.

When spud type internal vibrators, either hand operated or attached to spreaders or finishing machines, are used adjacent to forms, they shall have a frequency of not less than 3,500 impulses per minute (58Hz).

(d) Concrete Saw

When saw joints are elected or specified, the Contractor shall provide sawing equipment adequate in number of units and power to complete the sawing with a water-cooled diamond edge saw blade or an abrasive wheel to the required dimensions and at the required rate. The Contractor shall provide at least one standby saw in good working order. An ample supply of saw blades shall be maintained at the site of the work at all times during sawing operations. The Contractor shall provide adequate artificial lighting facilities for night sawing. All of this equipment shall be on the job both before and continuously during concrete placement.

(e) Forms

Straight side forms shall be made of metal having a thickness of not less than 5 mm and shall be furnished in sections not less than 3.0m in length. Forms shall have a depth at least equal to the prescribed edge thickness of the pavement without horizontal joint, and a base width equal to not less than the depth of the forms. Flexible or curved forms of proper radius shall be used for curves of 30.0m radius or less. Flexible or curved forms shall be of a design acceptable to the Engineer. Forms shall be provided with adequate devices for secure setting so that when in place they will withstand, without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Flange braces shall extend outward on the base not less than  $\frac{2}{3}$  the height of the form.

Forms with battered top surfaces, and bent, twisted, or broken forms shall be removed from the work. Repaired forms shall not be used until inspected and approved. The top face of the form shall not vary from a true plane more than 3mm in 3.0m and the upstanding leg shall not vary more than 6mm. The forms shall contain provisions for locking the ends of abutting form sections together tightly, and for secure setting.

S09.08 (5) Joints

Joints shall be constructed of the type and dimensions, and at the locations required by the Drawings. All joints shall be protected from the intrusion of injurious foreign material until sealed.

(a) Longitudinal Joints

Deformed steel tie bars of specified length, size, spacing and material shall be placed perpendicular to the longitudinal joints by approved mechanical equipment or rigidly secured by chairs or other approved supports to prevent displacement. Tie bars shall not be painted or coated with asphalt or other material or enclosed in tubes or sleeves except for future extension joint. When shown on the Drawings and when adjacent lanes of pavement are constructed separately, steel side forms shall be used which will form a keyway along the construction joint. Tie bars, except those made of rail steel, may be bent at right angles against the form of the first lance constructed and straightened into final position before the concrete of the adjacent lane is placed or in lieu of bent tie bars, approved two-piece connectors may be used.

Longitudinal formed joints shall consist of a groove extending downward form, and normal to, the surface of the pavement. These joints shall be effected or formed by an approved mechanically or manually operated device to the dimensions and line indicated on the Drawings and while the concrete is in a plastic state. The groove shall be filled with either a premoulded strip or poured material as required.

The longitudinal centre joint shall be installed so that its ends are in contact with the transverse joints, if any.

Longitudinal sawn joints shall be cut by means of approved concrete saws to the depth, width and line shown on the Drawings. Suitable guide lines or devices shall be used to assure cutting the longitudinal joint on the true line as shown on the Drawings. The longitudinal joint shall be sawn before the end of the curing period of shortly thereafter and before any equipment or vehicles are allowed on the pavement. The sawn area shall be thoroughly cleaned and, if required, the joint shall immediately be filled with sealer.

Longitudinal permanent insert type joints shall be formed by placing a continuous strip of plastic material which will not react adversely with the chemical constituents of the concrete. The insert strip shall be of sufficient width to form a weakened plane to the depth required by the Drawings. Weakened plane type joints shall not be sawn. The insert strip thickness shall not be less than 0.5mm and shall be inserted with a mechanical device that places the material in a continuous strip. Splices will be permitted provided they are effective in maintaining the

continuity of the insert strip. The top edge of the insert strip shall be positioned below the finished surface as shown in the Drawings.

The insert strip shall not be deformed from a vertical position during installation or in subsequent finishing operations performed on the concrete. The alignment of the finished joint shall be uniformly parallel with the centreline of the pavement and shall be free from excessive local irregularities in alignment. The mechanical installation device shall vibrate the concrete during the insertion of the strip in such a manner as to cause the disturbed concrete to return evenly along the edges of the strip without segregation or developing voids.

(b) Transverse Expansion Joints

The expansion joint filler shall be continuous from form to form, shaped to the subgrade and to the keyway along the form. Preformed joint filler shall be furnished in lengths equal to the pavement width or equal to the width of one lane. Damaged or repaired joint filler shall not be used unless approved by the Engineer.

The expansion joint filler shall be held in a vertical position. An approved installing bar, or other device, shall be used if required to secure preformed expansion joint filler at the proper grade and alignment during placing and finishing of the concrete. Finished joints shall not deviate more than 5mm in the horizontal alignment from a straight line. If joint fillers are assembled in sections, there shall be no offsets between adjacent units. No plugs of concrete shall be permitted anywhere within the expansion space.

(c) Transverse Contraction Joints

Transverse contraction joints shall consist of planes of weakness created by forming or cutting grooves in the surface of the pavement and, when shown on the Drawings, shall include load transfer assemblies.

- (i) Transverse strip contraction joints – These joints shall be formed by installing a parting strip to be left in place as shown on the Drawings.
- (ii) Formed grooves – These grooves shall be made by depressing an approved tool or device into the plastic concrete. The tool or device shall remain in place at least until the concrete has attained its initial set and shall then be removed without disturbing the adjacent concrete, unless the device is designed to remain in the joint.
- (iii) Sawn contraction joints – These joints shall be created by sawing grooves in the surface of the pavement of the width, depth, and at the spacing and lines shown on the Drawings, with an approved concrete saw. After each joint is sawn, the saw cut and adjacent concrete surface shall be thoroughly cleaned.

Sawing of the joints shall commence as soon as the concrete has hardened sufficiently to permit sawing without excessive ravelling, and not more than 18 hours after final compaction of



the concrete. All joints shall be sawn before uncontrolled shrinkage cracking takes place. If necessary, the sawing operations shall be carried on both during the day and night, regardless of weather conditions. The sawing of a joint shall be omitted if a crack occurs at or near the joint location prior to the time of sawing. Sawing shall be discontinued when a crack develops ahead of the saw. If extreme conditions exist which make it impractical to prevent erratic cracking by early sawing, the contraction joint groove shall be formed prior to initial set of concrete as provided above. In general, all joints should be sawn in sequence.

- (iv) Transverse formed contraction joints – These joints shall comply with the requirements of sub-clause (a) above for the longitudinal formed joint.
- (v) Transverse construction joints – Transverse construction joints shall be constructed when there is an interruption of more than 30 minutes in the concreting operations. No transverse joint shall be constructed within 3.0m of an expansion joint, contraction joint, or plane of weakness. If sufficient concrete has not been mixed at the time of interruption to form a slab at least 3.0m long, The excess concrete back to the last preceding joint shall be removed and disposed of as directed.

(d) Load Transfer Devices

Dowels, when used, shall be held in position parallel to the surface and centreline of the slab by a metal device that is left in the pavement.

Dowel ends shall be carefully sawn to provide a smooth regular surface. The portion of each dowel lubricated as shown on the Drawings shall be thoroughly coated with approved bituminous material or an approved lubricant, to prevent the concrete from binding to that portion of the dowel. A metal or PVC dowel cap or sleeve approved by the Engineer shall be furnished for each dowel bar used with the expansion joints. The caps or sleeves shall fit the dowel bar tightly and the closed end shall be water-tight.

In lieu of using dowel assemblies at contraction joints, dowel bars may be placed in the full thickness of pavement by a mechanical device approved by the Engineer.

(e) Sealing Joints

Joints shall be sealed as soon after completion of the curing period as feasible and before the pavement is opened to traffic, including the Contractor's equipment. Just prior to sealing, each joint shall be thoroughly cleaned of all foreign material, including membrane curing compound and the joint faces shall be clean and surface dry when the seal is applied.

The sealing material shall be applied to each joint opening to conform to the details shown on the Drawings or as directed by the Engineer.

Material for seal applied hot shall be stirred during heating so that localized overheating does not occur. The pouring shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. Any excess material on the surface of the concrete pavement shall be removed immediately and the pavement surface cleaned. The use of sand or similar material as a cover for the seal will not be permitted.

S09.08 (6) Construction

(a) General

Before commencing work on the concrete slab, all work on the sub-base, ducts, and adjacent curb shall be completed to the satisfaction of the Engineer.

Except for areas falling within the scope of and laid in accordance with sub-clause S.09.08 (6) (f) all concrete shall be distributed uniformly, compacted and finished by machines.

(b) Form Setting

Forms shall be set sufficiently in advance of the point where concrete is being placed to permit the performance and approval of all operations required within and adjacent to the form lines. Forms shall be staked into place with no less than 3 pins for each 3.0m section. A pin shall be placed at each side of every joint. Form sections shall be tightly locked, free from play or movement in any direction. The forms shall not deviate from true line by more than 5 mm at any point. Forms shall be so set that they will withstand without visible spring or settlement, the impact and vibration of the consolidating and finishing equipment. Forms shall be cleaned and coated with a form release agent or oiled prior to the placing of concrete.

The alignment and grade elevation of the forms shall be checked and corrections made by the Contractor immediately before placing the concrete. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

(c) Placing Concrete

The concrete shall be deposited on the grade in such manner as to require as little rehandling as possible. Unless truck mixers, truck agitators, or non-agitating hauling equipment are equipped with means for discharge of concrete without segregation of the materials, the concrete shall be unloaded into an approved spreading device and mechanically spread on the grade in such manner as to prevent segregation of the materials. Placing shall be continuous between transverse joints without the use of intermediate bulkheads. Necessary hand spreading shall be done with shovels, not rakes. Workmen shall not walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances.

Where concrete is to be placed adjoining a previously constructed lane of pavement and mechanical equipment will be operated upon the existing lane of pavement, that lane shall have attained at least 90% of the strength specified for 28 days concrete. If only finishing equipment is

carried on the existing lane, paving in adjoining lanes may be permitted after 9 days.

Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies, by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form. In no case shall the vibrator be operated longer than 5 seconds in any one location.

Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them, but shall not be dumped from the discharge bucket or hopper onto a joint assembly unless the hopper is well centred on the joint assembly.

Should any concrete materials fall on or be worked into the surface of a completed slab, they shall be removed immediately by approved methods.

(d) Placement of Reinforcement

Following the placing of the concrete, it shall be struck off to conform to the cross section shown on the Drawings. When reinforced concrete pavement is placed in two layers, the bottom layer shall be struck off and consolidated to such length and depth that the sheet of fabric or bar mat may be laid full length on the concrete in its final position without further manipulation. The reinforcement shall then be placed directly upon the concrete, after which the top layer of the concrete shall be placed, struck off and screeded. Any portion of the bottom layer of concrete which has been placed more than 30 minutes without being covered with the top layer shall be removed and replaced with freshly mixed concrete at the Contractor's expense. When reinforced concrete is placed in one layer, the reinforcement may be firmly positioned in advance of concrete placement or it may be placed at the depth shown on the Drawings in the plastic concrete, after spreading, by mechanical or vibratory means.

At joints between mats of steel fabric reinforcement the first wire of one mat shall lie within the complete mesh of the previous mat and the overlap shall be not less than 450 mm.

Reinforcing steel shall be free from dirt, oil, paint, grease, millscale, and loose or thick rust which could impair bond of the steel with the concrete.

(e) Machine Finishing

The concrete shall be distributed or spread as soon as placed and shall be struck off, vibrated and screeded by an approved finishing machine. The machine shall go over each area of pavement as many times and at such intervals as necessary to give the proper consolidation and to leave a surface of uniform texture. Excessive operation over a given area shall be avoided. The tops of the forms shall be kept clean and the travel of the machine on the forms shall be maintained true without lift, wobbling, or other vibration tending to effect the precision finish.

During the first pass of the finishing machine a uniform ridge of concrete shall be maintained ahead of the front screed for its entire length.

(f) Hand Finishing

Where slabs are so small or irregular, or with the permission of the Engineer when the Site is so restricted or limited as to make the use of the methods specified in sub-clause (c) impracticable, concrete shall be evenly distributed and spread by hand without pre-compaction or segregation.

Concrete to be compacted by a vibrating beam shall be struck off at such a level that the surface level after all entrapped air has been removed by compaction is above that of the side forms. The concrete shall be compacted by a steel or steel-shod hardwood compacting beam not less than 75mm wide, 225mm deep with an energy input of not less than 250W per meter width of slab, the beam being lifted and moved forward by increments not exceeding the beam width. Alternatively, a vibrating twin beam compactor of equivalent power may be used. When compacting layers of concrete exceeding 200mm in depth, or when directed by the Engineer sufficient additional internal vibration shall be provided over the whole width of the slab to produce full compaction. After every 1.5m length of slab has been compacted the vibrating beam shall be taken back 1.5m and then drawn slowly forward whilst vibrating over the compacted surface to provide a smooth finish.

The surface shall then be regulated by at least two passes of a scraping straight-edge with blade length not less than 1.8m. If the surface is torn extensively by the straight-edge, owing to irregularities in the surface, a further pass of the vibrating beam shall be made, followed by a further pass of the scraping straight-edge.

When laying reinforced concrete two layer construction shall be used. The first layer shall be spread, struck off and compacted to a level so that the reinforcement when placed shall have the required depth of cover. Immediately after placing the reinforcement the top layer of concrete shall be laid and finished.

(g) **Floating**

After the concrete has been struck off and consolidated, it shall be further smoothed, trued, and consolidated by means of a float, using one of the following methods as specified or permitted.

- (i) **Hand method** – a hand-operated longitudinal float not less than 3.5m in length and 150mm in width, properly stiffened to prevent flexibility and warping shall be used. The longitudinal float, operated from foot bridges resting on the side forms and spanning but not touching the concrete, shall be worked with a sawing motion, while held in a floating position parallel to the road centre line, and passing gradually from one side of the pavement to the other. Movement ahead along the centre line of the pavement shall be in successive advances of not more than one-half the length of the float. Any excess water or fluid material shall be wasted over the side forms on each pass.
- (ii) **Mechanical method** – The mechanical float shall be of a design approved by the Engineer and shall be in good working condition.

The float shall be accurately adjusted to the required crown and coordinated with the adjustments of the transverse finishing machine.

As an alternative to the mechanical float above, the Contractor may use a machine composed of a cutting and smoothing float or floats, suspended from and guided by a rigid frame. The frame shall be carried by four or more visible wheels riding on, and constantly in contact with, the side forms.

If necessary, following one of the preceding methods of floating, long-handled floats having blades not less than 1.5m in length and 150mm in width may be used to smooth and fill in open-textured areas in the pavement. Long-handled floats shall not be used to float the entire surface of the pavement in lieu of, or supplementing, one of the preceding methods of floating. When strike-off and consolidation are done by the hand method and the crown of the pavement will not permit the use of the longitudinal float, the surface shall be floated transversely by means of the long-handled float. Care shall be taken not to work the crown out of the pavement during the operation. After floating, any excess water and residue shall be removed from the surface of the pavement by a straightedge 3.0m or more in length. Successive drags shall be lapped one-half the length of the blade.

(h) Surface Correction

After the floating has been completed and the excess water removed, but while the concrete is still plastic, depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated, and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the requirements for smoothness. Surface corrections shall continue until the entire surface is found to be free from observable departures and the slab conforms to the required grade and cross section.

The variation of the surface from the testing edge of a straightedge between any two contacts with the surface shall not exceed the allowable tolerance specified in the Special Specifications.

(i) Edging

As soon as the concrete has been struck off and consolidated, the edges of slabs along the forms and at the joints shall be carefully finished with an edging tool to form a smooth rounded surface of the required radius which unless shown otherwise on the Drawings shall be 12 mm.

(j) Surface Finish

After the completion of joints and edging and before the application of curing compound the surface of the concrete pavement shall be brushed in a direction aspect of centre line of the pavement.

Brushed finish shall be formed with a wire broom not less than 450mm wide, the tufts of the broom initially to be 100mm long of 32 gauge tape wire. The broom shall contain two rows of tufts, at 20mm centres and tufts shall be at 10 mm centres and offset to the centre of the gap

minimum of 14 wires each. Brooms shall be replaced when shortest tufts wear down to 90mm long. The average textured depth shall not be less than 0.75mm.

(k) Surface Test

As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 3.0m straightedge. Areas showing high spots of more than 3mm but not exceeding 12.5mm in 3.0m shall be marked and immediately ground down with an approved grinding tool to an elevation where the area or spot will not show surface deviations in excess of 3mm when tested with a 3.0m straightedge. Where the departure from correct cross section exceeds 12.5mm, the pavement shall be removed and replaced by and at the expense of the Contractor.

Any area or section so removed shall be not less than 3.0m in length nor less than the full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 3.0m in length, shall also be removed and replaced.

(l) Curing

The exposed surfaces of concrete pavement shall be cured immediately after the surface finish brushing by treating with an approved curing compound which shall be mechanically sprayed on to the surface at a rate of 0.22-0.27 litre/m<sup>2</sup> using a fine spray for the sides of slip-formed slab or where the side forms are removed and for small areas where a mechanical distributor cannot be used, the compound shall be sprayed by hand lance at the rate of 0.27-0.36 litre/m<sup>2</sup>. Any groove over a joint shall be protected from the entry of curing compound.

Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface of the newly placed concrete shall be covered and cured in accordance with one of the methods specified in Clause S10.01 (4) (g). Failure to provide sufficient cover or lack of water to adequately take care of both curing and other requirements, shall be cause for immediate suspension of concreting operations.

(m) Removal of Forms

Unless otherwise provided, forms shall not be removed from freshly placed concrete until it has set for at least 12 hours. Forms shall be removed carefully so as to avoid damage to the pavement. After the forms have been removed, the sides of the slab shall be cured as required in (k) above.

Minor areas of honeycomb shall be cleaned, wetted, and neatly patched with stiff mortar in the proportions of 1 part cement to 2 parts fine aggregate.

Major honeycombed areas will be considered as defective work and shall be removed and replaced. Any area or section so removed shall not be less than 3.0m in length nor less than full width of the lane involved. When it is necessary to remove and replace a section of pavement, any

remaining portion of the slab adjacent to the joints that is less than 3.0m in length shall also be removed and replaced.

S09.08 (7) Trial Lengths

The Contractor shall demonstrate the plant, equipment and method of construction by laying an initial trial length not less than 30m long at a location provided by the Contractor outside the permanent works. Subsequent trial lengths may be instructed by the Engineer if any aspect of the initial trial proves unsatisfactory.

Following approval by the Engineer of the initial trial a comprehensive trial length at least 150m and not more than 300m long shall be carried out within the permanent works. This comprehensive trial shall demonstrate all aspects of the work and shall include each type of joint to be used in the Works.

The Contractor shall submit to the Engineer at least one month prior to the date proposed for the initial trial length, a detailed description of the plant, equipment and method of construction. No development of the plant shall be permitted either during this trial length or when pavement concrete is being laid in the permanent works.

The Contractor shall not continue with the laying of pavement quality concrete in the permanent works until approval to a comprehensive trial has been given or permission has been given by the Engineer to proceed with another comprehensive trial.

For the comprehensive trial to be acceptable, the length of pavement shall conform, without remedial works, to the Specification.

If the comprehensive trial length does not conform with the Specification the Contractor shall construct another trial length. Trial length which do not conform with the Specification shall be removed unless the Engineer permits otherwise.

S09.08 (8) Protection of Pavement

The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by his own employees and agents. This shall include watchmen to direct traffic and the erection and maintenance of warning sign, lights, pavement bridges, or crossovers, etc.

Any damage to the pavement, occurring prior to final acceptance, shall be repaired or the pavement replaced, as directed by the Engineer.

S09.08 (9) Opening to Traffic

The Engineer will decide when the pavement shall be opened to traffic. The pavement will not be opened to traffic until test specimens moulded and cured in accordance with AASHTO T 23 have attained not less than 90% of the minimum flexural strength at 28 days given in Table 10-1-1 of the Specifications when tested by the third point method. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening to traffic, the pavement shall be cleaned and joint sealing completed.

S09.08(10) Tolerance in Pavement Thickness

The thickness of the pavement will be determined by average caliper measurement of cores tested in accordance with AASHTO T 148.

For the purpose of establishing an adjusted unit price for pavement, units to be considered separately are defined as 300 m of pavement in each traffic lane starting at the end of the pavement bearing the smaller station number. The last unit in each lane shall be 300m plus the fractional part of 300m remaining. One core will be taken at random by the Engineer in each unit. When the measurement of the core from a unit is not deficient more than 5mm from the specified thickness, full payment will be made. When such measurement is deficient more than 5mm and not more than 25mm from the specified thickness, two additional cores at intervals not less than 90m will be taken and used in the average thickness for that unit. An adjusted unit price as provided in sub-clause S09.08 (12) (b) will be paid for the unit represented.

Other areas such as intersections, entrances, crossovers, ramps, toll plazas, etc., will be considered as one unit, and the thickness of each unit will be determined separately. Small irregular unit areas may be included as part of another unit. At such points as the Engineer may select in each unit, one core will be taken for each 500m<sup>2</sup> of pavement, or fraction thereof, in the unit. If the core so taken is not deficient more than 5mm from the specified thickness, full payment will be made. If the core is deficient in thickness by more than 5mm but not more than 25mm from the specified thickness, two additional cores will be taken from the area represented and the average of the three cores determined. If the average measurement of these three cores is not deficient more than 5mm from the specified thickness, full payment will be made. If the average thickness of these three cores is deficient by more than 5mm but not more than 25mm from the specified thickness, and adjusted unit price as provided in sub-clause S09.08 (12) (b) will be paid for the area represented by these cores.

In calculating the average thickness of the pavement, measurements which are in excess of the specified thickness by more than 5mm will be considered as the specified thickness plus 5mm, and measurements which are less than the specified thickness by more than 25mm will not be included in the average.

When the measurement of any core is less than the specified thickness by more than 25mm, the actual thickness of the pavement in this area will be determined by taking additional exploratory cores at not less than 3.0m intervals parallel to the centre line in each direction from the affected location until in each direction a core is found which is not deficient by more than 25 mm. Areas found deficient in thickness by more than 25mm shall be evaluated by the Engineer, and if in his determination the deficient areas warrant removal, they shall be removed and replaced with concrete of the thickness shown on the Drawings. Exploratory cores for deficient thickness will not be used in average for adjusted unit price.

S09.08 (11) Method of Measurement

The quantity to be paid for under this item will be the number of square meters of concrete pavement completed and accepted as measured complete in place in the permanent works. the width for measurement will be the width of the pavement shown on the typical cross section of the plans, additional areas such as ramps and toll plazas where called for, or as otherwise directed in writing by



the Engineer. The length will be measured by the Engineer. The length will be measured along the centre line of each roadway.

Joints and reinforcing steel required for the work of this clause will not be measured for separate payment.

The initial trial length placed outside the permanent works shall not be measured for payment.

S09.08 (12) Basis of Payment

(a) General

The accepted quantities of concrete pavement determined as provided above will be paid for at the contract unit price per square metre which price and payment will be full compensation for furnishing and placing all materials, including, by not limited to, class P concrete, reinforcing steel, forms, dowels, tie bars and joint materials, carrying out trial lengths, taking cores for price adjustment, and all other material, labour, equipment and incidentals necessary to complete the work as shown on the Drawings.

However for any pavement found deficient in thickness by more than 5mm, but not more than 25mm, only the reduced price stipulated below will be paid.

No additional payment over the contract unit price will be made for any pavement which as an average thickness in excess of that shown on the Drawings.

Pay Item No.	Name	Unit of Measurement
9.08 (1)	Portland Cement Concrete Pavement (thickness 25 cm)	square metre

(b) Price Adjustments

Where the average thickness of pavement is deficient in thickness by more than 5mm, but not more than 25mm, payment will be made at an adjusted price as specified in the following table:

**CONCRETE PAVEMENT DEFICIENCY**

Deficiency in Thickness Determined by Cores	Proportional part of Contract Price Allowed
0 to 5 mm	100 percent
6 to 8 mm	80 percent
9 to 10 mm	72 percent
11 to 12 mm	68 percent
13 to 19 mm	57 percent
20 to 25 mm	50 percent

When the thickness of pavement is deficient by more than 25mm and the determination of the Engineer is that the area of such deficiency should not be removed and replaced, there will be no payment for the area retained.

S09.09 Wet Lean Concrete

S09.09 (1) Description

The work shall consist of furnishing all labour, equipment, supplies and materials, and of performing all operations in connection with construction of levelling course and pavement widening works with wet lean concrete including underlying course preparation, importing and preparation of aggregates, batching, mixing, transporting, placing, consolidating, finishing, curing, maintenance and other incidental operations pertaining to the construction. All work shall be done in strict accordance with the Drawings, Specifications, and as directed by the Engineer.

S09.09 (2) Underlying Course

Where wet lean concrete is specified for leveling course, prior to construction the underlying course shall be cleaned of dirt, mud, loose stone or other foreign matter and inspected by the Engineer to ensure compaction, finish and surface smoothness. Any areas failing to comply with the applicable specification requirements shall be removed, repaired or reconstructed as directed by the Engineer. No direct payment will be made for this removal, repair, or reconstruction provided that the Contractor is held responsible therefor.

S09.09 (3) Sand Bedding

Where wet lean concrete is specified for pavement widening work, the lean concrete shall be laid on a prepared levelled bed comprising 4 cm of natural sand. Any natural sand with the bulk of its mass being retained on a No. 200 mesh sieve and its mortar fraction being non-plastic may be used. The sand at a suitable moisture content shall be spread on the prepared approved sub-grade and levelled. The levelled bed shall be compacted with the largest roller that can be utilized in the excavation to refusal. Prior to placing wet lean concrete the sand bed shall be dampened with water.

S09.09 (4) Materials

The aggregates, cement and water shall conform to the requirements of Clause S10.01 (2) of these Specifications. The maximum aggregate size, subject to the Engineer's approval, shall be selected by the Contractor with regard to the specific application of wet lean concrete.

S09.09 (5) Mix Proportions

The ratio mass of cement to aggregate in the saturated surface dry condition shall be sufficient to achieve the crushing strength requirements of this clause, and to provide a satisfactory consistency of mixing, and shall not be less than 1:24.

S09.09 (6) Formwork

Wet lean concrete for levelling course shall be placed between cut-off screeding forms of steel or timber set true to grade and elevation.

S09.09 (7) Joints

Longitudinal joints shall be offset by at least 20cm from the longitudinal joint of the concrete pavement to be superimposed.

Transverse construction joints shall be formed at the end of each day's work and shall form a true transverse vertical surface.

S09.09 (8) Mixing, Transportation, Laying and Consolidation

Wet lean concrete shall be mixed, transported, placed, spread and compacted in accordance with the requirements of Clauses S10.01 (3) and S10.04 (4).

S09.09(9) Finishing

After consolidation and screeding to the correct plane and elevation the wet lean concrete shall be floated to a smooth finish the surface being free from depressions or projections and areas of open texture. The surface shall then be regulated by at least two passes of a scraping straightedge with a blade not less than 1.8m.

S09.09 (10) Curing

Wet lean concrete shall immediately on completion of finishing be cured for a period of not less than 7 days. Curing of the surface shall be achieved by one of the following methods:

- (i) Covering until the next pavement layer is laid with impermeable plastic sheeting, adequately secured from being blown off the surface and with the joints overlapped at least 300mm and set to prohibit egress of moisture.
- (ii) The entire surface sprayed uniformly with white pigmented curing compound.
- (iii) Continual mist spraying covering the entire surface and maintaining a permanently moist condition for the full duration of the curing period. Intermittent wet curing will not be accepted.

S09.09 (11) Testing for strength

Compressive strength test cylinders, 15cm diameter by 30cm high shall be prepared from the wet lean concrete delivered to site.

One cylinder shall be prepared representing each 50 linear meter of wet lean concrete being laid and not less than three (3) cylinders shall be prepared from each day's work.

S09.09 (12) Crushing Strength Requirements

The average crushing strength at 7 days of each group of specimens representing each day's work shall not be less than 30kg/cm<sup>2</sup>.

If the average crushing strength of more than one group of any five consecutive groups falls below 30kg/cm<sup>2</sup>, the cement content shall be increased to such a value as may be approved by the Engineer, until it can be shown by the results that satisfactory material can be achieved with different mix proportions.

S09.09 (13) Cause for Rejection

Provided the crushing strength requirements are followed, low crushing strength values will not be cause for rejection.

All loose, segregated or otherwise defective areas, along with areas not complying with the surface smoothness requirements, which cannot be corrected by grinding shall be delimited by the Engineer. The material shall be broken out to the full thickness of layer, removed and replaced with freshly mixed material complying to the Specification. Surface patching will not be permitted.

S09.09 (14) Surface Smoothness

Wet lean concrete shall be shaped and finished to the lines, grades, and cross sections as shown on the Drawings. The finished surface shall not deviate more than 3cm from the planned elevation. The finished surface shall not deviate more than 5mm from a 3m straightedge when applied parallel with and at right angles to the centerline of the roadway.

Straightedge shall be applied by successively overlapping by  $\frac{1}{2}$  the length of the straightedge. The difference in deviations from the planned elevation of levelling course for concrete pavement between any two points within 20m distance shall not exceed 20mm.

S09.09 (15) Maintenance

Neither equipment nor traffic, including construction vehicles, will be allowed on the finished surface during the initial 7 day's curing period.

After the curing period such equipment and vehicles required for the continuation of works will be permitted to traffic on the wet lean concrete.

Wet lean concrete shall be maintained in a proper condition prior to placing the next pavement layer. Any damage from any cause whatsoever shall be repaired by replacement of the area in question at the expense of the Contractor.

S09.09 (16) Method of Measurement

Wet lean concrete for levelling course to be paid for will be the number of square metres of levelling course, completed and accepted in accordance with the Drawings, Specifications and as directed by the Engineer.

Wet lean concrete for applications other than levelling course to be measured for payment shall be the number of cubic metres of wet lean concrete accepted in place.

Sand bedding to be paid for will be the number of square metres of bedding complete in place and accepted.

In computing all quantities the dimensions used shall be those shown on the Drawings or ordered in writing by the Engineer. No pay allowance shall be made for any increased cement content or for variations in layer thickness where minimum thickness is specified.

S09.09 (17) Basis of Payment

The accepted quantities of net lean concrete and sand bedding, determined as provided above, will be paid for at the Contract unit price for each item shown below. This payment shall be full compensation for furnishing all labour, equipment and materials necessary to complete the work, including underlying

course preparation, sand bedding, mixing, preparation, transporting, laying, consolidation, finishing, curing, maintenance and all other incidental items of work in accordance with the Drawings, Specifications, and as directed by the Engineer.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
9.09 (1)	Lean concrete base	cubic metre



**SECTION 10 CONCRETE STRUCTURES**

S10.01 Concrete

S10.01 (1) Description

(a) Scope

This work shall consist of the general items pertaining to the required class or classes of concrete, with or without reinforcement, constructed in accordance with these Specifications and the lines, levels, grades and dimensions shown on the Drawings, and as required by the Engineer.

Portland cement concrete shall consist of a mixture of cement, water and coarse and fine aggregates.

(b) Concrete Classes and their Use

The use of each class of concrete shall be as follows unless otherwise shown on the Drawings or directed by the Engineer :

CLASS	USE OF EACH CLASS OF CONCRETE	STRENGTH* kg/cm <sup>2</sup>
A-1	- Cast-in-place prestressed concrete box girders for cantilever erection	400
A-2	- Cast-in-place prestressed concrete box girder.	400
A-3	- Pre-cast prestressed concrete I-girders.	400
B-1	- (not applicable)	350
C-1	- Reinforced concrete deck slabs, diaphragms of prestressed concrete I-Girders and parapet and foundations of lighting poles excluding those for RC hollow slab.	290
C-2	- Pre-cast reinforced concrete plate.	290
C-3	- Pre-cast reinforced concrete piles.	290
C-4	- RC piers (including cantilevered pier heads, pier columns and footings), RC abutments (including wing walls), RC retaining walls and box culverts.	290
C-5	- RC hollow slab and parapet and foundation of lighting poles for RC hollow slab.	290
D-1	- (not applicable)	240
E-1	- Approach slabs.	210
E-2	- Pipe culverts.	210
E-3	- Concrete foundation and encasement of RC pipes.	210
E-4	- Precast concrete curbs.	210
G	- Lean Concrete.	-
P	- Concrete pavement.	-
Y	- Cast-in-place reinforced concrete piles.	290

\*Note: Minimum 28-day compressive strength by cylinder test (30cm x  $\Phi$ 15cm).

(c) Determining the Proportions and Batch Weights

No structural concrete shall be placed in the Works until the relevant mix has been approved by the Engineer.

The proportions and batch weights for concrete will be determined as prescribed below. The determinations will be made after the materials furnished by the Contractor have been accepted.

- (i) Trial mixes - The Contractor shall, at least thirty five (35) days prior to the commencement of concreting, have laboratory trial mixes prepared which shall be witnessed by the Engineer.

The laboratory trial mixes shall be so designed by the Contractor that the resultant compressive or flexural strength result as applicable, (Preliminary Test Result), shall show an adequate working strength margin, in accordance with normal good practice, so that the probability of site working strength test values falling below the minimum specified strength shown in Table 10-1-1 is reduced to a value not exceeding 5%.

The Engineer will determine the proportions on the basis of the trial mixes conducted with the materials to be used in the Work.

The proportions for the trial mixes will be based on the values given in Table 10-1-1 adjusted as described in this sub-clause. However the proportions given in the table are approximate values for the convenience of the Contractor's estimate only, excepting that it shall be understood that :

- The water cement ratios given shall be absolute maximum values
- The cement contents given shall be absolute minimum values
- The minimum compressive strength values given shall be taken to mean the minimum site working strength.



Table 10-1-1 Standard Proportions of Concrete for Use in Structures

STRENGTH CLASS 1/ DESCRIPTION	A-1 A-2 A-3	B-1	C-1 C-2 C-3 C-4 C-5	D1	E-1 E-2 E-3 E-4	F	G	Y	P
Maximum size of coarse aggregate (mm)	20	20	20	20	20	25	40	20	25
Slump (cm) 2/	7.5± 2.5	7.5± 2.5	7.5± 2.5	7.5± 2.5	7.5± 2.5	5.0± 2.5	5.0± 2.5	15.0± 2.5	Max. 5
Maximum Water/cement ratio W/C (%)	37.5	42.9	49.4	56.9	61.4	76.0	88.2	49.4	40.0
Water content W (kg/m <sup>3</sup> )	170	175	181	181	181	169	157	197	160
Cement content C (kg/m <sup>3</sup> )	450	408	366	318	295	222	178	399	400
Fine aggregate S (kg/m <sup>3</sup> )	720	765	819	860	885	906	896	786	791
Coarse aggregate G (kg/m <sup>3</sup> )	1100	1075	1044	1041	1039	1110	1187	1004	1077
Minimum 28 day compressive strength by cylinder test (30 x 15(Øcm) (kg/cm <sup>2</sup> ) 3/ 4/	400	350	290	240	210	130	-	290	-
Minimum 28 day flexural strength (kg/cm <sup>2</sup> ) 5/	-	-	-	-	-	-	-	-	45

Notes to Table 10-1-1

- 1/ Class of concrete shall be applied as shown in Clause S10.01(1)(b).
- 2/ Slump will be determined in accordance with AASHTO T119 or JIS A 1101.
- 3/ Concrete compressive tests shall conform to the requirements of AASHTO T22 and 23.
- 4/ In the event of any dispute regarding conformance with this Specification, the results obtained by the standard cylinder test (30cm x φ15cm) will be taken as conclusive.
- 5/ Flexural strength will be tested by the third point loading method in accordance with AASHTO T97.

The weights of aggregate per cubic metre of concrete in Table 10-1-1 are based on the use of aggregates which have a bulk specific gravity of 2.65 when in a saturated surface-dry condition, the use of a uniformly graded natural sand having a fineness modulus of 2.75, and the use of a uniformly graded coarse aggregate of the size indicated.

For aggregates having other specific gravities, the weights will be corrected by multiplying the weights shown in the table by the specific gravity and dividing by 2.65.

When angular, manufactured sand or sand having a fineness modulus greater than 2.75 is used, the amount of fine aggregate will be increased and the amount of coarse aggregate decreased. When using sand having a fineness modulus less than 2.75, the amount of fine aggregate will be decreased and the amount of coarse aggregate increased. For each change in fineness modulus of 0.10 as compared to 2.70, the percentage of sand will be changed by 1 percent in relation to the total weight of combined fine and coarse aggregates. The fineness modulus of fine aggregate will be determined by adding the cumulative percentage, by weight, of material retained on each of ASTM Standard sieves 9.5, 4.75, 2.36, 1.18, 0.600, 0.300 and 0.150 mm, and dividing by 100.

The correction for fineness modulus will be made prior to making a correction in the weights of Table 10-1-1 for variations from 2.65 in specific gravity.

The Contractor may, subject to prior approval by the Engineer, use alternative sizes of coarse aggregate to those in Table 10-1-1.

If the use of an alternative size of coarse aggregate produces concrete which exceeds the permissible water content, thereby requiring additional cement above that specified, no compensation will be made to the Contractor for the additional cement. Designated sizes of coarse aggregate need not be separated into component sizes. However, two sizes are preferred when the maximum size exceeds 2.5 cm. If one or more of the component sizes used fails to meet the specified grading for its respective size, but a combination of the sizes can be used to meet the specified grading for the combined size, they may be used with the written permission of the Engineer.

- (ii) Proportions and batch weights - The Engineer will designate the weight in kilograms of fine and coarse aggregate (in a saturated surface-dry condition) per cubic metre of concrete for the specified class of concrete and these proportions will not be changed except as provided in the paragraphs immediately following. In addition, the Engineer will also designate the batch weights of aggregate after he has made moisture determinations and corrected the saturated surface-dry weights for free moisture.

In batching aggregate for structures containing less than 25 cubic metres of concrete, the Contractor may substitute approved volumetric measuring devices in lieu of weighing devices. In such event, weighing will not be required but the volumes of coarse aggregate and of fine aggregate measured into each batch shall be those designated by the Engineer.

- (iii) Adjustment for variation in workability - If it is found impossible to obtain concrete of the desired placeability and workability with the proportions originally designated by the Engineer, he will make such changes in aggregate weights as are necessary, provided that in no case shall the cement content originally designated be changed.
- (iv) Adjustment for variation in yield - If the cement content of the concrete, determined by means of the yield test, AASHTO T 121, varies more than plus or minus two (2) percent from the designated value in Table 10-1-1, the proportions will be adjusted by the Engineer to maintain a cement content within these limits. The water content shall in no case exceed the specified amount.
- (v) Adjustment for excess water content - If, when using the designated cement content, it is impossible to produce concrete having the required consistency without exceeding the maximum allowable water content specified in Table 10-1-1, the cement shall be increased by the Engineer so that the maximum water content will not be exceeded.
- (vi) Adjustment for new materials - No change in the source or character of the materials shall be made without due notice to the Engineer and no new materials shall be used until the Engineer has accepted such materials and has designated new proportions based on tests or trial mixes as provided herein. Should the changes due to the new materials require an increase in the amount of cement, no additional payment shall be made to the Contractor for the cost of such additional cement.

(d) Sampling of Concrete

In order to assess compliance of concrete during construction, the Contractor shall prepare and cure test specimens which shall be tested at 7 days and 28 days as determined by the Engineer, or at any other interval that may be deemed necessary to determine the strength of concrete. (Site Working Strength).

(i) Specimens shall be made in pairs as follows:

a) For batches Individual Pours

< 1 m<sup>3</sup>

Not more than one sample shall be taken from which not less than 2 specimens shall be tested.

For batches > 1 m<sup>3</sup> < 20 m<sup>3</sup>

Not more than two samples shall be taken from which not less than 4 specimens shall be tested.

b) Continuous Pours

For any given section of the work that does not qualify as bulk concrete ie.  $> 20 \text{ m}^3 < 100 \text{ m}^3$

A minimum of three random samples shall be taken from which not less than 6 specimens shall be tested.

For any given section of the work that is considered as bulk concrete ie  $> 100 \text{ m}^3$

A minimum of four random samples shall be taken for every  $100 \text{ m}^3$  of concrete or fraction thereof greater than  $100 \text{ m}^3$  placed during one days work or as deemed necessary by the Engineer from which not less than eight specimens shall be tested.

- (ii) Irrespective of the quantity, every days production of concrete shall be tested both for strength and for slump and every structure and every component of every structure shall likewise be so tested for strength and for slump. The checking and testing of the concrete shall be the prerogative of the Engineer, and he may increase the specified strength and condition as required for the project.

The concrete test specimens will be tested by the Contractor at a conveniently located and properly equipped laboratory.

The Contractor shall take, on his own responsibility, every precaution to prevent injury to the test specimens during handling, transporting and storing.

(e) Strength Requirements

(i) Specimen Preparation

The ultimate compressive strength of the concrete shall be determined on specimens obtained and prepared in accordance with AASHTO T141 (ASTM C 172) and AASHTO T23 (ASTM C 31). Test cylinders made in the laboratory shall conform to AASHTO T126 (ASTM C 192).

The compression test performed on cylinders shall be according to specifications AASHTO T22 (ASTM C 39).

(ii) Compressive and Flexural Strength

The average site working strength value of any 4 consecutive results of the 28 day tests shall not be less than the minimum strength specified in Table 10-1-1 for the respective class of concrete. In the event of failure to comply with this requirement all of the concrete in all the batches represented by such samples and specimens, including any batches within the sequence which were not sampled shall be deemed not to comply with the strength requirement of this clause.

If at any time the average of any 4 consecutive results of 7 day tests falls below 70% of the prescribed minimum value at 28 days for compressive strength or below 80% of the prescribed minimum value at 28 days for flexural strength the cement content of the concrete will be increased by at least 20 kg per cubic metre of compacted concrete, without extra payment, until any necessary mix modifications have been agreed following examination of 28 day tests.

(iii) Characteristic Strength

The characteristic strength of the various classes of concrete shall be determined as soon as the first 30 test results of each class become available.

The characteristic strength shall be calculated by the equation:

$$\bar{X}_0 = X - kS$$

Where :

- $\bar{X}_0$  : characteristic strength
- X : mean or average of the series of results
- k : a factor depending upon the percentage of results that fall below the characteristic strength
- S : standard deviation given by the equation :

$$S = \left[ \frac{\sum (X - \bar{X})^2}{(N - 1)} \right]^{1/2}$$

Where :

- X : the individual result
- N : the total number of results

The values for the factor k are :

Percentage of results falling below the minimum	Value of k
0.1	3.09
0.6	2.50
1.0	2.33
2.5	1.96
5.0	1.64

If the characteristic strength so determined falls below the minimum site working strength the Contractor shall increase the cement content in the same manner as described in Item (ii) above until such time as adjustments shall be made in the mix proportions or improvements made in the quality control measures to raise the average strength or reduce variation to the satisfaction of the Engineer.

(iv) Failure to Comply with Compressive Strength Requirements

In the event of compressive strength results not complying with the strength requirements of this Clause or in the event of doubtful results, the Engineer will proceed to check the sample compressive

strength by means of crushing tests performed on test specimens taken with a rotary core borer at suitable points indicated by the Engineer on the structure already constructed.

Such tests shall be carried out by an agreed authority having suitable test facilities. If such tests show strength in compliance with the requirements herein specified, the concrete will be considered satisfactory. If such tests do not comply with the requirements, the Engineer may direct the Contractor to cut out and make good the defective work at the Contractor's expense.

(v) Care of Specimens

The cost of taking specimens and performing the tests including the cost of providing stout, substantial packing cases and the cost of shipping or transporting the test specimens from the site to the laboratory shall be included as part of the price bid for Portland cement concrete. The Contractor shall take, on his own responsibility, every precaution to prevent injury to the test specimens during handling and transporting.

(vi) Records

The records of all tests shall be kept by the Engineer but results shall be available at all times to the Contractor. The Contractor shall be responsible for making such adjustments as may be necessary to produce specification concrete and the test results shall include whether or not the concrete is satisfactory.

S10.01 (2) Materials

(a) General

All materials to be furnished and used that are not covered in this section shall conform to the requirements stipulated in other applicable sections.

(b) Cement

Unless specified to the contrary or otherwise permitted by the Engineer the Contractor shall use only one brand of any one type of cement having uniform quality for the Work. All cement used in the Work shall be Ordinary Portland Cement (ASTM Type-I) conforming to the minimum requirements of JIS R 5210, AASHTO-M 85, BS 12: 1978 or TCVN 2682 - 1992 for PC-40 Cement.

(c) Admixtures

Admixtures shall not be used without the written approval of the Engineer. The Contractor shall submit samples of any proposed admixtures to the Engineer at least 28 days prior to the date of commencement of construction of the particular structure or portion of structure on which he intends to use such admixtures.

(d) Water

All water used in concrete shall be subject to the Engineer's approval. Water used in mixing, curing, or other designated applications shall as a general rule be potable, otherwise reasonably clean and free from oil,

salt, acid, alkali, sugar, vegetable, or any other substance injurious to the finished product. If required by the Engineer, water shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement test for soundness, time of setting and mortar strength. Indication of unsoundness, change in time of setting of plus or minus 30 minutes or more, or decrease of mortar strength more than 10 percent compared with distilled water shall be sufficient cause for rejection of the water that is being tested.

Where the source of water is relatively shallow, the intake shall be so enclosed as to exclude silt, mud, grass, or other foreign materials.

(e) Fine Aggregate

- (i) The fine aggregate for concrete shall consist of natural sand or, subject to approval of the Engineer, other inert materials with similar characteristics, having clean, hard and durable particles, and it shall be free from objectionable quantities of dust, silt, clay, organic matter, and other impurities.
- (ii) The fine aggregate shall be uniformly graded and shall meet the following grading requirements :

Grading of Fine Aggregate:

Sieve Size (mm)	Cumulative Passing Percentage by Weight
9.5	100
4.75	95 - 100
2.36	80 - 100
1.18	50 - 85
0.600	25 - 60
0.300	10 - 30
0.150	2 - 10

Sieve analysis of fine aggregate shall be made in accordance with JIS A 1102 (Method of Test for Sieve Analysis of Aggregate) or AASHTO - T 27.

The gradation requirements given above are the extreme limits to be used in determining the suitability of material from all possible sources of supply. The gradation of materials from any one source shall not vary in composition beyond the range of values that govern the selection of a source of supply. For the purpose of determining the degree of uniformity, a fineness modulus determination shall be made upon representative samples, submitted by the Contractor, from such sources as he proposes to use. If fineness modulus of fine aggregate varies more than 0.2 from the value used in selecting concrete proportions, the fine aggregate shall be rejected unless suitable adjustment of the mix proportions are made with the approval of the Engineer.

- (iii) The amount of deleterious substances in fine aggregate shall not exceed the limits specified in Table 10-1-2. Treatment of other deleterious substances which are not shown in the above table shall be determined by the direction of the Engineer.

Tests for material finer than 0.075 mm sieve shall be made in accordance with JIS A 1103 (Method of Test for Amount of Material Passing Standard Sieve 0.074 mm in Aggregates), or AASHTO - T 11.

Table 10-1-2

Limits for Deleterious Substances in Fine Aggregates

Item	Maximum % by Weight
* Clay lumps	1.0
* Material finer than 0.075 mm sieve:	
Concrete subject to abrasion	3.0 <u>1/</u>
All other concrete	5.0 <u>1/</u>
* Material coarser than 0.300 mm sieve floating on a liquid having a specific gravity of 1.95	0.5 <u>2/</u>

Note :

1/ In the case of crushed aggregate, if the material finer than 0.075 mm sieve consists of the dust of fracture essentially free from clay or shale, these percentages may be increased to 5 and 7 percent respectively.

2/ This requirement does not apply to manufactured sand produced from blast furnace slag.

- (iv) All fine aggregate shall be free from injurious amounts of organic impurities. Approximate determination of the presence of injurious organic impurities in natural sand shall be in accordance with JIS A 1105 (Method of Test for Organic Impurities in Sands) or AASHTO T 21. Aggregate subjected to the colourimetric test for organic impurities, and producing a colour darker than the standard, shall be rejected.

However, any sand that fails to meet the above requirement may be used provided that the compressive strength of mortar specimens using such sand is more than 95% of that of mortar specimens using the same sand which is washed by 3% solution of sodium hydroxide and then by water, and approved by the Engineer. Testing age of mortar specimens shall be 7 and 28 days for normal Portland cement.

Compressive strength of mortar specimens shall be determined by AASHTO T 71, "Effect of Organic Impurities in Fine Aggregate on Strength of Mortar".

(f) Coarse Aggregate

- (i) The coarse aggregate shall consist of one or more of the following: crushed stone, gravel, blast-furnace slag, or other approved inert materials of similar characteristics having clean, hard, durable pieces. It shall be free from objectionable quantities of flat or elongated particles, organic matter or other deleterious matter.
- (ii) Sieve analysis of coarse aggregate shall be made in accordance with JIS A 1102 (Method of Test for Sieve Analysis of Aggregate)



or AASHTO T 27 and material shall meet the following grading requirements:

**Grading of Coarse Aggregate**

SIZE OF COARSE Agg -mm	PERCENTAGE BY WEIGHT (JIS A 1102)										
	AMOUNTS FINER THAN EACH STANDARD SEIVE (mm)										
	100	80	60	50	40	25	20	15	10	5	2.5
50 - 5	-	-	100	95-100	-	37-70	-	10-35	-	0-5	-
40 - 5	-	-	-	100	95-100	-	35-70	-	10-30	0-5	-
25 - 5	-	-	-	-	100	95-100	-	30-70	-	0-10	0-5
20 - 5	-	-	-	-	-	100	90-100	-	20-55	0-10	0-5
15 - 5	-	-	-	-	-	-	100	90-100	40-70	0-15	0-5
80 - 40	100	90-100	45-75	-	0-15	-	0-5	-	-	-	-
60 - 40	-	100	90-100	35-70	0-15	-	0-5	-	-	-	-
50 - 25	-	-	100	90-100	35-70	0-15	-	0-5	-	-	-
40 - 20	-	-	-	100	90-100	20-55	0-15	-	0-5	-	-

- (iii) The amount of deleterious substance in coarse aggregate shall not exceed the limits prescribed in Table 10-1-3. Treatment of the other deleterious substances which are not shown in the table shall be determined by the direction of the Engineer.

**Table 10-1-3**

Limits of Deleterious Substance (Percent by Weight) in Coarse Aggregate

Item	Maximum
Clay lumps	0.25
Soft particles	5.0
Material finer than 0.075 mm sieve	1.0 <u>1/</u>
Material floating on a liquid having a specific gravity of 1.95	1.0 <u>2/</u>

**Note :**

- 1/ In the case of crushed aggregate, if the material finer than 0.075 mm sieve consists of the dust of fracture essentially free from clay or shale, this percentage may be increased to 1.5.
- 2/ This requirement does not apply to manufactured sand produced from blast furnace slag.
- (iv) Test for material finer than 0.075 mm sieve shall be made in accordance with JIS A 1103 (Method of Test for Amount of Material Passing Standard Sieve 0.075 mm in Aggregates), or AASHTO T11. Test for soft particles shall be made in accordance with JIS A 1126 (Method of Test for Soft Particles in Coarse Aggregate by Use of Scratch Tester), or AASHTO T 112.

**(g) Test of Aggregate**

Before use, results of the foregoing tests of aggregate from each source shall be submitted to and approved by the Engineer. Coarse aggregate shall meet the requirements ASTM C39 for Compressive Strength and the percentage of wear of the Aggregate shall not be greater than 50 as

determined by AASHTO T96 . Tests for aggregate in use shall be made when required by the Engineer.

(h) Expansion Joint Filler (Asphaltic Joint Filler)

Expansion joint filler shall conform to the requirements of AASHTO M 33.

The filler for each joint shall be furnished in a single piece for the full depth and width required for the joint unless otherwise authorized by the Engineer. When the use of more than one piece is authorized for a joint, the abutting ends shall be fastened securely, and held accurately to shape, by stapling or other positive fastening satisfactory to the Engineer.

(i) Storage of Materials

(i) Storage of cement - Cement may be shipped from pre-tested and approved bins at the mill. Cement shall be stored in a damp-proof warehouse with a floor raised at least 30 cm from the ground so as to permit easy access for inspection and for use in the delivered order. Bagged cement shall not be piled more than 13 sacks high. Cement which has become damp, lumpy or otherwise not in proper condition shall not be used. Cement stored by the Contractor for a period longer than 60 (sixty) days shall require the Engineer's approval before being used on the work.

(ii) Storage of aggregate - Fine and coarse aggregates shall be stored separately to prevent contamination by foreign material. Aggregate shall be stored in such a manner as to keep the moisture content as uniform as possible, and shall be handled in such a manner as to prevent segregation. Aggregate shall be stored so as to protect it from the direct rays of the sun. Aggregate from different sources of supply shall not be stored in the same place without permission from the Engineer.

S10.01 (3) Equipment and Tools

Equipment and tools necessary for handling materials and performing the work, and satisfactory to the Engineer as to design, capacity, and mechanical condition, shall be at the site of the work before work is started.

If any equipment is not maintained in full working order or if the equipment as used by the Contractor proves inadequate to obtain the results prescribed, such equipment shall be improved or other satisfactory equipment substituted or added at the direction of the Engineer.

(a) Batching Plant and Equipment

(i) General - All material in the mix shall be proportioned wholly by weight. The batching plant shall include bins, weighing hoppers and scales for the fine aggregate and for each separated size of coarse aggregate. If cement is used in bulk, a bin, hopper and scales for the cement shall be included. The container shall be watertight. Provision satisfactory to the Engineer shall be made for batching other components of the mix at the batching plant, which may be either stationary or mobile type. It shall be always properly leveled within the accuracy required for the proper operation of weighing mechanisms.

- (ii) Bins and hoppers - Bins with adequate separate compartments for fine aggregate and for each required size of coarse aggregate shall be provided in the batching plant. Each compartment shall discharge efficiently and freely into the weighing hopper. Means of control shall be provided so that as the quantity desired in the weighing hopper is being approached, the material may be added slowly and shut off with precision. A port or other opening for removing any overload of the several materials from the hopper shall be provided. Weighing hopper shall be constructed so as to discharge completely.
- (iii) Scales - The scales for weighing aggregates and cement shall be of either the beam type or the spring-less dial type. They shall be accurate within one-half of 1% under operating conditions throughout the range of use. Ten weights of 25 kilograms each shall be available for checking accuracy. All exposed fulcrums, clevises and similar working parts of scales shall be kept clean. When beam-type scales are used, provision shall be made for indicating to the operator that the required load in the weighing hopper is being approached. The device shall indicate at least the last 100 kilograms of load and up to 25 kilograms overload.

All weighing and indicating devices shall be in full view of the operator while charging the hopper and he shall have convenient access to all controls.

Cement may be measured by weight, or in standard sacks considered to weigh 50 kilograms net. When measured by weight a separate, satisfactory scale and hopper shall be provided together with a boot or other approved device to transfer the cement from the weighing hopper. Satisfactory methods of handling shall be employed.

Batching shall be so conducted as to result in the weights of material required, within tolerances of 1% for cement and 2% for aggregates.

(b) Mixers

- (i) General - All concrete shall be mixed in batch mixers. It may be mixed at the site of construction, at a central plant, or in transit.  
Each mixer shall have attached to it in a prominent place a manufacturer's plate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of mixing drum.
- (ii) Mixers at site of construction - Mixers at the site shall be approved drum-type capable of combining the aggregate, cement and water into a thoroughly mixed and uniform mass within the specified mixing period and of discharging the mixture without segregation. The mixer shall be equipped with a suitable charging hopper, water storage, and a water measuring device, accurate within 1%. Controls shall be so arranged that the water can be applied only while the mixer is being charged. The discharge level shall lock automatically until the batch has been mixed the required time after all materials are in the mixer.

Suitable equipment for discharging the concrete on the roadbed shall be provided. The mixer shall be cleaned at suitable intervals. The pick-up and throw-over blades in the drum shall be replaced when they have lost 10% of their depth.

- (iii) Central plant mixers - These mixers shall be of approved drum type capable of combining the aggregate, cement and water into the thoroughly mixed and uniform mass within the specified mixing period and of discharging the mixture without segregation. Central plant mixers shall be equipped with an acceptable timing device that will not permit the batch to be discharged until the specified mixing time has elapsed. The water system for a central mixer shall be either a calibrated measuring tank or a metre and shall not necessarily be an integral part of the mixer.

The mixers shall be cleaned at suitable intervals. They shall be examined daily for changes in interior condition. The pick-up and throw-over blades in the drum shall be replaced when they have lost 10% of their depth.

- (iv) Truck or transit mixers - These shall be equipped with electrically actuated counters by which the number of revolutions of the drum or blades may readily be verified and the counters shall be actuated at the commencement of mixing operations at designated mixing speeds. The mixer when loaded shall not be filled to more than 60% of the drum gross volume. The mixer shall be capable of combining the ingredients of the concrete into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity.

Except when intended for use exclusively as agitators, truck mixers shall be provided with a water measuring device to measure accurately the quantity of water for each batch. The delivered amount of water shall be within plus or minus 1% of the indicated amount.

(c) Vibrators

Unless otherwise directed, the concrete shall be consolidated with approved mechanical vibrators operating within the concrete. When required, vibrating shall be supplemented by hand spading with suitable tools to assure proper and adequate compaction.

The vibrators shall be of a type approved by the Engineer, with a minimum frequency of 3500 impulses per minute and shall be capable of visibly affecting a properly designed concrete with a 2 centimetre slump over a circular area of 45 centimetres radius. The number of vibrators used shall be sufficient to consolidate the concrete properly within 10 minutes after it is deposited in the forms and in addition at least 3 spare vibrators shall be available on standby at the site of the pour to maintain immediate continuity in case of breakdown.

(d) Forms

- (i) Forms shall be made of metal, shall conform to the shape, lines and dimensions of the members shown on the Drawings, and

shall be so constructed as to prevent deformation due to load, vibration, and other causes.

- (ii) Forms shall be properly equipped with braces, ties and other devices, so as to maintain them in the positions and the shape as shown on the Drawings.
- (iii) Forms shall be so constructed that they can be removed easily and safely. Joints in linings or panels shall be either horizontal or vertical as far as possible, and shall be sufficiently tight to prevent any leakage of mortar.
- (iv) Curved forms shall be of the radius called for on the Drawings and acceptable flexible forms shall be installed with that radius.
- (v) After forms have been set in the correct location, they shall be inspected and approved by the Engineer before concrete is placed.
- (vi) Care shall be exercised to keep forms free from dust, grease or other foreign matter. No material or treatment that will adhere to concrete or discolour concrete shall be used. All forms shall be treated with an approved form-release-oil prior to placing reinforcement.
- (vii) For narrow walls, columns, etc., where the bottom of the form is inaccessible, lower form boards or parts thereof shall be left loose so that they may be removed for cleaning out extraneous material immediately before placing concrete.
- (viii) Forms for exposed surfaces shall be constructed with triangular fillets not less than 25 mm x 25 mm attached so as to prevent mortar runs and to produce smooth straight chamfers at all sharp external edges of the concrete.

(e) Batching and Transporting Materials

For mixing at site of construction, aggregates shall be transported from the batching plant to the mixer in batch boxes, vehicle bodies, or other containers adequate in design and construction to properly carry the batch required. Partitions separating batches shall be adequate and effective to prevent spilling from one compartment to another while in transit or while being dumped.

Cement in original shipping containers may be transported on top of the aggregates. The number of sacks of cement required for each batch shall be placed on the aggregates for that batch. Sacked cement shall be emptied into the aggregates prior to dumping into mixer.

Batches shall be delivered to the mixer separately and intact. Each batch container shall be dumped cleanly into the mixer without loss of cement or mixing or spilling of material from one batch compartment into another.

(f) Mixing Concrete

- (i) General - Concrete shall be mixed at the construction site, at a central mixing plant, in a truck mixer, or by a combination of central plant and truck mixing. Hand-mixing may be used only

when approved by the Engineer. No concrete shall be mixed, placed, or finished when the natural light is insufficient, unless an adequate and approved artificial lighting system is operated.

- (ii) Mixing at site of concrete construction - Concrete shall be mixed in a batch mixer of the type and capacity approved by the Engineer. Mixing time shall be determined by the Engineer in accordance with JIS A 1119 (Method of Test for Variation in Unit Weight of Air Free Mortar in Freshly Mixed Concrete). When results of the above tests are not available, the mixing time shall be longer than 1 1/2 minutes after all the materials have been introduced into the mixer, but in no case shall the mixing time exceed three times the mixing time prescribed above. Charging of water into the mixer shall begin before the cement and aggregates enter the drum. During mixing, the drum shall be operated at speeds specified by manufacturers. Pick-up blades in the drum of the mixer which are worn down 2 cm or more at any part must be replaced.

The volume of a batch shall not exceed the manufacturer's rated capacity of the mixer without written permission of the Engineer. No mixer whose rated capacity is less than a one-bag batch shall be used.

Concrete shall be mixed only in such quantities as are required for immediate use, and concrete which is not of the required consistency at the time of placement shall not be used.

Re-tempering of concrete will not be permitted. Entire content of the mixer shall be removed from the drum before materials for the next batch are placed therein. Upon cessation of mixing for a considerable length of time, the mixer shall be cleaned thoroughly. Upon resumption of mixing, the first batch of concrete material placed in the mixer shall contain sufficient sand, cement, and water to coat the inside surface of the drum without diminishing the required mortar content of the mix.

- (iii) Central plant mixing - When mixed at a central plant, the mixer and methods used shall be in accordance with the requirements of Sub-clause S10.01 (3) (f) (ii). Mixed concrete shall be transported from the central mixing plant to the site of work in agitator or non-agitator trucks approved by the Engineer.

Agitator trucks shall be equipped with a water-tight revolving drum, and shall be capable of transporting and discharging concrete without segregation. The agitation speed of the drum shall be between 2 and 6 revolutions per minute. The volume of mixed concrete permitted in the drum shall not exceed the manufacturer's rating nor exceed 70% of the gross volume of the drum. Upon approval of the Engineer, truck mixers may be used in lieu of agitator trucks for transportation of central plant mixed concrete. Gross volume of agitator bodies, expressed in cubic metres, shall be as determined by the mixer manufacturer. The interval between introduction of water into mixer drum and final discharge time shall be a maximum of 45 minutes unless the use of additives have been approved. Depending on the type and usage of the approved

additives this interval may be extended up to a maximum of 2 hours. During this interval the mixture shall be agitated continuously.

Bodies of non-agitator trucks shall be smooth and water-tight. Covers shall be provided when needed for protection against rainfall. The non-agitator trucks shall deliver concrete to the work site in a thoroughly mixed and uniform mass. Uniformity shall be deemed satisfactory if samples from the one-quarter and three-quarter points of the load do not differ more than 2.5 cm in slump. Placing of concrete shall be completed within 30 minutes after introduction of mixing water into the cement and aggregates or if admixture is used at a time to be determined by the Engineer.

- (iv) Truck mixing - Concrete may be mixed in truck mixers of approved design. Truck mixing shall be in accordance with the following provisions. The truck mixer shall be either a closed, water-tight, revolving drum or an open-top revolving-blade or paddle type. It shall combine all ingredients into a thoroughly mixed and uniform mass, and shall discharge the concrete with satisfactory uniformity. A maximum difference of 2.5 cm between slumps of samples from the one-quarter and three-quarter points of the discharge load shall be deemed satisfactory.

Mixing speed for revolving drum type mixers shall not be less than 4 revolutions per minute of the drum nor greater than a speed resulting in a peripheral velocity of the drum of 1 metre per second. For the open-top type mixer, mixing speed shall be between 4 and 16 revolutions per minute of the mixing blades or paddles. Agitation speed for both the revolving-drum and revolving blade type mixers shall be between 2 and 6 revolutions per minute of the drum or mixing blades or paddles.

The capacities of truck mixer shall be in accordance with the manufacturer's ratings except that they shall not exceed the limitation herein. Standard for normal rated capacity, expressed as percentage of the gross volume of the drum, shall not be more than 50% for truck mixing and 70% for agitating.

The concrete shall be delivered to the site of the work and discharge shall be completed within 45 minutes after the introduction of the mixing water into cement and aggregates unless the use of additives have been approved by the Engineer. Depending on the type and usage of the approved additives this interval may be extended up to a maximum of 2 hours. During this interval the mixture shall be agitated continuously.

When the concrete is mixed in a truck mixer, the mixing operation shall begin within 30 minutes after the cement has been mixed with the aggregates. Except when intended for use exclusively as agitators, truck mixers shall be provided with a water measuring device which will measure accurately the quantity of water for each batch. The delivered amount of water shall be within plus or minus 1% of the indicated amount when the tank, if mounted on the truck mixer, is satisfactorily and practically level.

(v) Hand mixing - Hand mixing will not be permitted, except in case of emergency, without written permission from the Engineer. When permitted, it shall be performed only on water-tight mixing platforms made of metal, etc. Concrete shall be turned and returned on the platform at least six times and until all particles of the coarse aggregate are covered thoroughly with mortar and the mixture is uniform.

(g) Retempering Concrete

Retempering concrete by adding water will not be permitted under any circumstances. Concrete that is not within the specified slump limits at the time of placement shall not be used. Admixtures for increasing the workability or for accelerating the set will be permitted only with the written approval of the Engineer.

(h) Consistency

Slump will be measured in accordance with AASHTO T 119 or JIS A 1101 and shall be in accordance with Table 10-1-1.

S10.01 (4) Construction

(a) General

The Contractor shall maintain an adequate number of trained and experienced supervisors and foremen at the site to supervise and control the work. All construction, other than the concrete, shall conform to the requirements prescribed in other sections or clauses for the several items of work entering into the complete structure.

(b) Foundation

Preparation of foundations shall conform to the details as shown on the Drawings in accordance with the requirements of Clause S5.01. The elevations of the bottoms of footings as shown on the Drawings are approximate only and the Engineer may order further excavation as necessary to obtain satisfactory foundations.

Pile foundations shall be constructed in accordance with the provisions set out in the other relevant Clauses and as shown on the Drawings.

(c) Falsework

Falsework shall be built on foundations of sufficient strength to carry the loads without appreciable settlement. Falsework that cannot be founded on solid footings must be supported by ample falsework piling provided at the Contractor's expense.

Before constructing forms or falsework the Contractor, if required, shall submit detailed drawings of proposed forms or falsework for approval by the Engineer, but such approval shall not relieve the Contractor of any of his responsibilities under the Contract for the successful completion of the structure.

(d) Formwork

Before concrete is placed the Engineer shall inspect all formwork and falsework and no concrete shall be placed until the Engineer has



inspected and approved such formwork and falsework. Such approval shall not relieve the Contractor of any of his responsibilities under the Contract for the successful completion of the structure.

Internal formwork for hollow slab construction shall be made of plywood, thin metal plate or other materials. These materials shall have sufficient strength to resist the pressure and the buoyancy effects of fresh concrete.

Type and structure of joint and cover for the cylindrical form shall be tight to prevent any leakage of concrete, and shall be approved by the Engineer. Nominal diameter of cylindrical forms shall be the outer diameter, or the outer diameter of projecting portion in case of thin metal plate having projection. The height of the projection shall be less than 10 mm.

Internal forms shall be fixed in the correct position such that they will not displace or deform during placing concrete. U-shape bolts shall be used to fix the internal forms and the method of supporting and fixing the internal forms shall be approved by the Engineer. Care shall be taken to ensure that U-shape bolts and other items can resist the buoyancy forces on the formwork.

In falsework, bridge camber shall be considered in accordance with the Working Drawings prepared by the Contractor and approved by the Engineer.

(e) Reinforcement

The Engineer shall inspect and approve all reinforcement in place in accordance with the requirements of Clause S10.02, before concrete is placed. An experienced steel fixer shall be present while all concrete is placed to ensure that no reinforcement becomes displaced during placing and if it does to reposition reinforcement before placing continues.

(f) Placing Concrete

(i) General - All concrete shall be placed within the time specified in Sub-clause S10.01 (3) (f). Concrete shall be placed in such a manner as to avoid segregation and the displacement of reinforcing bars and shall be spread in horizontal layers where practicable. Concrete shall be placed where necessary inside forms by hand shovels and in no instance shall vibrators be so manipulated to transport concrete inside formwork. Care shall be taken to prevent mortar from spattering forms and reinforcing steel and from drying ahead of the final covering with concrete. When spattering has occurred the forms and steel shall be cleaned with wire brushes or scrapers before concrete is placed around steel or in forms which have been spattered.

Troughs, pipes, or short chutes used as aids in placing concrete shall be positioned in such a manner that segregation of the concrete will not occur. All chutes, troughs, and pipes shall be kept clean and free from coating of hardened concrete or mortar. Concrete shall not be dropped freely over a vertical distance of more than 1.5 metres.

Concrete shall be placed continuously throughout each section of the structure or between indicated joints if shown on the Drawings or as directed by the Engineer.

If in an emergency it is necessary to stop placing concrete before a section is completed, bulkheads shall be placed as the Engineer may direct and the resulting joint shall be deemed a construction joint, and treated as specified herein below.

- (ii) Concrete columns - Concrete in columns or bents shall be placed in one continuous operation unless shown on the Drawings or permitted by the Engineer.
- (iii) Concrete slab and girder spans - Slabs and girders having spans of 10 metres or less shall be placed in one continuous operation unless otherwise stated on the Drawings. Concrete preferably shall be deposited by beginning at the centre of the span working from the centre toward the ends.

Concrete in slab spans shall be placed in one continuous operation and in one layer for each span, unless otherwise stated on the Drawings.

Concrete in girders spanning more than 10 metres may be placed in two operations, the first operation being the placing of concrete in the girder stems to the bottom of the slab haunches or the bottom of the slab whichever is applicable. A period of at least 24 hours shall elapse between the completion of placing concrete in the girder and the commencement of placing concrete in slab.

The construction procedure for the concrete deck slab on steel box girders shall be so arranged as to eliminate excessive stress in new or recently placed concrete.

Immediately before placing concrete, the top surface of the previously placed concrete shall be hammered with a sharp hand tool (scabbed) until the aggregate is exposed and cleaned. The Contractor shall check all falsework for shrinkage and settlement, and shall tighten all wedges to ensure minimum deflection of all formwork.

- (iv) Walls, piers, etc. - Where walls, piers, columns, struts, posts and other such structural members allow horizontal construction joints, concrete shall not be placed on top of other concrete which has not been allowed to set for 12 hours or more.

Work shall not be discontinued within 45 centimetres of the top of any face, unless provision has been made for a coping less than 45 centimetres thick, in which case, if permitted by the Engineer, the construction joint may be made at the underside of the coping.

- (v) Culverts - The slabs of box culverts shall be placed for their full depth in one mass or layer and allowed to set not less than 12 hours before any additional work is done on them.

Before concrete is placed in sidewalls, bottom slabs shall be cleaned of all shavings, sticks, sawdust and other extraneous material.

The Contractor shall submit to the Engineer for approval his proposals for pouring culvert walls before commencing culvert construction. Concrete shall not be placed in layers more than one metre high relative to the concrete already placed. Deposition shall proceed in a systematic manner.

- (vi) Depositing concrete underwater - Concrete shall not be deposited in water except with the approval of the Engineer and with his immediate supervision, and by the method described in this paragraph.

To prevent segregation, the concrete shall be carefully placed in a compact mass in its final position by means of a tremie tube or pipe, or a closed bottom-dump bucket, or by other means, and shall not be disturbed after being deposited. Special care must be exercised to maintain still water at the point of deposit. Concrete shall not be placed in running water. The method of depositing concrete shall be so regulated as to produce approximately horizontal surfaces. Concrete seals shall be placed in one continuous operation. When a tremie tube or pipe is used, it shall consist of a tube or pipe not less than 25 centimetres in diameter, constructed in sections having flanged couplings fitted with gaskets.

The means of supporting the tremie shall be such as to permit free movement of the discharge end over the entire top of the concrete and permit its being lowered rapidly when necessary to choke off or retard the flow. The tremie shall be filled by a method that will prevent washing of the concrete. The discharge end shall be completely submerged in concrete at all times and the tremie shall contain sufficient concrete to prevent any water entry.

When concrete is placed with a bottom-dump bucket, the bucket shall have a capacity of not less than 1.20 cubic metres and shall be equipped with loose-fitting top covers. The bottom door shall open freely downward and outward when tripped. The bucket shall be completely filled and be lowered gradually and carefully until it rests on the surface upon which the concrete is to be deposited. It shall then be raised very slowly during the discharge travel, the intent being to maintain, as nearly as possible, still water at the point of discharge and to avoid agitating the mixture.

Dewatering shall proceed only when the concrete seal is considered strong enough to withstand any pressures to be exerted upon it. This time will be decided by the Engineer. All laitance or other unsatisfactory material shall be removed from the exposed surface by scraping, jetting, chipping or other means which will not unduly injure the seal.

- (vii) Construction joints - Construction joints shall be located where shown on the Drawings or permitted or instructed by the Engineer. Construction joints shall be perpendicular to the principal lines of stress and in general shall be located at points of minimum shear.

At horizontal construction joints, details shall be as approved by the Engineer. Before placing fresh concrete, the surfaces of construction joints shall be scabbed, sandblasted or washed and scrubbed with a wire brush to expose clean aggregate, drenched with water until saturated, and kept saturated until the new concrete is placed. Immediately prior to placing new concrete the forms shall be drawn tight against the concrete already in place and the old surface shall be coated thoroughly with a 1.5 mm thick coating of neat cement mortar. Concrete in substructures shall be placed in such a manner that all exposed horizontal construction joints will be truly horizontal.

Where vertical construction joints are necessary, reinforcing bars shall extend across the joint in such a manner as to make the structure monolithic. Special care shall be taken to avoid construction joints through paneled wing walls or other large surfaces which are to have an architectural finish. Necessary dowel, load-transfer devices, and bonding devices shall be placed as shown on the Drawings or directed by the Engineer.

- (viii) Expansion joints – Expansion joints shall be asphaltic joint filler, 20mm thick, and shall be located and formed as required on the Drawings. Cut-off plate for water stops used for the expansion joints shall be flexible PVC to JIS K 6773 and shall be placed in accordance with the Drawings. The water stops shall be held firmly in place to prevent displacement during concreting. If after placing concrete water stops are materially out of position or shape, the surrounding concrete shall be removed, the water stop reset, and the concrete replaced, all at the Contractor's expense.

Water stop shall be furnished full length for each straight portion of the joint, without field splices. Water stop shall be cut and spliced at changes in direction as may be necessary to avoid buckling or distortion. All field splices shall be performed by heat sealing, hot-air welding or vulcanising the adjacent surfaces in accordance with the manufacturer's recommendations to form continuous watertight joints.

- (ix) Open joints - Open joints shall be constructed where shown on the Drawings by insertion and subsequent removal of a wooden strip, metal plate, or other approved material. The insertion and removal of the template shall be accomplished without chipping or breaking the corners of the concrete. Reinforcement shall not extend across an open joint unless so specified on the Drawings.
- (x) Anchor bolts - All necessary anchor bolts in piers or abutments shall be accurately set in holes formed while the concrete is being placed. Holes may be formed by inserting in the fresh concrete oiled wooden plugs, metal pipe sleeves, or other approved devices, and withdrawing them after the concrete has partially set. Holes so formed shall be at least 10 cm in diameter. Bolts shall be set accurately and fixed with grout completely filling the holes. The grout shall be non-shrink mortar of a type approved by the Engineer.

Anchor bolts used in connection with expansion shoes, rollers, and rockers shall be located with due regard to the temperature at the time of erection. Care shall be taken that full and free movement of the superstructure at the moveable bearings is not restricted by improper setting or adjustment of bearings or anchor bolt and nuts.

- (xi) Shoes and bearing plates - Bridge seat bearing areas shall preferably be finished high and ground to the level required. Shoes and bearing plates shall be set as provided in Clause S10.11.
- (xii) Drainage holes and weep holes - Drainage holes and weep holes shall be constructed in the manner and at the locations indicated on the Drawings or required by the Engineer. Ports or vents for equalizing hydrostatic pressure shall be placed below low water.  
  
Forms for weep holes through concrete shall be PVC pipe. Exposed surfaces of weep drain pipe shall be flush with the concrete.
- (xiii) Pipe, conduits, and ducts - Pipes, conduits, and ducts that are to be encased in concrete shall be installed by the Contractor before the concrete is placed. Unless otherwise indicated, pipe embedded in concrete shall be standard, light-weight, non-corrosive pipes. Pipes shall be held or braced rigidly during concrete placement in order to prevent their displacement.
- (xiv) Piers and abutments - No superstructure load shall be placed upon finished bents, piers, or abutments until the Engineer so directs, but the minimum time allowed for the hardening of concrete in the substructure before any load of the superstructure is placed thereon shall be 7 days when normal Portland cement is used.

(g) Curing Concrete

Immediately after forms have been removed and finishing completed, all concrete shall be cured by one of the following methods. The Engineer will specify the concrete surface which may be cured by either method.

- (i) Water method - The entire exposed surfaces other than slabs shall be protected from the sun and the whole structure shall be covered with wet burlap, cotton mats, or other suitable fabric for a period of at least seven days. These materials shall be kept thoroughly wet for the entire curing period. Curbs, walls, and other surfaces requiring a rubbed finish may have the covering temporarily removed for finishing, but the covering must be restored as soon as possible. All concrete slabs shall be covered as soon as possible with sand, earth or other suitable material and kept thoroughly wet for at least seven days. This covering material shall not be cleared from the surface of the concrete slabs for a period of twenty one days.

If wood forms are allowed to remain in place during the curing period, they shall be kept moist at all times to prevent them from shrinking.

- (ii) Membrane forming curing compound - All surfaces shall be given the required surface finish prior to application of the curing compound. During the finishing period, the concrete shall be protected by the water method of curing.

Membrane curing compound shall be applied after the removal of forms, or after the disappearance of surface water. It can be sprayed or applied to the concrete surface by means of an applicator in one or more coats at the rate instructed by the manufacturer.

Should the membrane seal be broken or damaged before the expiration of the curing period, the damaged area shall be immediately repaired by the application of additional membrane material.

The Contractor's proposals for the use of liquid membrane curing compound and the locations shall be subject to the approval of the Engineer.

(h) Removal of Formwork and Falsework

- (i) Time of removal - formwork and falsework shall not be removed without the approval of the Engineer. The Engineer's approval shall not relieve the Contractor of responsibility for the safety of the work. Blocks and bracing shall be removed at the same time as the forms and in no case shall any portion of wooden forms be left in the concrete.

Falsework removal for continuous or cantilevered structures shall be as approved and directed by the Engineer and shall be such that the structure is gradually subjected to its working stress.

When the time for removal of forms and supports is determined based on concrete strength tests, such removal shall not begin until the concrete has attained the percentage of the specified design strength shown in the table below.

If field operations are not controlled by compressive strength tests, the time shown below for removal of forms and supports shall be used as a minimum:

In continuous structures, falsework shall not be released in any span until the first and second adjoining spans on each side have reached the strength specified herein or in the special provisions. When cast-in-place post-tensioned bridges are constructed, falsework shall remain in place until all post-tensioning has been accomplished

Removal of Formwork and Falsework

Structure	Standard Concrete	Early Strength Concrete	Percentage of Design Strength
Centering under girders, beams, frames or arches	14 days	7 days	80%
Floor slabs	14 days	7 days	70%
Walls	1 day	12 hours	-
Columns	2 days	1 day	-
Side of beams and all other vertical surfaces	1 day	12 hours	-

Falsework under all spans of continuous structures shall be completely released before concrete is placed in railings and bridge parapets.

Forms and falsework shall not be released from under concrete without first determining if the concrete has gained adequate strength without regard to the time element. In the absence of strength determinations, the forms and falsework are to remain in place until removal is permitted by the Engineer.

The forms for footings constructed within cofferdams or cribs may be left in place when, in the opinion of the Engineer, their removal would endanger the safety of the cofferdam or crib, and

when the forms so left intact will not be exposed to view in the finished structure. All other forms shall be removed whether above or below the ground line or water level.

All formwork shall be removed from the cells of concrete box girders within which utilities are required, and all formwork except that necessary to support the deck slab shall be removed from the remaining cells of the box girder.

To facilitate finishing, forms used on ornamental work, railings, parapets, and exposed vertical surfaces shall be removed at least 12 but not more than 48 hours later depending upon weather conditions.

In order to determine the condition of concrete in columns, forms to columns shall always be removed before releasing supports from beneath beams and girders.

Falsework supporting the deck of rigid frame structures shall not be removed until fill has been placed behind the vertical legs.

- (ii) Patching - Immediately following removal of the forms all projecting wires or metal devices that have been used for holding the forms in place shall be removed or cut back at least 2.5 cm beneath the surface of the concrete. Fins or runs of mortar and all irregularities caused by form joints shall be removed. Small

holes, depressions, and voids that show on the concrete shall be filled with cement mortar mixed in the same proportions as that used in the body of the work, except without coarse aggregate.

The surface of this mortar shall be floated with a wooden float before initial set takes place. It shall be uniform in colour with the surrounding concrete and neat and workmanlike in appearance.

- (iii) Cause for rejection - Excessive honeycombing shall be sufficient cause for rejection of portions of the structure containing this honeycombing. The Contractor, on receipt of written orders from the Engineer, shall remove and rebuild such portions of the structure at his own expense.

(i) Finishing Concrete

All concrete surfaces exposed in the completed work shall comply with the requirements of Item (iii) Ordinary finish herein except where otherwise shown or specified.

- (i) Concrete decks - Immediately after placing concrete, concrete decks shall be struck off with templates to provide proper transverse sections and shall be hand finished smooth to the concrete levels. Finish shall be slightly but uniformly roughened by brooming. The finished surface shall not vary more than 10 millimetres from a 4 metre straightedge placed parallel to the centreline of the roadway and 10 millimetres from a transverse template cut to the true cross section of the roadway.
- (ii) Curb and footpath surface - Exposed faces of curbs and footpath shall be finished true to lines and grades. The curb surface shall be wood floated to a smooth but non-slippery finish. Footpath surfaces shall be slightly but uniformly roughened by brooming across the direction of travel.
- (iii) Ordinary finish - An ordinary finish is defined as the finish left on a surface after the removal of the forms when all holes left by form ties have been filled, and any minor surface defects have been repaired. The surface shall be true and even, free from depressions or projections and of reasonably uniform colour.

Repaired surfaces, the appearance of which is not satisfactory, shall be "rubbed" as specified in Item (iv) Rubbed finish.

The concrete in bridge seats, caps, and tops of walls shall be struck off with a straightedge and floated to true grade. Unless shown on the Drawings the use of mortar topping for concrete surfaces will not be permitted.

- (iv) Rubbed finish - After the removal of forms the rubbing of concrete shall be started as soon as its condition will permit. Immediately before starting this work the concrete shall be kept thoroughly saturated with water. Sufficient time shall have elapsed before the wetting down to allow the mortar used in patching to set thoroughly. Surfaces to be finished shall be rubbed with a medium coarse carborundum stone, using a small



amount of mortar on its face. The mortar shall be composed of cement and fine sand mixed in the same proportions as those used in the concrete being finished. Rubbing shall be continued until all form marks, projections and irregularities have been removed, all voids filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place. After all concrete above the surface being treated has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water. This rubbing shall be continued until the entire surface is of a smooth texture and uniform colour.

After the final rubbing has been completed and the surface has dried, it shall be rubbed with burlap to remove loose particles and laitance. The final surface shall be free from all unsound patches, paste, powder and objectionable marks.

- (v) Backfill and road fills - All spaces which have been excavated and the volumes of which are not occupied by the concrete structure shall be backfilled and compacted with acceptable material in accordance with the provisions of Section 5 of these Specifications.

If there is likelihood of water accumulating behind any wall, the backfill shall not be placed until after the retaining, diaphragm, or spandrel walls are 28 days old. No fill shall be placed over arches and slabs until the concrete is 28 days old or until test specimens indicate the concrete has attained the required 28-day strength.

- (vi) Loading - Traffic or heavy construction equipment shall not be allowed on reinforced concrete structures until 28 days have elapsed from the last placing of concrete except as noted below. If it is proposed to use the structure at an earlier date, extra test specimens shall be cast. The structure may be used when tests of these specimens show that the concrete has attained its specified 28-day strength.

(j) Cleaning Up

Upon completion of structure and before final acceptance, the Contractor shall remove all falsework, falsework piling, etc., down to 1.0 metre below the finished ground line. Excavated, or useless materials, rubbish, etc. shall be removed from the site and the site shall be left in a neat and presentable condition satisfactory to the Engineer.

S10.01 (5) Method of Measurement

Concrete shall be measured by the number of cubic metres of the several classes complete in place and accepted. In computing quantities the dimensions used shall be those shown on the Drawings or ordered in writing by the Engineer but the measurement shall not include any concrete used for the construction of temporary works. No deduction from the measured quantity shall be made for the volume occupied by pipes less than 20 cm in diameter nor for reinforcing steel, anchors, conduits, weep holes or piling except that deductions will be made for the volume of structural steel, including steel piling, encased in concrete. The measurement shall not include any concrete

used in the construction of cofferdams or falsework, or the volume of forms or falsework.

At locations where steel access doors are required for maintenance of box girders, these will not be paid for separately but will be a subsidiary obligation of the Contractor under the pay item for the relevant class of concrete. The full volume of concrete will be measured for payment and no deduction will be made for the volume of concrete omitted to provide the access.

No pay allowance shall be made for any increased cement content, for any admixtures nor for any finishing of any description of concrete or concrete floor. Any Class B concrete permitted to be constructed where Class C, D or E concrete was specified shall be measured for payment as Class C, D and E concrete, respectively. Any Class C concrete permitted to be constructed where Class D or E concrete was specified shall be measured for payment as Class D or E concrete.

Unless described otherwise, Concrete used for the works on other Pay Items in these Specifications will not be measured separately for payment under this Clause S10.01.

The quantities of reinforcing steel and other Contract items which are included in the completed and accepted structure shall be measured for payment as described for the separate items involved.

S10.01 (6) Basis of Payment

The work measured as provided above for the class or classes of concrete specified, shall be paid for at the Contract unit price per cubic metre for concrete as detailed below. The payment shall be full compensation for furnishing and placing all materials, including all labour, tools, equipment, formwork, falsework (scaffolding and supporting), including piling of formwork for beams and slabs; for mixing, placing, finishing and curing the concrete, etc., and all incidental work thereto including the provision and construction of drainage falls and systems and weepholes. The supply, fixing and finishing of expansion joints and reinforcing steel shall not be paid for separately and is considered to be included in the payment for concrete.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
10.01 (A-1)	Structural Concrete, Class A-1	cubic metre
10.01 (A-2)	Structural Concrete, Class A-2	cubic metre
10.01 (C-1)	Structural Concrete, Class C-1	cubic metre
10.01 (C-4)	Structural Concrete, Class C-4	cubic metre
10.01 (C-5)	Structural Concrete, Class C-5	cubic metre
10.01 (E-1)	Structural Concrete, Class E-1	cubic metre
10.01 (G)	Structural Concrete, Class G	cubic metre

S10.02 Reinforcing Steel Bars

S10.02 (1) Description

This work shall consist of furnishing, fabricating, and placing reinforcing steel bars of the type and size provided in accordance with these Specifications and in reasonably close conformity with the Drawings or as directed by the Engineer.

S10.02 (2) Materials

Reinforcing steel shall conform to the requirements of the following specifications except that the weights of the standard bar sizes will be taken as per Tables 10-2-1 and 10-2-2, irrespective of the specification used in manufacture.

Round Bar :

A-I (CT-3) 22TCN 18-79; or  
JIS G 3112 (Grade SR 235); or  
ASTM A615

Deformed Bars :

A-II (CT-5) 22TCN 18-79; or  
JIS G 3112 (Grade SD 295A); or  
JIS G 3112 (Grade SD 345); or  
ASTM A615

Reinforcing bars shall be kept off the ground and stored within a building or provided with suitable cover.

S10.02 (3) Construction

(a) Fabrication

- (i) Reinforcing bars shall be accurately formed to the shapes and dimensions indicated in the design, and shall be fabricated in a manner that will not injure the material.
- (ii) Unless otherwise permitted, all reinforcing bars requiring bending shall be bent cold. When reinforcing bars are bent by heating, the entire operation shall be approved by the Engineer. Should the Engineer approve the application of heat for field bending reinforcing bars, precautions shall be taken to ensure that the physical properties of the steel will not be materially altered.
- (iii) Reinforcing bars that cannot be straightened by means of fabrication shall not be used. Bars partially embedded in concrete shall not be bent except as shown on the Drawings or otherwise permitted.
- (iv) Qualified men shall be employed for cutting and bending, and proper appliances shall be provided for such work.
- (v) If it is necessary for the Engineer to ascertain the quality of reinforcing bars, the Contractor shall test reinforcing bars, at his own expense, by means as directed by the Engineer.

(b) Placing

- (i) Reinforcing bars before being positioned shall be cleaned and free from rust, dirt, mud and loose scale and from paint, oil, or any other foreign substance that destroys or reduces the bond.
- (ii) Reinforcing bars shall be accurately placed in proper position so that they will be firmly held during placing concrete. Reinforcing bars for erecting shall be used when needed.
- (iii) Bars shall be tied at all intersections by using annealed iron wire 0.9 mm or larger diameter or suitable clips. Welding will not be permitted for this requirement.
- (iv) Distances from the forms shall be maintained correctly by means of metal hangers, mortar blocks, metal supports, or other supports approved by the Engineer.
- (v) Reinforcing bars shall be inspected by the Engineer after placing. When a long time has elapsed after placing reinforcing bars, they shall be cleaned and inspected again by the Engineer before placing concrete.

(c) Splicing

- (i) When it is necessary to splice reinforcing bar at points other than shown on the designs, positions and methods of splicing shall be determined based on strength calculations approved by the Engineer.
- (ii) In lapped splices, the bars shall be lapped the required length and wired together at several points by using annealed iron wire larger than 0.9 mm.
- (iii) Exposed reinforcing bars intended for bonding with future extensions shall be effectively protected from injury and corrosion.
- (iv) Welding of reinforcing steel shall be done only if detailed on the Drawings or if authorized by the Engineer in writing.
- (v) Substitution of different size bars shall be permitted only upon the specific authorization of the Engineer. If steel is substituted, it shall be of a size equivalent to the design size or larger.

S10.02 (4) Method of Measurement

The quantity of reinforcing steel bar to be paid for shall be the weight (kg) of reinforcing bar erected as shown on the Drawings or ordered by the Engineer in writing. The weight calculated will be based upon the following tables :

Table 10-2-1 Unit Weights of Plain Round Bars

Nom. Bar Size (dia. mm)	D9	D13	D16	D19	D22	D25	D28
Weight per linear metre in kg	0.499	1.040	1.580	2.230	2.980	3.850	4.830

Table 10-2-1 Unit Weights of Plain Round Bars -- cont.

Nom. Bar Size (dia. mm)	D32	D36	D38	D42	D46	D48	D50
Weight per linear metre in kg	6.310	7.990	8.900	10.900	13.000	14.200	15.400

Nom. Bar Size (dia. mm)	D55	D60	D65	D70	D75	D80	D85
Weight per linear metre in kg	18.700	22.200	26.000	30.200	34.700	39.500	44.500

Table 10-2-2 Unit Weights of Deformed Bars

Nom Bar Size (dia. mm)	D13	D16	D19	D22	D25	D29	D32
Weight per linear metre in kg	0.995	1.560	2.250	3.040	3.980	5.040	6.230

The lengths to be taken in calculating the weight for the purpose of payment shall be shown on the Drawings or ordered in writing by the Engineer.

No measurement or payment will be made for splices added by the Contractor for his convenience or for splices which are not shown on the Drawings and are not approved by the Engineer.

Clips, ties or other material used for positioning and fastening the reinforcing bars in place shall not be measured for payment. Reinforcing steel bars used for the pay items in Sections 6, 12 and 13 (except foundation for high mast lighting pole) and for the Pay Items 10.03, 10.04, 10.05, 10.07, 10.10, 10.11 and 10.12 of these Specifications, shall not be measured for payment in this Clause S10.02.

**S10.02 (5) Basis of Payment**

The accepted quantities of reinforcing steel bar determined as provided above shall be paid for at the Contract price per kilogram, completed in place.

This payment shall be full compensation for furnishing all labour, equipment, and materials, necessary for fabricating, bending, assembling and erecting reinforcing bar, for unloading at the specific location, storing and handling of reinforcing steel bar.

Payment Item No.	Name	Unit of Measurement
10.02	Reinforcing Steel Bars	ton

S10.03 Prestressed Concrete

S10.03 (1) Description

(a) General

This work shall consist of prestressed concrete structures and the prestressed concrete portions of composite structures, constructed in close conformity with the lines, grades, design, and dimensions shown on the Drawings, or established by the Engineer and in accordance with this and other specification items involved.

The work shall include the furnishing and installing of any appurtenant items necessary for the particular prestressing system to be used, including but not limited to ducts, anchorage assemblies and grout used for pressure grouting ducts.

It shall include the manufacture, transportation, and storage of beams, slabs, and other structural members of pre-cast concrete prestressed by either pre-tensioning or post-tensioning methods. It shall also include the installation of all pre-cast prestressed members.

For cast-in-place prestressed concrete, the term "member" as used in this section shall be considered to mean the concrete which is to be prestressed.

(b) Definitions

Post-tensioning is defined as any method of prestressing concrete in which the tensioned reinforcement is tensioned after the concrete is placed. Pre-tensioning is defined as any method of prestressing concrete in which the tensioned reinforcement is tensioned before the concrete is placed. Prestressing reinforcement is defined as any reinforcement to which pre-stress is applied by post-tensioning or pre-tensioning.

S10.03 (2) Materials

(a) General

All materials to be furnished and used which are not covered in this Clause shall conform to the requirements stipulated in other applicable Clauses.

(b) Reinforcement - General

(i) Non-prestressing reinforcement shall conform either to Clause S10.02 or, where prestressing quality is called for on the Drawings it shall conform to the requirements for prestressing steel.

(ii) Prestressing steel shall be high tensile strength steel wire, high tensile strength steel strand or high tensile strength steel bar.

(c) Prestressing Steel

(i) High tensile strength steel wire shall be stress relieved and shall conform to the requirements of ASTM A421-91 or JIS G 3536 "Uncoated Stress Relieved Wire for Prestressed Concrete".

(ii) High tensile steel strand shall be weld free and stress relieved after stranding and shall conform to the requirements of ASTM A

416-90a or JIS G 3536 "Un-coated Seven Wire Stress Relieved Strand for Prestressed Concrete".

- (iii) High tensile steel bar shall be stress relieved and shall conform to the requirements of ASTM A 722 or JIS G 3109
- (iv) Testing - The testing of prestressing reinforcement shall be in accordance with the requirements of the ASTM Specifications for the type of system intended to be used or as instructed by the Engineer.

(d) Anchorage

All post-tensioned prestressing steel shall be secured at the ends by means of approved permanent type anchoring devices which shall be of a steel bearing plate type.

All anchorage devices for post-tensioning shall be capable of holding the prestressing steel at a load producing a stress of not less than 95 percent of the guaranteed minimum tensile strength of the prestressing steel.

Fixed anchorage's for tendons in PC I-Girders shall be of a steel bearing plate type while all remaining anchorage's shall be those capable of adjustment by means of a threaded anchor head and ring nut.

It shall be the responsibility of the Contractor to determine the required bursting reinforcements in the local zone for the particular shape and design of the anchorage devices proposed. Details of such reinforcements shall be incorporated into the working drawings to be supplied under Clause S10.03(3)(b) Plan of Operation.

(e) Ducts

All ducts shall be metallic and shall be mortar-tight. Ducts shall be strong enough to maintain their shape under working stresses, and where grouting is specified, air and grout holes shall be provided with pipes or other devices so that the injection of grout will completely fill all void spaces within the entire length of the duct.

(f) Grout

Grout shall consist of Portland cement, water, and an expansive admixture plus retarder as approved by the Engineer. Water shall be potable. No admixtures containing chlorides or nitrates shall be used.

The Contractor shall submit the proportion of mixing for approval of the Engineer but in no case shall the W/C ratio proposed be less than 0.40

Water shall be first added to the mixer followed by cement and admixture. The grout shall be mixed in mechanical mixing equipment of a type that will produce uniform and thoroughly mixed grout. Re-tempering of grout will not be permitted. Grout shall be continuously agitated until it is pumped.

(g) Concrete

Concrete shall conform to the requirements of Class A-1, A-2 or A-3 concrete of Clause S10.01 of this Specification and to the requirements specified below unless otherwise stated in the Drawings.



The Contractor shall develop his own mix designs which shall be submitted to the Engineer for approval.

The maximum size of aggregate for use in the manufacture of prestressed concrete shall be 2 centimetres.

S10.03 (3) Construction

(a) General

The Contractor shall provide a Technician skilled in the use of the system of prestressing to be used, who shall supervise the work and give the Engineer such assistance as the Engineer may consider necessary.

The Contractor shall provide all equipment necessary for the construction and the prestressing. Prestressing shall be done with approved proprietary system jacking equipment. If hydraulic jacks are used they shall be equipped with accurately reading pressure gauges. The combination of jack and gauge shall be calibrated and a graph or table showing the calibration shall be furnished to the Engineer. Should other types of jacks be used, calibrated proving rings or other devices shall be furnished so that the jacking forces may be accurately known.

All of the applicable requirements of Clause S10.01 (4) "Construction" shall be complied with, except as may be modified in this Clause. Prestressed concrete shall be formed, stressed, placed, cured, and protected at shops, manufacturing plants, and locations approved by the Engineer, where the fabrication of such members may be properly inspected and controlled.

(b) Plan of Operation

The Contractor shall, prepare, check and submit to the Engineer for approval complete detailed Working (Shop) Drawings or Schedules together with calculations as required by the Engineer showing, but not limited to, the following:

- (i) Contractor's alternative designs if the submission of alternatives is approved;
- (ii) Contractor's details of proposed manufacture and construction;
- (iii) sequence of operations proposed complete with structural analysis at each stage of construction if so required by the Engineer;
- (iv) dimensions and complete descriptions of all devices, joints, bearings, and anchorages not specified or detailed in the Contract Documents,
- (v) deflection control measures,
- (vi) details of traveling forms, suspended scaffolding of mid-spans if used,
- (vii) temporary fixing/stabilising method of the supports at the pier tables while in cantilevering operations,
- (viii) method and timing of the insertion of the prestressing cables

Concrete shall not be cast prior to the Engineer's approval of the Contractor's Drawings, of concrete mixtures, of formwork and falsework, of methods of application of prestressing forces, of methods of placing, of curing, of protecting, of handling and of erecting members. Any alternative to the design in the Contract Documents, shall be subject to the Engineer's approval before manufacture or construction.

The Contractor shall inform the Engineer not less than 7 days in advance of the probable date of commencement of manufacture and the dates when casting of units, tensioning of steel and transfer of stress will be undertaken for the first time.

(c) Placing Steel

All steel units shall be accurately placed in the position shown on the Drawings and rigidly held during placing and setting of the concrete. Distance from the forms shall be maintained by stays, formwork spacers, ties, hangers, or other approved support. Formwork spacers for holding units from contact with the forms shall be of approved material, shape and dimensions. Layers of units shall be separated by suitable wire spacers. Wooden blocks shall not be used.

(d) Curing

Steam curing process may be used as an alternative to water curing. The casting bed for any unit cured with steam shall be completely enclosed to prevent steam escaping and exclude outside atmosphere. Two to four hours after placing concrete and after the concrete has undergone initial set, the first application of steam shall be made. If retarding admixtures have been used, the delay before application of the steam shall be increased to four to six hours. Water curing methods shall be used from the time the concrete is placed until steam is first applied.

The steam shall be at 100% relative humidity to prevent loss of moisture and to provide moisture for proper hydration of the cement. Application of the steam shall not be directly on the concrete. During the application of the steam, the ambient air temperature shall increase at a rate not to exceed 22° C (Celsius) per hour until the maximum temperature is reached and shall be held until the concrete has reached the desired strength. In discontinuing the steam application, the ambient air temperature shall not decrease at a rate to exceed 22° C per hour until a temperature has been reached 10° C above the temperature of the air to which the concrete will be exposed. The maximum curing temperature shall be from 60° C to 67° C.

If the Contractor elects to cure by any other special method, the method and details shall be subject to the approval of the Engineer.

Except as specified or otherwise approved, curing shall comply with the requirements in Clause S10.01.

(e) Post-tensioning Method

Tensioning of the prestressing reinforcement shall not be commenced until tests on concrete cylinders, manufactured of the same concrete of

the particular member to be prestressed has attained compressive strength indicated in the Drawings or directed by the Engineer.

After all concrete has attained the required strength, the prestressing reinforcement shall be stressed by means of jacks to the desired tension and the stress transferred to the end anchorage.

Cast-in-place concrete shall not be post-tensioned until at least 10 days after the last concrete has been placed in the member to be post-tensioned or until the compressive strength of said placed concrete has reached the strength specified for the concrete at the time of stressing.

All side and inside forms for girders shall be removed before post-tensioning. The falsework under the bottom slab supporting the superstructure shall not be released until a minimum of 48 hours have elapsed after grouting of the post-tension tendons nor until all other conditions of the specifications have been met. The supporting falsework shall be constructed in such a manner that the superstructure will be free to lift off the falsework and shorten during post-tensioning.

The tensioning process shall be so conducted that the tension being applied and the elongation of the prestressing elements may be measured at all times and the method of stressing control such as mentioned herein shall be approved by the Engineer prior to the commencement.

A record shall be kept of gauge pressures and elongation at all times and submitted to the Engineer for his approval.

The load from the anchoring device shall be distributed to the concrete by means of approved devices that will effectively distribute the load to the concrete.

Where the end of a post-tensioned assembly will not be covered by concrete, the anchoring devices shall be recessed so that the ends of the prestressing steel and all parts of the anchoring devices will be at least 50 mm inside of the end surface of the members, unless a greater embedment is shown on the plans. Following post-tensioning, the recesses shall be filled with concrete, and finished as shown in the Drawings.

(f) Bonding Steel

Post-tensioned steel shall be bonded to the concrete. All prestressing steel to be bonded to the concrete shall be free of dirt, loose rust, grease or other deleterious substances.

Prestressing steel shall be bonded to the concrete by filling the void space between the duct and the tendon with a non-shrink (expanding) grout. All ducts shall be clean and free of deleterious materials that would impair bonding of the grout or interfere with grouting procedures.

All grout shall pass through a screen with 1.20 mm maximum clear openings prior to being introduced into the grout pump.

Grout injection pipes shall be fitted with positive mechanical shutoff valves. Vents and ejection pipes shall be fitted with valves, caps, or other devices capable of withstanding the pumping pressure. Valves and caps shall not be removed or opened until the grout has set.

(g) Handling, Transport and Storage

Pre-cast prestressed concrete shall not be moved from the casting position or transported until the concrete has attained a compressive strength of 90% of the specified 28-day strength. Extreme care shall be exercised in handling and moving pre-cast prestressed concrete members. Pre-cast girders and slabs shall be transported in an upright position, shock shall be avoided and the points of support and directions of the reactions with respect to the member shall be approximately the same during transporting and storage as when the member is in its final position. If the Contractor deems it expedient to transport or store pre-cast prestressed units in other than this position, it shall be done at his own risk after notifying the Engineer of his intention to do so. Any unit considered by the Engineer to have become substandard shall be rejected and replaced at the Contractor's expense by an acceptable unit.

(h) Marking of Precast Prestressed Members

Each precast prestressed member is to be uniquely and permanently marked so as to show its type, date of casting and reinforcement.

(i) Testing of Precast Prestressed Members

When directed by the Engineer one or more beams shall be subjected to a loading test. The Contractor shall obtain the prior approval of the Engineer to the detailed arrangements for the testing. A beam which is to undergo testing shall be supported at its design points of bearing and the upward deflection due to the prestressing force measured relative to a line joining these points. Equal loads shall then be applied at the third points in ten equal increments, the total being sustained for 5 minutes. The beam shall then be unloaded.

The mid-span deflection relative to the reference line shall be measured for each increment of load. The load deflection curve plotted from these values must show no appreciable variation from a straight line. The Drawings shall show, or the Engineer shall direct, the loads to be applied and the corresponding deflections which must not be exceeded.

Any beam which fails to satisfy the Engineer under the prescribed test shall be rejected and all other beams cast in the same line as the rejected beam shall also be rejected unless tested at the Contractor's expense and found satisfactory.

The Contractor shall supply to the Engineer record sheets of the tests showing date of test, the loads, deflections, and load deflection curves, calculated values of "E" and the strength of the concrete at release as indicated by the relevant cylinder test results.

The tests are to be carried out on units selected by and in the presence of the Engineer after he has agreed to the method of testing and form of records. The cost of such tests and records shall be included in the Contract unit prices.

S10.03 (4) Method of Measurement

The quantity of prestressed concrete I-girders to be measured for payment shall be the actual number of pre-cast prestressed concrete structural members, installed in place, completed and accepted. Each member shall include the concrete, reinforcement and prestressing steel, and other such material contained within or attached to the beam or slab unit.

Prestressed cast-in-place concrete members will be paid for on the basis of the number of cubic metres of concrete, the weight (kg) of reinforcing steel and the weight (kg) of prestressing steel respectively. For concrete, reference is made to Clause S10.01 and for reinforcing steel reference is made to Clause S10.02.

S10.03 (5) Basis of Payment

The work, measured as provided above, shall be paid for at the Contract unit price for any item listed below which appears in the Bid Schedule. The prices and payment shall be full compensation for furnishing and placing all materials including all labour, tools, equipment and incidentals necessary to complete the work prescribed in this Clause. The payment of PC cable shall include the work of tensioning, grouting, anchorages and ducts. The unit price for I-girders will be deemed to include all concrete, reinforcement, PC cables, hauling and erection.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
10.03 (1)	PC Tendon, Strand, Type A (12T15.2)	kilogram
10.03 (2)	PC Tendon, Strand, Type B (4T15.2)	kilogram
10.03 (3)	PC Tendon, Strand, Type C (3T15.2)	kilogram
10.03 (4)	PC Tendon, Strand, Type D (12T12.7)	kilogram
10.03 (5)	PC Tendon, Strand, Type E (7T12.7)	kilogram
10.03 (6)	PC Tendon, Bar, Type F (Φ 32)	kilogram
10.03 (7)	PC I-Girder, Length 20m; Height 1.65m	each
10.03 (8)	PC I-Girder, Length 28m; Height 1.50m	each
10.03 (9)	PC I-Girder, Length 28m; Height 1.65m	each
10.03 (10)	PC I-Girder, Length 33m; Height 1.65m	each
10.03 (11)	PC I-Girder, Length 35m; Height 1.75m	each

S10.04 Precast Concrete Piling

S10.04 (1) Description

This work shall consist of precast reinforced concrete piling furnished and driven in accordance with these Specifications and in reasonably close conformity with the requirements on the Drawings or elsewhere in the Contract Documents.

S10.04 (2) Materials

(a) General

Pre-cast reinforced concrete piles shall be constructed in accordance with the details shown on the Drawings, of concrete Class C-3, mixed and placed in accordance with the provisions of Clause S10.01 of these Specifications. Reinforcement shall comply with the provisions of Clause S10.02 of these Specifications. Main reinforcing bars shall be supplied in one complete length and should this prove impractical separate lengths shall be effectively spliced by a method approved by the Engineer. The pile shall be so straight that a line stretched from tip to butt on any face will not be more than 1/1000 of the length of the pile from the face of the pile at any point.

(b) Formwork

Forms for pre-cast piles shall conform to the general requirements for concrete formwork as described in Clause S10.01 of these Specifications. Forms shall be accessible for compacting the concrete. Side forms may be removed at any time not less than 24 hours after completion of the placing of concrete but the entire pile shall remain supported for at least 7 days and shall not be subjected to any handling stress until the concrete has been in place for 21 days or such reduced time as the Engineer may decide as a result of tests.

(c) Reinforcement

Reinforcement shall be in accordance with the provisions set out in Clause S10.02 and positioned as shown on the Drawings.

(d) Casting

The piles shall be cast in a horizontal position. Special care shall be taken to place the concrete so as to produce a pile free from any air pockets, honeycomb or other defect.

Concrete shall be placed continuously and shall be compacted by vibrating or by other means satisfactory to the Engineer. The forms shall be slightly overfilled, the surplus concrete screeded off, and the top surface finished to a uniform, even texture similar to that produced by the forms.

(e) Finish

When removed from the forms piles shall present true, smooth, even surfaces free from any surface blemishes, and true to the dimensions shown on the Drawings.

(f) Curing

Concrete piles shall be covered with wet burlap immediately after placing is complete and shall be kept continuously wet for at least 7 days.

(g) Handling

When raising or transporting pre-cast concrete piles the Contractor shall provide slings and other equipment necessary to prevent any appreciable bending of the pile or cracking of the concrete. No concrete pile shall be lifted otherwise than by slinging from the lifting holes, the positions of which shall be submitted to and approved by the Engineer. Piles damaged in handling or driving shall be replaced. Concrete piles shall be so handled at all times to prevent breaking or chipping the edges.

Piles shall not be driven until 28 days have elapsed from the time of casting or such reduced time as the Engineer may decide as a result of tests.

S10.04 (3) Construction

(a) Preparation for Driving

- (i) Caps - The heads of all concrete piles, when the nature of the driving is such as to unduly injure them, shall be protected by caps of approved design having a suitable cushion next to the pile head and fitting into a casing which in turn supports a timber shock block. No pile head will be held so firmly that the slight rotation of the pile normally occurring while the pile is being driven will be prevented.
- (ii) Splicing piles - splices will be considered subject to specific approval by the Engineer as to their design, and location.

(b) Handling, Pitching and Driving

- (i) General - The main setting out for the piles is to be completed prior to commencement of driving. Secondary or individual pile setting out is to be completed and agreed not less than 8 hours prior to commencing work on the piles concerned. All main setting out points, lines and stations are to be maintained safe and undisturbed until the work is complete.

Piles shall be pitched accurately in the positions and driven to the lines shown on the Drawings or fixed by the Engineer. Piles deflected from the vertical or proper line shall, where ordered by the Engineer, be withdrawn and re-pitched until the correction of the position or line of any pile will be permitted. Any pile damaged by reason of improper driving or driven out of its proper location or driven below the elevation fixed by the Drawings or by the Engineer, shall be corrected at the Contractor's expense by one of the following methods approved by the Engineer for the pile in question :

- The pile shall be withdrawn and replaced by a new and if necessary longer pile. Any holes from which piles are withdrawn shall be packed with approved non-plastic material before re-driving takes place; or



- A second pile shall be driven adjacent to the defective or low pile.

All piles pushed up by the driving of adjacent piles or by any other cause shall be driven again.

- (ii) Batter piles - Batter piles shall be driven accurately to the batter shown on the Drawings. The pile frame employed for the driving of the batter piles shall have leads capable of adjustment to the required angle. When piles have to be driven below the level of the bottom of the leads extension leads shall be provided except where the use of a follower is specifically permitted by the Engineer.
- (iii) Driving equipment - Before any piling work is commenced the Contractor shall submit to the Engineer full details of the pile driving equipment and the method of carrying out the work he intends to use. All piles shall be provided with caps for driving as specified in Item (a) (i) above. For special types of piles, driving head mandrels, or other devices in accordance with these requirements shall be provided so that piles may be driven without damage.

Piles shall be driven with steam, air or diesel hammers, a combination of hammers with water jets or gravity hammers.

In general:

- where diesel hammers are used for driving pre-cast concrete piles, the energy of the hammer shall numerically approximate one half of the weight of pile plus 4000kg.
  - when gravity hammers are used for driving pre-cast concrete piles, the drop of the hammer shall not exceed 2.5 metres and the hammers shall have a weight of not less than half the weight of the pile. The fall shall be regulated so as to prevent injury to the pile.
  - plant and equipment furnished for steam and air hammers shall have sufficient capacity to maintain, under working conditions, the pressure in the manner specified by the manufacturer. The boiler or tank shall be equipped with an accurate pressure gauge, and another gauge shall be supplied at the hammer intake.
- (iv) Driving - Piles shall be supported in line and position with leads while being driven. Pile drive leads shall be constructed so as to afford freedom of movement of the hammer, and they shall be held firmly in position to ensure rigid lateral support to the pile during driving. Except where piles are driven through water, the leads shall be of sufficient length to make the use of a follower unnecessary, and shall be so designed as to permit the proper placing of batter piles. Once started driving shall be continuous.

When water jets are considered by the Engineer to be necessary, the number of jets and the nozzle volume and pressure shall be sufficient to freely erode the material adjacent to the piling. The plant shall have at all times a pressure of at least 7 kilograms per square centimetre at two (2) centimetre jet nozzles. Before the required penetration is reached, the jets shall be shut off and the piles driven by hammer to final penetration.

A detailed accurate record of the driving of all piles shall be kept by the Engineer. The Contractor shall give every assistance to the Engineer to help him keep this record which will include the following : pile numbers, positions, types, sizes, actual lengths, dates driven, lengths in footings, penetration under final blows of the hammer, striking energy of the hammer, length cut off, and final pay lengths. No pile shall be driven near freshly placed concrete.

- (v) Bearing values - Piles shall be driven to a bearing value of not less than that shown on the Drawings. The Engineer will specify the penetration and the Contractor shall drive the piles to the penetration specified, but if the Engineer is not satisfied that the desired bearing value has been attained, he may instruct action as for a defective pile as detailed in paragraph (3) (b) (i) of this section. Provided that the pile is not defective because of the failure of the Contractor to fulfill his obligations under this Contract, both the first pile and its replacement will be measured for payment under this Clause.
- (vi) Cut off - Concrete piles shall be cut off as indicated on the Drawings or as directed by the Engineer at such elevation that the pile reinforcement will extend into and connect with the cap or footing.

Unless otherwise specified, pile cut-off length shall become the property of the Contractor and shall be disposed of beyond Government property limits and outside the limit of view from the roadway to the satisfaction of the Engineer.

Reinforced concrete piles may be cast the full length of the reinforcing bars, provided that the concrete is cut off to expose the steel as shown on the Drawings after the piles have been driven.

(c) Test Piles

The Engineer may order the execution of test piles as he may consider necessary to ascertain the type of the foundation for the project. The Contractor shall furnish and execute test piling at the locations designated by the Engineer.

The lengths of the piles shown on the Drawings are based on information obtained from previous site investigations. However, piles of different lengths may be required as directed by the Engineer. Before final pile lengths are settled, the Contractor shall construct to the lengths shown on the Drawings such pilot piles as may be found necessary. These piles shall be driven in the positions specified by the Engineer and the

Contractor shall furnish the Engineer daily with a detailed record of the driving of pilot piles throughout the full depth of driving.

After attaining the approved set, driving shall be continued until the Engineer directs that it shall cease. Driving of test piles beyond the point at which the approved set is obtained will be called for to demonstrate that driving resistance continues to increase. The Contractor shall then furnish the remainder of the piles in the structure. In determining the lengths of piles the Contractor shall base his list on the lengths assumed to remain in the completed structure.

S10.04 (4) Method of Measurement

(a) Piles Furnished

The unit of measurement for payment for furnishing pre-cast reinforced concrete piles shall be in linear metres, furnished in compliance with the drawings and the Engineer's instructions and the material requirements of these Specifications and stockpiled in good condition at the site of the work by the Contractor, and accepted by the Engineer.

No allowance will be made for the length of piles furnished by the Contractor to replace piles previously accepted by the Engineer that are subsequently lost or those that are damaged prior to completion of the Contract while in stockpile, or during handling or driving, and are ordered by the Engineer to be removed from the site of the work or disposed of otherwise. Where the Contractor elects to cast reinforced concrete piles the full length of the reinforcing bars as permitted in Clause S10.04 (3) (b) (vi) the length to be cut off due to such casting will not be measured for payment.

(b) Piles Driven

The quantities of driven pre-cast reinforced concrete piles to be paid for shall be the number of linear metres of piles actually driven and accepted. The pay lengths of the satisfactorily driven piles shall be measured from the tip to the cut-off. Lengths cut-off will not be measured for payment.

(c) Test Piles

The quantities of test piles as provided in Clause S10.04 (3) (c) to be paid for shall be the linear metres of test piles completed and accepted, whether they are executed inside or outside the foundation.

S10.04 (5) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price per linear metre for the particular pay items listed below. The rate shall constitute full compensation for all materials including reinforcement and shoes, equipment, hardware, furnishing, including formwork, etc., driving, jetting, cutting-off, welding, coupling and all related tools, rigs, cranes, boilers, hammers, jets, labour and other incidental equipment and work.

Payment for test piles, completed and accepted, shall be made as the linear metre of test piles for furnishing and driving a test pile of the size specified. When test piles are incorporated in the foundation no additional payment shall be made for the pile so utilized other than as for test pile.

No payment shall be made for unauthorized, defective, unsound or unsatisfactorily driven piles or for any costs incurred by the Contractor for such piles.

<i>Pay Item No.</i>	<i>Name</i>	<i>Unit of Measurement</i>
10.04 (1)-S	Furnish and Drive Test Pile of Size S cm x S cm	each
10.04 (2)	Furnish reinforced concrete pile, 35 cm x 35 cm	linear metre
10.04 (3)	Drive reinforced concrete Vertical pile, 35 cm x 35 cm	linear metre
10.04 (4)	Drive reinforced concrete Batter pile, 35 cm x 35 cm	linear metre
10.04 (5)	Furnish reinforced concrete pile, 40 cm x 40 cm	linear metre
10.04 (6)	Drive reinforced concrete Vertical pile, 40 cm x 40 cm	linear metre
10.04 (7)	Drive reinforced concrete Batter pile, 40 cm x 40 cm	linear metre
10.04 (8)	Furnish reinforced concrete pile, 45 cm x 45 cm	linear metre
10.04 (9)	Drive reinforced concrete Vertical pile, 45 cm x 45 cm	linear metre
10.04 (10)	Drive reinforced concrete Batter pile, 45 cm x 45 cm	linear metre

S10.05 Pretensioned Concrete Piling

Section withdrawn.

S10.06 Steel Piling

Section withdrawn.

S10.07 Cast-in-place Concrete Piling

S10.07 (1) Description

The work shall consist of cast-in-place concrete piles constructed by reverse circulation drilling methods, "Grab Type" hammers, steel casing, caisson or any other methods approved by the Engineer as appropriate after the carrying out of necessary sub-soil investigations have been completed by the Contractor all to be in accordance with these Specifications and with the requirements shown on the Drawings. As part of the quality assurance control of the work non-destructive testing shall be carried out as directed.

S10.07 (2) Materials

Cast-in-place concrete piles shall be constructed, in accordance with the details shown on the Drawings, of concrete Class Y, mixed and placed in accordance with the provisions of Clause S10.01 of these Specifications.

Reinforcement shall comply with the provisions of Clause S10.02 of these Specifications.

S10.07 (3) Construction

(a) Excavation

All holes for cast-in-place concrete piles shall extend to the tips of piles. The length of piles shall be as instructed by the Engineer. The methods used shall be such that the hole can be maintained vertical during all excavating operations.

Completed piles and existing structures very close to the pile excavation area shall be protected from the influence of ground movement and vibration and the Contractor's proposals to ensure this shall be submitted, to and approved by the Engineer, at least four weeks before the start of piling.

Excavated holes shall be protected from collapse by the provision of a head of water, bentonite slurry, steel casing pipe, segmental erected shields or other method approved by the Engineer for use at the particular location. If used, steel casing pipe shall be rigid and project above ground or bed level as required by the equipment in use.

(b) Drilling

Where bored pile drilling methods are adopted and bentonite mud is used to support the surrounding unstable ground, it shall be formed by a mix of top quality bentonite suspended in water, normally in the ratio of from 8 - 17 kg of dry bentonite to 100 litres of water the actual ration subject to final approval by the Engineer. The bentonite suspension when submitted to laboratory test shall satisfy the following criteria.

TEST	CRITERIA
1. Screening Oversize, 1000 mesh/sq.cm screen	1%
2. Moisture Content	15%
3. Liquidity Limit	440%
4. Marsh Cone Viscosity 1500/1000 of 6% suspension in distilled water	40%
5. Setting of 6% Suspension in 24 hours.	2%
6. Water Separation By Pressurised Filtration or 450cc of the 6% suspension in 30 minutes at a pressure of 7 kg/sq.cm	18 cc
7. pH of Filtered Water.	7 pH 9
8. Cake Thickness of Filter-Pressure Filter	2.5 mm

(c) Preparation of Bentonite

The specifications of the bentonite used on site shall be as follows:

PROPERTY TO BE MEASURED	RANGE OF VALUES at 20 C°	TEST METHOD
1. Density	1.10 gm/ml	Mud density balance
2. Viscosity	30 - 90 sec.	Marsh Cone
3. pH value	9.5 - 12	pH Indicator Strips.
4. Shear Strength	1.4 - 10 N/m <sup>2</sup>	Shearometre

The mixture shall be prepared using automatic high-powered mixers together with a component weight measuring device.

(d) Testing Bentonite

The drilling fluid shall be tested during piling operations. Once boring is completed, and before concreting, the fluid properties shall be measured taking samples at different depths.

The Contractor shall have approved testing facilities on site for tests of the specific gravity of the mixture, while an approved laboratory shall be used for testing the density, viscosity, pH and shear strength of the mixture.

The frequency of testing drilling fluid and the method and procedure of sampling shall be proposed by the Contractor as part of a method statement to be approved by the Engineer prior to the commencement of work.

Control tests shall be carried out on the bentonite suspension using suitable apparatus. The density of freshly mixed bentonite suspension shall be measured daily as a check on the quality of the suspension being formed. The measuring device shall be calibrated to read to within 0.01 gm/ml. Tests to determine density, viscosity, pH values and shear strength shall be applied to all bentonite being supplied to the drilled hole. For average soil conditions the results of all testing shall generally be within the range of

values stated in the above tables. The content of extra-fine sand must be less than 3% of the dry bentonite. Testing shall be carried out until a consistent working pattern has been established, account being taken of the mixing process, any blending of freshly mixed bentonite suspension and previously used bentonite suspension and any process which may be used to remove impurities from a previously used bentonite suspension. When the results show consistent behavior, the tests for shear strength and pH value may be discontinued, and tests to determine density and viscosity shall be carried out as agreed with the Engineer.

The Contractor shall submit to the Engineer for his approval the method proposed for sampling and checking of contaminated bentonite and for cleaning of the base of the bore. In the event of a change in the established and approved working pattern, tests for shear strength shall be re-introduced.

(e) Temporary Casings

Temporary casings shall be used to maintain the stability of the pile excavation which might otherwise collapse. Temporary casings shall be free of distortion and shall have a uniform cross-section throughout each continuous length. During concreting they shall be free from internal projections and encrusted concrete which might prevent the proper formation of piles.

S10.07(4) Construction

(a) General Requirements

The Contractor shall submit to the Engineer for his approval particulars of the proposed materials and methods of constructing bored cast-in-place piles.

In particular if the Contractor proposes to use bentonite or other agents he shall:

- \* submit a certificate from the manufacturer of the bentonite powder showing the type, the manufacturers name, the date and place of manufacture and including details of the apparent viscosity range in centipoises and gel strength range in N/sq.mm for solids in water.
- \* give the characteristics of the bentonite slurry in a freshly mixed condition and in the excavation immediately before concreting.
- \* give the method of quality control, sampling, testing, mixing, storing, re-circulation removal of silt and sand, preventing spillages and disposal from the site.
- \* give the head of bentonite slurry, including calculations.
- \* method of placing the concrete by tremie.
- \* methods of cleaning all loose material from the bottom of the hole and demonstrating to the Engineer that removal has been accomplished.

(b) Reinforcement

Reinforcement shall be positioned as shown on the Drawings. The connecting portions of main bars with hoops may be tack welded by arc fillet welding unless higher strength grades of reinforcements than those

specified are in use, whence the connecting portions shall be securely tied.

During the placing of the reinforcement in the hole, the verticality and position of the reinforcement shall be carefully controlled to ensure design cover of concrete over the steel is maintained and to prevent damage to the walls or collapse of the excavation.

(c) Casting

Before casting commences all loose, disturbed or re-moulded soil shall be removed from the base of the pile using appropriate and approved methods, which may include air-lifting, and which shall be designed to clean while at the same time minimising further ground disturbance below the pile base.

Concrete shall be placed in one continuous operation from tip to cut-off elevation by tremie tubes and shall be carried out in such a manner as to avoid segregation. The tip of the tremie shall generally be 2 m lower than the fresh concrete surface.

A sliding plug or similar barrier shall be placed within the tremie tube to prevent direct contact between the first charge of concrete and the water or bentonite.

The Contractor at his own expense shall initially cast an additional length of pile above the finished level of the top of the pile and subsequently remove any defective concrete to ensure satisfactory bonding of the pile head to the footing structure.

(d) Reporting

The Contractor shall furnish the Engineer daily with a detailed record of soils encountered during excavation and of the construction of the piles.

S10.07 (5) Non-destructive Testing of Piles

It will be a requirement of the Employer's quality assurance procedures for bored piles that non-destructive testing of the cast-in-place concrete be undertaken.

For purposes of Ultra-Sonic Testing four 50 mm (nominal) dia. Schedule 40 steel tubes shall be provided at every pile which are to be equally spaced around the perimeter of the inner reinforcing steel spacer hoops.

The length of each tube shall be such as to extend from the bottom of the main reinforcements to at least the top of the temporary casing. The bottom of the tube shall be permanently sealed while the top shall be provided with a screwed plug to prevent the ingress of any undesirable material. It will be incumbent on the Contractor to select his tubes for straightness and to arrange his method of assembly of the tubes during placing of the pile reinforcements and concrete to avoid any possibility of introducing undesirable material into the tubes. Should it be considered necessary to test a particular pile and that for any reason it is not possible to lower a test probe down a tube, the Contractor will be held liable for the costs of making good whatever obstruction is present.



When directed to do so by the Engineer each of the tubes shall be filled with an expanding grout capable of displacing the water contained within each tube while grout is progressively introduced starting from the bottom of the tube and working upwards.

The cost of providing and installing the steel tubes shall be included as part of the cost per linear metre of the bored pile.

S10.07 (6) Method of Measurement

Cast-In-Place Concrete Piles

The quantity of cast-in-place concrete piles to be paid for will be the actual number of linear metres of piles cast and left in place in the completed and accepted work.

Measurement will be made from the point of the tip of the pile as specified to the bottom of the footing. Portions of piles cast deeper into bearing strata than required through over-excavation procedures will not be measured for payment.

S10.07 (7) Basis of Payment

The work measured as provided above shall be paid for at the Contract price per unit of measurement for the pay items listed below.

The payment for cast-in-place pile shall be full compensation for construction of the piles including protection of existing piles and structures, all materials for completion of the pile and for all labour, tools, equipment, hauling, handling, jetting, jointing, cutting and all other incidental works connected therewith.

Pay Item No.	Name	Unit of Measurement
10.07 (1)	Cast-In-Place Concrete Pile, D = 1000mm	linear metre
10.07 (2)	Cast-In-Place Concrete Pile, D = 1500mm	linear metre
10.07 (3)	Cast-In-Place Concrete Pile, D = 2000mm	linear metre
10.07 (T)	Ultra-Sonic and Pile Integrity Testing	Provisional Sum

10.08 Test Drilling

S10.08 (1) Description

This work shall consist of test drilling for the investigation of structural sites and soft ground as directed by the Engineer.

S10.08 (2) Test Bores

(a) General

When testing is required the Contractor shall take several test bores at each site to get the exact soil profile or as otherwise directed by the Engineer. Where rock is outcropping on the surface the Engineer may dispense with test bores.

(b) Depth of Bores

The depth of test bores shall be made as follows:

Structural Drilling: to confirm the bearing stratum as proven by five metres of SPT results > 50. Maximum depth of drilling to be 60 metres.

Soft Soil Drilling: to confirm the absence of soft soil as shown by either a two metre strata with SPT results greater than 50, or a five metre strata with SPT results greater than those given in paragraph f). Maximum depth of drilling will be 40 metres.

(c) Method of Boring

The Contractor shall be required to drill and obtain samples including undisturbed thin-walled samples to a maximum depth of 40 m.

(d) Tests Required on Bores.

Standard penetration tests shall be taken at 1.5 metre intervals or at each change of strata whichever is lesser. The static ground water level shall be recorded for each hole. In rock core drilling the full core shall be recovered and stored in core boxes for inspection by the Engineer. Further testing will be required as follows:

TEST Description	TESTING FREQUENCY (Drilling Type)	
	Structural	Soft Soil
Standard Penetration ( ASTM D 1586 )	every 1.5m	every 1.5m
Vane Shear Test ( ASTM D 2573 )	every 2m	every 2m
Specific Gravity ( ASTM D 854 )	every 5m	every 5m
Natural Water Content ( ASTM D 2216 )	every 5m	every 5m
Grain Size Analysis ( ASTM D 422 )	every 5m	every 5m
Liquid Limit Test ( ASTM D 423 )	every 5m	every 5m
Plastic Limit Test ( ASTM D 424 )	every 5m	every 5m
Wet Density Test ( Caliper method )	every 5m	every 5m
Unconfined Compression ( ASTM D 2166 )	every 5m	every 5m
Triaxial Compression ( ASTM D 2850 )	-	every 5m
Consolidation Test ( ASTM D 2435 )	-	every 5m

Test results from the soft soil boring will be used in the control of embankment filling and where necessary the design of a system of vertical soil drains to accelerate the rate of consolidation in such areas.

The Engineer will call for more extensive testing than described above at any site should he find that the information obtained by the Contractor is not adequate enough to determine the necessary parameters to allow the intent of the design to proceed.

(e) Logging of All Bores

If so requested by the Engineer, the Contractor shall supply on the working day following completion of the bore the following information:

- |                                 |                                  |
|---------------------------------|----------------------------------|
| 1) Structure name               | 2) Bore position and code number |
| 3) Reduced level of top of bore | 4) Date and time of boring       |
| 5) Diametre of bore             | 6) Depth to which bore was cased |

- |                          |  |
|--------------------------|--|
| 7) Type of plant used    | 8) Depth to base of each stratum       |
| 9) Description of strata | 10) Depth and results of in-situ tests |
| 11) Static water level   | 12) Remarks                            |

(f) The general criteria for determining soft ground shall be as follows:

	PEAT OR CLAYEY SOIL		SANDY SOIL
	Thickness < 10 m	Thickness > 10 m	
N - Value by SPT	SPT < 4	SPT < 6	SPT < 10
Unconfined Compression Strength $q_u$ (kgf/cm <sup>2</sup> )	$q_u < 0.6$	$q_u < 0.6$	—
Cone Coefficient by Dutch Cone Test: $q_c$ (kgf/cm <sup>2</sup> )	$q_c < 8$	$q_c < 12$	$q_c < 40$

S10.08 (3) **Method of Measurement**

The test drilling will be measured for payment purposes as lengths of hole drilled no matter what materials are encountered or tests performed.

S10.08 (4) **Basis of Payment**

Payment will be made on the quantities as measured above and at the rates shown in the Bid Schedule. The payment shall include full compensation for all drilling, casing (if necessary), sample preparation, testing, recording and presenting the results and storing the samples until their disposal is approved by the Engineer.

Pay Item No.	Name	Unit of Measurement
10.08(1)	Test Drilling for Soil Investigation, General	linear metre
10.08(2)	Test Drilling for Soil Investigation, in the Red River Channel	linear metre
10.08(3)	Test Drilling for Soft Ground Investigation	linear metre

S10.09 **Bridge Parapet and Railing**

S10.09 (1) **Description**

This work shall consist of the provision of reinforced concrete bridge parapets complete with lighting pole corbels and other ancillary requirements, furnishing, fabricating and erecting steel pipe railings, aluminium railings for bridges, incidental structures, all as indicated on the Drawings and required by these Specifications and as directed by the Engineer.

S10.09 (2) Materials

- (a) Materials shall conform to the requirements of :
- JIS G 3101 : Rolled Steel for General Structures
  - JIS G 3452 : Carbon Steel Pipes for Ordinary Piping
  - JIS G 3444 : Carbon Steel Tubes for General Structural Purposes
  - JIS G 3466 : Carbon Steel Square Pipes for General Structural Purposes
  - JIS G 3532 : Low Carbon Steel Wires
  - JIS H 4040 : Aluminium and Aluminium Alloy Rods, Bars, Wires
  - JIS G 4303 : Stainless Steel Bars
- (b) Mortar and grout shall conform to the provisions of Clause S12.04 of these Specifications. Parapets shall be constructed, in accordance with the details shown on the Drawings, of concrete Class C-1 mixed and placed in accordance with the provisions of Clause S10.01 of these Specifications. Reinforcement shall comply with the provisions of Clause S10.02 of these Specifications.
- (c) All steel railing and fittings shall be hot-dip galvanised unless otherwise specified, in accordance with the requirements of Clause S12.18 of these Specifications. All aluminium alloy shall be coated in accordance with the Specifications of JIS H 8601. Galvanised areas damaged by welding or other site works shall be cleaned and given 3 coats of an approved zinc based paint, to the satisfaction of the Engineer.
- (d) Where painting is required, it shall be in accordance with the requirements of Clause S12.18 of these Specifications.

S10.09 (3) Construction

- (a) Pipe railings, fittings and incidental parts shall be carefully handled and stored on blocking, racks or platforms so as not to be in contact with the ground and shall be protected from corrosion. Materials shall be kept free from dirt, oil, grease and other foreign matter. Surfaces to be painted shall be carefully protected both in the shop and in the field. Threads shall be carefully protected from damage.
- (b) Railings shall be carefully constructed true to line and grade as shown on the Drawings, and no construction shall be commenced before the inspection and approval by the Engineer, and before all centres, supports, and falsework or staging of bridge superstructure have been removed.
- (c) The component parts of pipe railings shall be connected with threaded screws unless otherwise specified on the Drawings. Fitting for railings on slopes shall be leveled to fit the required grades. Screw thread fittings shall be coated with red lead and oil, and the threads shall engage for a minimum length of 2 centimetres. Expansion shall be provided by omitting threads on one side of fittings at designated posts. Where the rails are continuous through two or more posts threads may be omitted between the rails and the fitting, but the rail must be pinned at each post. Where welding of component parts is permitted, the details must be in accordance with the Drawings or as approved by the Engineer.

- (d) The Contractor shall provide for the erection of pipe railing by suitable fabrication in the shop. Where railing is fitted between concrete posts, provision shall be made to allow the installation of same.

Railings shall be fabricated and erected as indicated on the Drawings, and rails shall be parallel to the grade of the road. Posts shall be set truly vertical unless otherwise instructed by the Engineer.

All exposed surfaces shall be thoroughly cleaned in an approved manner as a final operation under this project.

- (e) The Contractor shall furnish for the approval of the Engineer working drawings for the particular type of bridge railing specified to be installed.

S10.09 (4) Method of Measurement

The quantities of metal bridge railing to be paid for shall be the number of linear metres of railing and completed and accepted in accordance with the Drawings, these Specifications, and as directed by the Engineer.

S10.09 (5) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price per linear metre of bridge railing. The price and payment shall be full compensation for furnishing bridge railing including delivery, erection and finishing, and for all labour, equipment, tools and incidentals necessary for the satisfactory completion of the work.

Pay Item No.	Name	Unit of Measurement
10.09(1)	Bridge Parapet and Railing, Complete (Type A)	linear metre
10.09(2)	Bridge Parapet and Railing, Complete (Type B)	linear metre

S10.10 Bridge Expansion Joints

S10.10 (1) Description

This work shall consist of the supply and installation of expansion joints in accordance with and at the locations shown in the drawings.

S10.10 (2) Submittals

A sample of any expansion joint material that the Contractor proposes to use in the work, together with a statement as to its source and test data giving its properties shall be submitted to the Engineer and approved by him before placing any order for the materials. The Contractor shall submit a certificate by the manufacturer to the Engineer for approval before furnishing the material.

S10.10(3) Expansion Joints.

- (a) PC I-Girders (Continuous)

Rubber expansion joints shall be designed for movement amounts of 60 mm at both piers and abutments.

(b) Main Span Girders (Continuous)

Rubber expansion joints shall be designed for movements of 120 mm.

(c) Simple PC Box Girder.

Rubber expansion joints shall be designed for movements of 70 mm

S10.10(4) **Materials**

(a) Material for rubber expansion joints shall comply with the following specification requirements:

(i) Poly-chloroprene Rubber (eg "Neoprene" )

Tensile strength ASTM D412	: $\geq 12.40$ MPa
Elongation @ Break Point ASTM D412	: $\geq 400\%$
Hardness Type A Durometre ASTM D 2240	: $45 \pm 5$
Compressive permanent strain ASTM D395 (Method B at 70oC, 22 hours)	: $\leq 20\%$

(ii) Bonding Agent for Rubber

Specific gravity JIS K 6911	: $1.20 \pm 0.10$
Viscosity JIS K 6838	: pasty condition
Peel Adhesive strength JIS K 6854 (180° peel adhesive strength between resin mortar and vulcanized rubber)	: $\geq 3$ kg/cm <sup>2</sup>
Tensile strength JIS K 6301	: $\geq 200\%$
Elongation JIS K 6301	: $\geq 200\%$

(b) Epoxy Concrete

The mixture of epoxy concrete shall include a two component epoxy resin and a silica sand.

The mixture shall meet or exceed the following ASTM requirements for C881-78 Type 1, Grade 2, Class B and C epoxies.

Density ( at 20°C, 7 days)	: 2.0 kg/l (approx.)
Bonding strength ( at 20°C, 1 day)	
to i) Concrete	: $\geq 3.5$ N/mm <sup>2</sup>
ii) Steel	: $\geq 20$ N/mm <sup>2</sup>
Tensile Strength	: 15 - 20 N/mm <sup>2</sup>
Flexural Strength	: 30 - 35 N/mm <sup>2</sup>
Compressive strength	: 80 - 90 N/mm <sup>2</sup>
Compressive Young's modulus	: $\geq 19,000$ N/mm <sup>2</sup>

(c) Sealant Material

Where required 2 part poly-sulphide sealant material shall be in accordance with JIS K 6301 with the following parametres.

Elongation	: = 500%
Tensile strength:	: = 8 kg/cm <sup>2</sup>

S10.10 (5) Construction

(a) Storage and Preparation

Expansion joint material delivered to the bridge site shall be stored under cover on platforms above the surface of the ground. It shall be protected at all times from damage, and when placed it shall be free from dirt, oil, grease or other foreign substance. Pre-molded material shall be used in as large a piece as possible. The material shall be cut to a clean, true edge with a sharp tool. Rough or ragged edges will not be permitted. Jointing of adjacent pieces shall be in accordance with the manufacturers' instructions.

(b) Installation

(i) General - Expansion joints shall be shaped to the section, and of a type of material as shown on the Drawings or approved by the Engineer. The size of the gap shall be compatible with the mean bridge temperature at the time of installation. This temperature shall be determined in accordance with arrangements agreed with the Engineer.

The position of all bolts cast into concrete and all holes shall be accurately determined from templates. The mixing, application and curing of all proprietary materials shall comply with the manufacturer's requirements.

All joints shall be constructed according to physical details shown on the Drawings or as directed by the Engineer, and strictly in accordance with the manufacturer's recommendations.

(ii) Placing of epoxy mortar - If required by the Engineer placing of epoxy mortar shall be executed in 2 (two) stages. Bottom-layer mortar shall be placed after a primer (epoxy binder) has been applied to the slab surface and side section of the pavement and the mortar compacted by means of a vibrator machine to a thickness of 2.0 cm from the pavement level. The top-layer of mortar shall be placed after the embedding of Fibre Reinforced Plastic. The top layer shall be compacted with a vibrator to level with the surface pavement. Rough finishing shall be carried out with a wooden trowel and final finishing with a metallic trowel.

(iii) Prevention of damage - During the placing and hardening of concrete or mortar under expansion joint components, relative movement shall be prevented between them and the supports to which they are being fixed.

When one half of the joint is being set, the other half shall be completely free from longitudinal restraint. In particular where strongbacks or templates are used to locate the two sides of a joint they shall not be fixed simultaneously to both sides. Screw threads shall be kept clean and free from rust.

Ramps shall be provided and maintained to protect all expansion joints from vehicular loading. Vehicles shall cross the joints only by means of the ramps until the Engineer permits their removal.

- (iv) Time of installation - Setting of expansion joints shall be done after pavement works on the bridge are finished.

S10.10 (6) Method of Measurement

The quantities to be paid for shall be:

The actual number of linear metres of pre-formed expansion joints completed in place in accordance with the Drawings. Sealant and back up forms of foamed polystyrene or asphalt impregnated fibre board material used in adjacent curbs and parapet walls will not be measured separately for payment.

S10.10 (7) Basis of Payment

The quantity, measured as specified above, shall be paid for at the Contract price per unit of measurement, respectively, for each of the particular pay items listed below, which price and payment shall constitute full compensation for all cutting and excavation of pavement, formation of construction joint with existing concrete and for all labour and equipment, furnishing of materials including epoxy concrete, epoxy mortar, fibre reinforced plastic, reinforcement and concrete, fabricating, transporting, painting, setting expansion joints, and for other incidentals. Payment for pre-formed expansion joints will be deemed to include the cost of sealant used in adjacent works and parapets.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
10.10 (1)	Expansion Joint, Type A 40mm.	linear metre
10.10 (2)	Expansion Joint, Type B 109mm	linear metre
10.10 (3)	Expansion Joint, Type C 150mm	linear metre
10.10 (4)	Expansion Joint, Type D 230mm	linear metre

S10.11 Bridge Bearings

S10.11 (1) Description

This work shall consist of furnishing and installing bearing shoes and bearing pads for bridge superstructures.



S10.11 (2) Materials

(a) Bearing Shoes

Material for elastomeric type bearing shoes shall conform to the following:

ITEM	UNIT	ELASTOMERIC MATERIAL						TEST METHOD and	
		Poly-chloroprene			Natural Rubber			CONDITION	
STATIC SHEARING									JISK 6301-13
ELASTICITY MODULUS	kgf /cm <sup>2</sup>	8±1	10±1	12±1.2	8±1	10±1	12±1.2	135±13	JISK 6301 Formula
HARDNESS	Degree	50±5	60±5	65±5	50±1	60±5	65±5		JISK 6301-5
ELONGATION	%	> 440			>650	>600	>550		JISK 6301-3
TENSILE Str.	kgf /cm <sup>2</sup>	>150						JISK 6301-3	
F A T I G U R E	STRENGTH VARIATION for 25% Elong.	% -10 <% <+10			% -10 <% < +30			JISK 6301-3 JISK 6301-13	
	ELONGATION	% >50						JISK 6301-3 JISK 6301-13	
PERM.COMPR STRAIN	%	<35			<25			JISK 6301-10	
OZONE RESIST.	-	No crack to be observed by naked eye						JISK 6301-16	
Wt. VARIATION DUE TO MOISTURE ABSORPTION	%	< 10%						JISK 6911-5	
LOW TEMP. RESISTANCE	Degree	≤ - 30°C						JISK 6301-14	
RESISTANCE TO STRIPPING	kgf /cm <sup>2</sup>	≥ 7						JISK6301-8.3 JISK 6301-13	

(b) PTFE Sliding Type Bearing Shoes

Physical Properties of PTFE (Polytetrafluoroethylene)

ITEM	UNIT	TEST VALUE	TEST METHOD USED	SPECIFIED VAUE
SPECIFIC WEIGHT		2.18	JISK 6888	2.10-2.40
MELTING POINT	°C	327	JISK 6888	327±10
TENSILE STRENGTH	kg/cm <sup>2</sup>	315	JISK 6888	140
ELONGATION	%	400	JISK 6888	100
HARDNESS	° SHORE	55	ASTM D 2240	55-70
COMPRESSIVE CREEP (24 Hour Permanent Deformation)	%	7.9	ASTM D 621 23±2°C 140 kg/cm <sup>2</sup>	8
FRICTION COEFFICIENT		0.063	SUS 316 ( as against SUS 916)	0.08

(c) Bearing Pads

Bearing pads shall consist of alternative laminations of elastomer and metal bonded together, as shown on the drawings, and shall conform to

the following requirements and the minimum values for the metal laminates specified below:

Bearing stress : 15 - 80 kg/cm<sup>2</sup>

Compression strain : 15% max.

Horizontal deformation : 50% max.

The Contractor shall submit a certificate by the manufacturer to the Engineer for approval prior to furnishing bearing pads.

BEARING PAD BONDED METAL REINFORCEMENT ( STRAIN CONTROL)

ITEM	UNIT	SUS 304		SS 400	
		SPEC. VALUE	TEST METHOD	SPEC. VALUE	TEST METHOD
TENSILE STRENGTH	N/mm <sup>2</sup>	>520	JIS Z 2241	>400	JIS G 3101
ELONGATION	%	>40		>21	
YEILD POINT OR ULT. STRENGTH	N/mm <sup>2</sup>	>205		>245	

(d) Allowable Values for Elastic Bearings.

		CHECK FORMULA	ALLOWABLE VALUES	REMARK
COMPRESSIVE STRESS	MAXIMUM	$\sigma_{max} \leq \sigma_{max,a}$	$\sigma_{max,a} = 80$ kgf/cm <sup>2</sup>	Effective bearing area considered.
	MINIMUM	$\sigma_{min} \geq \sigma_{min,a}$	$\sigma_{min} = 15$ kgf/cm <sup>2</sup>	
	STRESS FLUCTUATION	$\Delta\sigma \leq \Delta\sigma_a$	$\Delta\sigma_a = 50$ kgf/cm <sup>2</sup>	
SHEARING STRAIN	@ NORMAL	$\gamma_s \leq \gamma_a$	$\gamma_a = 70\%$	
	@ EARTHQUAKE	$\gamma_{se} \leq \gamma_{ae}$	$\gamma_{ae} = 150\%$	
BUCKLING		$a, b \geq 5 \times \sum t_c$ and $a, b \geq 10$ cm		
ROTATION		$\sum \alpha_e \times a/2 < \delta$		
LOCAL SHEARING STRAIN		$\gamma = \gamma_c + \gamma_s + \gamma_r$ $\gamma \leq \gamma_{ta}$	$\gamma_{ta} = \frac{\gamma_u}{1.5}$	To be checked @ normal condition.
STRESS ON REINFORCING STEEL		$\sigma_s \leq \sigma_{sa}$		SM490 in accordance with JISG 3106.
SPRING CONSTANTS (Compressive and Shearing to conform to design )				JISK 6835

Where:  $\Delta\sigma = \Delta\sigma_{max} - \Delta\sigma_{min}$   
a = Longitudinal effective length of bearing shoe,  
b = Transverse effective width of bearing shoe,  
 $\sum t_c$  : total thickness of the elastomer rubber,  
 $\sum \alpha_e$  : overall rotation (radians) of the total rubber thickness,  
 $\delta$  : compressive stain under vertical load with bearing effective area,  
 $\gamma_c$  : local shearing strain under vertical load,  
 $\gamma_s$  : local shearing strain due to shearing deformation,  
 $\gamma_r$  : local shearing strain due to rotation,  
 $\gamma_u$  : shearing strain at rupture

S10.11 (3) Construction

(a) Bearing Shoes and Stoppers.

- (i) Bearings, bearing shoes and stoppers shall be accurately set in their specified positions during construction of substructure and superstructure members.
- (ii) If the Engineer gives approval for bearing shoes and stoppers to be set after construction of the sub-structure members, block outs or boxing out of the piers or abutments shall be of such dimensions as to permit adequate horizontal and vertical positioning of the bearing shoes or stoppers prior to grouting of their anchor bars. Only a high-strength non-shrink mortar shall then be used to fill the block-outs and any space between the substructure and the underneath of the bearing shoe or stopper.
- (iii) In placing any anchor bolts - reference is made to Clause S10.01 (4)(f)(xi) should this, in the opinion of the Engineer, be applicable.

(b) Bearing Pads

The bearing pads shall be installed in the appropriate setting as directed by the Engineer or shown on the Drawings.

When they are set on thin beds of cement mortar, the mortar shall be cured and allowed to develop sufficient strength before the beams are erected.

The bearing pads shall be maintained in their correct position during the placing of the beams. After the beam has been completed, each bearing and the area around it shall be left clean.

S10.11 (4) Method of Measurement

- (a) The quantities of bearing shoes and pads shall be measured by the number of each type completed in place and accepted:

S10.11 (5) Basis of Payment

The work measured as provided above will be paid for at the Contract unit price respectively. The payment shall consist of full compensation for furnishing, fabricating, transporting, painting and placing all materials including all labour, tools, equipment, and incidentals necessary to complete the work prescribed. Details of necessary accessories are shown on the Drawings, and includes anchor bar and cap, and reinforcement, etc should these items be applicable.

Pay Item No.	Name	Unit of Measurement
10.11 (1) A	Reaction Distribution Bearing, Type A 175t	each
10.11 (1) B	Reaction Distribution Bearing, Type B 300t	each
10.11 (1) C	Reaction Distribution Bearing, Type C 650t	each
10.11 (1) D	Reaction Distribution Bearing, Type D 800t	each
10.11 (1) E	Reaction Distribution Bearing, Type E 850t	each
10.11 (2) A	Pot Bearing, Type A 350t	each
10.11 (2) B	Pot Bearing, Type B 400t	each
10.11 (2) C	Pot Bearing, Type C 450t	each
10.11 (2) D	Pot Bearing, Type D 950t	each
10.11 (2) E	Pot Bearing, Type E 2,250t	each
10.11 (3) A	Elastomeric Bearing Pad, TypeA 510*310*56	each
10.11 (3) B	Elastomeric Bearing Pad, TypeB 510*310*44	each
10.11 (3) C	Elastomeric Bearing Pad, TypeC 510*310*36	each
10.11 (3) D	Elastomeric Bearing Pad, TypeD 510*260*40	each
10.11 (3) E	Elastomeric Bearing Pad, TypeE 330*330*54	each
10.11 (3) F	Elastomeric Bearing Pad, TypeF 510*510*44	each
10.11 (3) G	Elastomeric Bearing Pad, TypeG 510*510*26	each
10.11 (3) H	Elastomeric Bearing Pad, TypeH 480*480*44	each

S10.12 Other Incidental Bridge Facilities

S10.12 (1) Description

This work shall consist of the furnishing and installation of drainage, waterproofing and other incidental bridge requirements. All work shall be done in strict accordance with the Drawings and these Specifications and as directed by the Engineer.

S10.12 (2) Materials

- (a) Drain pipe material shall conform to the requirements of (un-plasticised Poly-vinyl Chloride Pipes) AASHTO M267, deck drain material shall

conform to the requirements of JIS G 5101 (Carbon Steel Castings), JIS G 5501 (Grey Iron Castings), and JIS G 3101 (Rolled Steel for General Structures : SS41). All metal deck drain material including support brackets shall be zinc coated (hot-dip galvanised).

- (b) The Bridge Deck Waterproofing to be used shall take the form of a hot applied polyester- reinforced elastomeric-bitumen membrane with a particular application to the waterproofing of concrete surfaces. The proposed material shall be capable of retaining its bonding to the underlying concrete surface while maintaining its stability during the application and compaction of the asphaltic concrete overlay at 160 C°.
- (c) Pre-cast Reinforced Concrete Plate shall be formed as shown on the Drawings and in accordance with the appropriate clauses of this Specification.

S10.12 (3) Construction

Drainage Facilities

Drain pipes, catch basin and deck drains that are to be encased in concrete shall be installed by the Contractor as indicated on the Drawings. Other pipes and drainage boxes shall be fixed as indicated on the Drawings or as directed by the Engineer.

Bridge Deck Waterproofing

This shall be a proprietary material to be approved by the Engineer and all installation details shall be in accordance with the manufacturer's recommendations

S10.12 (4) Method of Measurement

The quantities of drain pipe to be paid for will be the number of linear metres measured along the central lines of pipe runs and no extra measurement will be made for bends, fittings, joints, etc.

The quantities of deck drain boxes to be paid for shall be measured by the number of each type, completed in place and accepted.

The quantity of bridge deck waterproofing material to be paid for will be the actual number of square metres of finished bridge deck treated in accordance with the Drawings and the Engineer's instructions. No extra measurement will be allowed for laps or wastage.

Pre-cast Reinforced Concrete Plate shall be measured by the number of square metres installed at the site in accordance with the drawings.

S10.12 (7) Basis of Payment

The quantities, measured as specified above, will be paid for at the Contract unit price per linear metre of drain pipes, per number of deck drain boxes and per square metre of bridge deck waterproofing.

Payment for drain pipe and deck drain will be deemed to include for all fittings and supports necessary to install the drains in accordance with the details shown on the Drawings.

The prices and payment for the above items shall be considered full compensation for labour, tools and equipment, furnishing of materials, fabricating, transporting, and setting of each item and all other incidental works connected therewith.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
10.12 (1)	PVC Drain Pipe, D=15cm	linear metre
10.12 (2)	PVC Drain Pipe, D=20cm	linear metre
10.12 (3)	Deck Drain Box	each
10.12 (4)	Precast RC Plate, Type A	square metre
10.12 (5)	Bridge Deck Waterproofing, Type A	square metre

## SECTION 11 STRUCTURAL STEEL WORK

Note: While there is no specific Pay Item for Section 11 this Section has been retained for the guidance of Contractors in the fabrication of steel work covered in other Pay Items.

### 11.01 Bridge Steel Work

#### S11.01 (1) General

##### (a) Description

This work shall consist of the supply, fabrication, delivery to the site, and erection complete, of all structural steel for bridge structures, in strict accordance with the Specifications and Drawings or as established by the Engineer.

##### (b) Standards and Specifications

When making reference to other specifications, standards, etc. in this Specification, the following abbreviations are used :

AASHTO - American Association of State Highway and  
Transportation Officials

ASTM - American Society for Testing and Materials

AWS - American Welding Society

SSPC - Steel Structures Painting Council (U.S.A)

JIS - Japanese Industrial Standard

If not otherwise indicated on the drawings, the fabrication and erection of the steel superstructure shall conform to the requirements of AASHTO's Standard Specifications for Highway Bridges, 1992, and AWS D1.1- 88, Structural Welding Code, as modified by the AASHTO Standard Specifications for Welding of Structural Steel Highway Bridges, 1992.

In case of conflict between the above referenced specifications and this Specification, this Specification shall govern.

##### (c) Testing and Inspection

###### (i) Inspection Authority

The Employer has the right to appoint an Inspection Authority to inspect, examine and test materials, workmanship and performance of any part of the works at the manufacturer's works or the site of fabrication. The Inspection Authority will be selected by the Employer but all fees and expenses for this work will be paid by the Contractor and will be deemed to be included in the unit prices for this work. Should the Employer decide to waive his right to appoint an Inspection Authority this will be notified at the time of bidding.

The Inspection Authority shall take instructions from the Engineer and his representatives and shall submit monthly reports to the Engineer. The Inspection Authority will certify that all works up to the stage of fabrication shop painting after trial assemblage,

have been carried out in accordance with these specifications and the approved shop Drawings. Certain authority of the Engineer will be delegated to the Inspection Authority, for the purpose of quality control and testing. The limits of this Authority will be notified to the Contractor in writing when the Inspection Authority is appointed.

The Inspection Authority's certificates shall not relieve the Contractor of any of his obligations under the contract.

(ii) Inspection by the Contractor

Irrespective of the appointment of an Inspection Authority, the Contractor shall himself inspect or have inspected all materials, shop work and field work to determine that the requirements of the Drawings and Specifications are met and that the Works are carried out in a first-class and workmanlike manner.

The Contractor shall provide the necessary assistants, labour, materials, electricity, fuel, stores, apparatus and instruments and any other materials required to ensure that all testing and inspection by the Engineer or the Inspection Authority can be carried out efficiently.

(d) Submittals

(i) Overall Schedule

Before any technical submittals are made, the Contractor shall submit his proposed schedule for all shop drawing submissions, materials submissions, and fabrication processes. In this schedule, the Contractor shall allow the Engineer 4 weeks from receipt of any submittal or resubmittal, for his review.

(ii) Necessity of Approvals

The Contractor shall not proceed with any purchase or fabrication of materials until the relevant shop drawings have been approved by the Engineer.

(iii) Materials

Prior to the use of any materials, the Contractor shall submit for the Engineer's approval, 2 copies of the Manufacturer's certificates for :

- bolts, nuts, washers, and filler for welding.
- mill test certificates for structural steel. These shall include the names and locations of steel mills, analysis of chemical and physical properties, and shall be properly correlated to the various grades of structural steel to be used in the project.

(iv) Welding Plan

The Contractor shall not proceed with any welding until the Engineer has approved his Welding Plan which shall include the following:



- All information on welding procedures, equipment, additives and preheating during the welding operations.
- Details of non-destructive testing methods to be used for specific typical joints.
- Precautions with regard to welding shrinkage.
- Possible treatment of completed welds by grinding with indication of grinding direction, etc.
- Procedures and programme of welding sequence (for each component and for welding components together). After approval of this submittal, welding procedures and sequences shall be followed without deviation.

The Engineer will require confirmation as to the suitability of the details contained in the welding plan, by tests as prescribed in the AWS "Standard Qualification Procedure".

(v) Painting Plan

The Contractor shall in ample time before the commencement of the surface treatment, prepare and submit for approval a detailed programme relating to the execution of the works, in the workshop, at the site, etc., as well as the methods used, and a time schedule for the individual treatments. The programme shall be subject to approval by the Engineer.

(vi) Erection Plan

Prior to the start of Fabrication the Contractor shall submit for the Engineer's approval a full description of his proposed erection method including :

- sequence of erection.
- use of temporary or permanent stanchions, beams and bracing.
- connection details.
- erection camber diagrams to show the vertical position of the structure at each stage of the erection process.
- design calculation to cover the various stages in the erection process.
- type of equipment to be used during erection.

The Engineer's approval of the above details will not relieve the Contractor of his contractual obligations or of his responsibility for providing proper methods, equipment, workmanship and safety precautions.

(vii) Painting Certification

The Contractor shall submit to the Engineer, 2 copies of certification stating that requirements pertaining to prepaint cleaning and painting of steel have been performed in accordance with the specifications.

(viii) Connection Records

The Contractor shall maintain records of shop welding procedures, welders employed with date of qualification and identification symbol. Records shall also be maintained of all bolts tested and the corresponding torque values if torque control is used. These records shall be freely available for the use of the Inspection Authority and shall be submitted to the Engineer on completion of all shop fabrication work.

(ix) As-built Drawings

Within 4 weeks of completion of the related works, the Contractor shall submit 2 plastics and 4 prints of the as-built drawings. These drawings shall include details of actual camber achieved, details of temporary bracings left in the works, etc.

(e) Matters to be considered by the Contractor

In this preparation of shop drawings and in all his fabrication works the Contractor shall give careful consideration to the following :

- the need for trial assemblage at the fabrication shop.
- problems on the weight and size of elements for transportation between fabrication yard and the construction site.
- temperature variation between the fabrication yard and the site temperature of 28 degrees Centigrade, assumed for the purposes of the Contract drawings.
- the need for certain dimensions of structural steel work to be verified by measurement at site.
- the prohibition of the use of site welding except for fixtures.

S11.01 (2) Material and Workmanship

(a) Materials

- (i) Structural steel shall be newly rolled and shall conform to the requirements of the following specifications or their ASTM equivalents :

JIS G 3101 - Rolled Steel for General Structure  
: SS41

JIS G 3106 - Rolled Steel for Welded Structure  
: SM41, SM50, SM50Y, SM53 and SM58

JIS G 3114 - Hot-rolled Atmospheric Corrosion  
Resisting Steel for Welded Structure  
: SMA41, SMA50 and SMA58

Carbon equivalent CE shall not exceed the following value :

$$CE = C + \frac{Mn}{6} + \frac{Si}{24} + \frac{Ni}{40} + \frac{Cr}{5} + \frac{Mo}{4} + \frac{V}{14} \geq 0.44\%$$

All steel shall be delivered with certificates and delivery shall be in accordance with the requirement of the current edition of JIS Standard G 3191, G 3192, G 3193 and G 0303 including the requirement to produce analysis, carbon equivalent, tolerances, inspection and testing, and marking.

Structural steel shall be stored above the ground upon platforms, skids, or other supports. It shall be kept free from dirt, grease and other foreign matter, and shall be properly protected in order to minimize corrosion.

- (ii) Bolts shall be high strength bolts, friction type, F10T, manufactured and delivered according to JIS B 1186. If F8T bolts are shown on the drawings they shall also conform with the requirements of JIS B 1186.
- (iii) Filler metal requirements shall conform to Structural Welding code AWS D1.1-81.

If the base metal is not included in the group of ASTM steel covered by Table 4.1.1 of ASW D1.1-81, then the properties of the welding metal used for filler material shall correspond to the properties of the base metal used for the parts to be welded. The Contractor shall in this respect submit his proposal for the Engineer's approval.

All materials to be used for welding shall be of a recognized manufacture, and the Contractor shall when requested by the Engineer furnish manufacturer's certification that the electrodes and other products used for welding meet the requirement of the specifications.

- (iv) Headed studs shall conform to JIS B 1198, minimum yield point of 24 kgf/mm<sup>2</sup> and minimum tensile strength of 41 kgf/mm<sup>2</sup>, and to the applicable requirements of AWS D1.1-88, section 4, part F.
- (v) Materials used in painting of steel structures shall be as shown on the drawings or specified elsewhere and shall conform to the requirements of the following specifications.

JIS K 5400 Testing Methods for Organic Coatings

JIS K 5421 Boiled Oil and Boiled Linseed Oil

JIS K 5516 Ready Mixed Paint

JIS K 5492 Aluminium Paint

JIS K 5621 Anticorrosive Paint for General Use

JIS K 5622 Red-Lead Anticorrosive Paint

JIS K 5623 Lead Suboxide Anticorrosive Paint (Class 1)

JIS K 5624 Basic Lead Chromate Anticorrosive Paint (Class 1)

JIS K 5625 Lead Cyanamide Anticorrosive Paint (Class 1)

JIS K 5626 Zinc Dust Anticorrosive Paint

JIS K 5627 Zinc Chromate Anticorrosive Paint

JIS K 5628 Red-Lead Zinc Chromate Anticorrosive Paint

JIS K 5633 Etching Primer (Class 2)

JIS K 5664 Tar-Epoxy Resin Paint

Where paints are specified that do not comply with any of the above specifications, they shall be supplied only by recognized manufacturers, and samples and technical data shall be submitted to the Engineer for his approval. In any paint system (viz. primer, undercoats, intermediate coat and finishing coats) each coat of paint shall be compatible with the other, and to ensure this, all paint shall be obtained from the same approved manufacturer with a guarantee of compatibility.

(b) Workmanship

Except as otherwise denoted herein or on the Drawings, all work shall be executed in accordance with the relevant sections of the Specification given in Clause S11.01 (1) (b).

The Contractor shall be responsible for any damage caused to other components of the structure including the substructures, by his operations for the duration of this Contract. In particular he shall take all necessary precautions to minimize concrete splash onto completed steel work or rust staining of concrete due to erected steel-work. He shall clean and/or repair all stains and other damage to completed work, before acceptance.

(c) Tolerances

The Contractor shall, through appropriate planning and continuous measurements in the workshop and at the erection site, ensure that the tolerances given in the Special Specifications are strictly observed.

The Engineer will require any specific working procedure changed in case such procedure appears not to afford sufficient security against exceeding the tolerances.

The Contractor is fully responsible for the calculation and provision of the necessary camber in the preassembled elements to obtain the correct levels in the completed bridge, duly considering the applied erection procedure and the sequence in the installation of the various dead load components.

The roadway levels given on the drawings - or defined by the given inclination and curvature - are the required roadway levels to top of asphalt surfacing in bridge axis of the completed bridge, when loaded only with the dead loads of the installed and completed structure. In fixing the geometry of the superstructure, the Contractor shall make compensation for the difference between workshop temperature and the temperature of the bridge in normal position (28 degrees celsius).

S11.01 (3) Construction

(a) Fabrication

(i) Templates and Measurements

The Contractor shall supply all templates, jigs and other appliances necessary to ensure the accuracy of the work.

(ii) Straightening

Before any work is done on them, all plates shall be checked for flatness and all bars and sections checked for straightness and freedom from twist. Any corrective action shall be taken so that when assembled, adjacent surfaces shall be in close contact throughout. The methods adopted for the work above shall be such as not to damage, mark or impair the strength of the material.

(iii) Cutting

Marking shall be performed accurately and elaborately using full size rules and templates. Prior to marking, the dimensions and grade of materials shall be checked.

Through-going plates in the box girder including longitudinal rib shall be so oriented that the direction of rolling shall follow the longitudinal direction of the bridge. For built-up sections the direction of rolling of the individual components shall follow the axis of the section.

Cutting shall be done automatically. Hand cutting may be used exceptionally, in connection with the erection, if approved by the Engineer. In such cases the joint edges shall receive a finishing treatment, with planing and grinding tools. Cutting by shearing machine may be used for plates not exceeding 10 mm in thickness provided that the plate edge be fully enclosed in a weld.

Oxygen cutting may be used provided a smooth and regular surface free from cracks and notches is secured and provided that the roughness of oxygen cut-surfaces shall be no greater than 508 according to JIS B 0601 by the use of a mechanical guide.

All cut plate edges that will not be welded shall be ground to planeness and all edges of plates and sections that will not be welded shall be rounded to the appropriate radius for painting.

(iv) Holing

Holes for bolts shall be drilled. Punching of holes shall not be permitted. If not otherwise indicated on the drawings, the diameter of bolt holes shall be 2.5 mm larger than the nominal diameter of bolts. All holes for field connection of girder, except stringer and bracket, shall be subdrilled 1.5 mm smaller and during shop assembly reamed 2.5 mm larger than the nominal diameter of the bolts.

(v) Bending

Bending of plate may be machined by cold processes, provided that the bending inner radius is at least 15 times the thickness of the plate.

(vi) Welding (Execution)

All welding shall be planned and executed using the most suitable materials and working methods for the particular purpose. Site welding will only be permitted for fixtures and details of any fixture welding proposed by the Contractor must be clearly

identified on the shop drawings and referred to in the accompanying submittal letter.

Welding requirements shall in all respects conform to the following sections of AWS D1.1-88: Section 2, Design of Welded Connections; Section 3, Workmanship; Section 4, Technique; Section 5, Qualification; Section 6, Inspection; and Section 9, Design of New Bridges.

All welding shall be executed by skilled, experienced welders holding valid welder examination qualifications based on the qualification tests specified in part C of Section 5 of AWS D1.1-88 or similar internationally recognized qualification tests. A welder shall be qualified for each process used.

Prior to commencement of any welding, the joint shall be carefully freed from rust, scale, slag, and burrs. Where two welds for structural reasons have to cross each other the former has to be ground flush. Where a flush surface is required, the excess weld metal shall be ground.

During the assembly work, the components shall be held in position and supported in such a manner that no unfavourable inherent stresses or deformation shall develop. Drilling of holes for temporary assembly for welding purposes shall not be accepted.

Minimum preheating and interpass temperature shall comply with the welding procedure in question, and shall be approved by the Engineer.

(vii) Welding (Tolerances)

The members to be connected by welding shall be so prepared that they fit exactly together, without being forced into position.

The tolerances concerning gap between parts to be welded, eccentricity and departure from theoretical alignment, dimensions of the cross section of groove welded joints, etc. shall conform to Section 3.3, Assembly, of AWS D1.1-88, except that the gap between parts to be jointed by fillet welds shall not exceed 1 mm for fillet welds connecting flange to web in box girder and 5 mm for all other fillet welds. Tolerances of weld profiles shall correspond to section 3.6 of AWS D1.1-88.

(viii) Welding (Procedure Qualification Tests)

The Contractor shall perform test welds of the types of welding seams to be applied in the structure, according to a programme to be agreed upon with the Engineer. The quality of the test welds shall be approved by the Engineer prior to execution of the welding work in question. The test welding shall be made from working positions corresponding to the actual working positions during construction.

(ix) Welding (Inspection)

The Contractor shall prepare a detailed programme for control of welds in consultation with the Engineer and the established programme must not be deviated from without the Engineer's consent.

The Contractor's control programme shall assure satisfactory inspection in the workshops to fulfill the stipulations laid down in AWS D1.1-88, Section 9.25.

The Contractor's control shall be performed at his own expense and shall correspond to the following schedule:

- 1) Preparation for Welding
  - Visual inspection of edge preparation
  - Visual inspection of surface conditions for cracks, gaps and other items that may cause any defect of welding.
- 2) Visual Inspection before and after Welding
  - All welds shall be visually inspected in accordance with AWS D1.1-88, Section 9.25. 1.
- 3) Non-destructive Testing of Welds
  - Welds that are subject to radiographic or magnetic particle testing in addition to visual inspection, shall be unacceptable if the radiographic or magnetic particle testing show any of the types of discontinuities given in AWS D1.1-88, Section 9.25.2.
  - Welds that are subject to ultrasonic testing, in addition to visual inspection, are acceptable if they meet the requirements of table 9.25.3 in AWS D1.1-88. Welds that are subject to liquid penetration testing, in addition to visual inspection, shall be evaluated on the basis of the requirements for visual inspection.
- 4) Scope of Non-destructive Testing of Weld
  - Fillet welds shall be tested by the most suitable of either the magnetic particle test or the liquid penetration.
  - Groove welds shall be tested by the most suitable of either the radiographic test or the ultrasonic test.
  - The method of non-destructive testing for a specific weld shall be elaborated in consultation with the Engineer.

The minimum extent of the testing (control) shall be as follows :

Box girder plate

Transverse butt weld in top and bottom flange plate:

Welds subject to tensile stress and reversal stress	= 100%
Weld subject to compressive stress	= 25%
Transverse butt weld in web plate (The major part of the control to be performed in the tension zone)	= 50%

Longitudinal fillet weld :

Top and bottom flange to web	= 25%
Longitudinal rib to top and bottom flange	= 10%
Horizontal stiffener to web	= 10%

Diaphragm

All butt weld	= 25%
Fillet weld	= 10%

Other

Other welds not mentioned above	= 10%
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The above figures are the minimum extent of testing and the Engineer may require additional tests if these are considered necessary to ensure compliance with the specifications.

(x) Stud Welding

After the studs have been welded to the beams a visual inspection shall be made and each stud shall be given a light blow with a hammer. Any stud which does not have a complete end weld, which does not emit a ringing sound when given a light blow with a hammer, which has been repaired by welding, or which has less than normal height due to welding, shall be struck with a hammer and bent 15 degrees from the correct axis of installation, and in the case of a defective or repaired weld, the stud shall be bent 15 degrees in the direction that will place that defective portion of the weld in the greatest tension. Studs that crack either in the weld or in the shank shall be replaced.

The Contractor is obliged to show the exact extent of the control on the shop drawings to be approved by the Engineer. Two sets of reports describing the inspection and comprising all the results have to be handed over to the Engineer concurrently with the execution of the inspection. The Contractor shall execute, at his own expense, the repair of unsatisfactory welds, and the repaired welds shall be tested anew on the Contractor's account.

(xi) Bolted Connection

Contact surfaces in bolted joints shall not be painted. When assembled in the field, the rust on joint surfaces, including those adjacent to bolt head, nut and washer, shall be removed by wire brushing. The separation between fraying surfaces of bolted connections shall be not greater than 1 mm. If the separation is between 1 mm and 3 mm, the surface shall be tapered to eliminate



the separation. Over 3 mm separation shall be filled with filler plate as required. Each bolt shall be tightened to provide, when all bolts in the joint are tight, the minimum bolt tension shown in the following Table.

Grade	Bolt Size	Minimum Bolt Tension (tonne)
F8T	M 20	13.3
	M 22	16.5
	M 24	19.2
F10T	M 20	16.5
	M 22	20.5
	M 24	23.8

High strength bolts shall not be reused. Re-tightening previously tightened bolts which may have been loosened by the tightening of adjacent bolts shall not be considered for re-use.

All high strength bolts shall be tightened by properly calibrated wrenches and their setting shall be such as to induce a bolt tension 10% in excess of the above value. These wrenches shall be calibrated at least once each working day by tightening in a device of the diameter of each bolt to be installed. Power wrenches shall be adjusted to stall or cut-out at the selected tension. If manual torque wrenches are used the torque indication corresponding to the calibrating tension shall be noted and used in the installation of all bolts of the tested lot. The nut shall be turned in the tightening direction when torque is measured. "Turn of the nut" method may be used for F10T bolts if the Engineer is satisfied that climatic conditions make the torque control method unsuitable.

For F8T bolts tightening may be by "Turn of the nut" method. When this method is used there shall first be enough bolts brought to a "snug tight" condition to insure that the parts of the joint are brought into full contact with each other. Snug tight shall be defined as the tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench.

#### Nut Rotation From Snug-Tight Condition

Disposition of outer faces of bolted parts		
Both faces normal to bolt axis, or one face normal to axis and other face sloped $\frac{1}{20}$		Both faces sloped from normal to bolt axis
Bolt length not exceeding 8 x diameter or 20 cm	Bolt length exceeding 8 x diameter or 20 cm	For all lengths of bolts
1/2 turn	2/3 turn	3/4 turn

$\frac{1}{20}$  slope 1 : 20 maximum

(xii) Trial Assemblage

The Contractor shall to the extent necessary carry out trial assemblage in his regular workshop and/or in the site workshop depending on the fabrication and erection procedure adopted.

Trial assemblage shall be understood as placing of prefabricated elements together to control the fit. The Contractor shall submit his proposal for trial assemblage for the approval of the Engineer. The trial assemblage shall verify that the individual elements have the shape to fit exactly into adjoining elements. Also, the trial assemblage shall verify that the camber aimed at, or prescribed, actually exists, and that the geometry is generally correct.

The Contractor shall perform measurement of the structural members, and the results shall be recorded and submitted to the Engineer. The Contractor shall inform the Engineer that the trial assemblage of major components have been completed and measured, and the structure shall not be dismantled until the trial assemblage has been approved by the Engineer.

(b) Surface Treatment of Steel

(i) General

This Specification covers the complete surface treatment of all steel parts, including surface preparation, priming and final protective coatings. Surface treatment of structural steel work shall be considered in six classes as shown on the Drawings and as described below :

System I : Generally, all external steel work which will be exposed to the atmospheric conditions.

System II : Concealed surfaces not liable to wetting or exposure to the atmosphere.

System III : Generally, all steel work to be encased, or in contact, with concrete.

System IV : Internal surfaces including box girders.

System V : Bolted joint.

System VI : Particular areas which are difficult to repaint during maintenance works.

(ii) Surface Preparation

Before the application of any paint, the surfaces to be treated shall be thoroughly cleaned and freed from all scale, loose paint, rust and other deleterious matters.

Oil and grease shall be removed from the surface by washing with solvents or with a detergent solution before any blast cleaning operation. If any traces of oil or grease remain after blasting, they shall be removed by solvent cleaning and the area reblasted.

All welding areas shall be given special attention for removal of weld flux slag, weld metal splatter, weld head oxides, weld flux fumes, slivers and other foreign objects before blasting. If deemed necessary by the Engineer acid washing and subsequent washing with clean water shall be used.

Any rough welding seams have to be ground and must be inspected and approved by the Engineer before application of the coatings.

All structural steel which will be painted shall be cleaned by blast cleaning in accordance with SSPC-SP 10 Near-White Blast cleaning. Mill scale, rust and foreign matter shall be removed to the extent that the only traces remaining are light stains in the form of spots or stripes. Finally, the surface is cleaned with a vacuum cleaner or clean, dry compressed air.

The blast cleaning shall produce a surface roughness complying with the one specified by the paint manufacturer for the primer concerned. If cleaned surfaces rust or are contaminated with foreign material before painting is accomplished, they shall be recleaned by the Contractor at his expense.

(iii) Painting Materials

All materials shall comply with the requirements of sub-clause S11.01, (2) (a) (v). The colours of all paint coats will be as instructed by the Engineer.

(iv) Painting

The execution of the painting works shall be carried out in the most perfect and workmanlike manner by experienced labour to the satisfaction of the Engineer. Furthermore, the application of the paints shall be carried out in accordance with the manufacturer's recommendations.

Planning and execution of the painting work shall be in conformity with the supplier's specifications in respect to minimum and maximum intervals between the application of the individual coats.

If a coating material requires the addition of a curing agent, the pot life under application conditions shall be clearly stated on the container label, and this pot life shall not be exceeded. When the pot life limit is reached, the spray equipment shall be emptied, remaining material discarded, the equipment cleaned and new material prepared.

Each coat shall be applied uniformly over the entire surface. Skips, runs, sags and drips shall be avoided. When these occur, they shall be brushed out immediately or the material shall be removed and the surface recoated. Each coat shall be allowed to dry for the time specified by the manufacturer or as directed by the Engineer before application of any succeeding coat.

The surface must be completely dry, and its temperature should be at least 5 degrees celsius above the dew point. Paint should only be applied in suitable weather conditions and any fresh paint damaged by weather shall be repaired or replaced at the Contractor's expense. Measure shall be taken to prevent dust or other extraneous matter from adhering to wet paint.

Brushes, when used, shall have sufficient body and length of bristle to spread the paint in a uniform film. Paint shall be evenly spread and thoroughly brushed out. On all surfaces which are inaccessible for painting by regular means, the paint shall be applied by sheepskin daubers, bottle brushes, or by any other means approved by the Engineer. Rollers, when used, shall be of a type which do not leave a stippled texture in the paint film.

A water trap acceptable to the Engineer shall be furnished and installed on all equipment used in spray painting. Mechanical mixers shall be used to mix paint. Prior to applying, the paint shall be mixed a sufficient length of time to thoroughly mix the pigment and vehicle together and shall be kept thoroughly mixed during its application. The dry film thickness of the paint will be measured in place with a calibrated magnetic film thickness gauge. The thickness of each application shall be limited to that specified in the Paint Systems.

(v) Film Thickness

The specified film thicknesses for coating materials shall be strictly observed and shall be checked with appropriate film thickness gauges furnished by the Contractor. The Contractor shall calibrate the gauges for the thickness range to be checked. Calibration shall generally be carried out on a ground and polished steel plate of a quality corresponding to the structural steel to be coated.

The dry film thickness shown on the painting systems are the minimum according to the specification SSPC-PA 2, Measurement of Dry Paint Thickness with Magnetic Gauges.

When dry film thickness is less than specified, additional coats shall be applied as required at no additional cost to the Employer. Particular attention shall be paid to the film thickness on edges, weldings, etc.

(vi) Protection of Paintwork

The Contractor shall provide protective measures as necessary to prevent damage to the work and to other property or persons from all cleaning and painting operations. Paint or paint stains which result in an unsightly appearance on surfaces not designated to be painted shall be removed or obliterated by the Contractor at his expense. All painted surfaces that in the opinion of the Engineer are marred or damaged in any way, shall be repaired by the Contractor, at his expense, with materials and to a condition equal to that of the coating specified herein. The Contractor's proposal for re-treatment of areas damaged by flame cutting and welding operations should be clearly stated in the detailed painting plan submitted in accordance with sub-clause S11.01 (1) (d) (v).

Upon completion of all painting operations and of any other work that would cause dust, grease, or other foreign materials to be deposited upon the painted surfaces, the painted surfaces shall be thoroughly cleaned. At the time of opening structures to public traffic, the painting shall be completed, and the surfaces shall be undamaged and clean.

(vii) Types of Surface Treatment

The treatment of the various areas of structural steel shall be in accordance with one of the six systems (I to VI) as shown on the attached table. The application of each system of surface treatment within the structure shall be as shown on the drawings.

The attached table is prepared on the assumption that the painting sequence is as follows :

Mill shop	-	shot blasting and etching primer.
Fabrication shop	-	painting to be after satisfactory completion of trial assemblage.
Site	-	painting to be after final erection.

Where the Contractor requests permission to deviate from the above sequence, this shall be clearly stated in the detailed painting plan submitted in accordance with sub-clause S11.01 (1) (d) (v).

The areas for HSFG bolts shall be protected by masking at the time of the fabrication shop undercoats. Immediately prior to final erection, any rust in the joint area shall be removed by power wire brushing to a standard equivalent to SSPC-SP 3.

(c) Transport, Handling and Storage

Before shop assembling is dismantled, all adjacent sections shall be marked with paint or grooved. The Contractor shall submit to the Engineer drawings of the finished structure showing all part and match marks.

The methods of transporting and handling shall be subject to the approval of the Engineer. Special care shall be taken in the packing, methods of supporting, lifting during handling and transporting of structural steel work which is shop assembled before delivery, to ensure protection from damage.

Immediately following delivery to the site, the Contractor shall check the material and bring immediately to the notice of the Engineer or his representative any damage or defects therein. He shall also report in writing to the Engineer any such damage or defects, and give his proposals for the rectification or replacement of damaged sections.

Material to be stored shall be placed on skids above the ground and shall be kept clean and properly drained. Girders and beams shall be placed upright and shored. Long members shall be supported on skids placed near enough together to prevent injury from deflection.

PAIN T SYSTEMS

System	Mill Shop	Fabrication Shop			Site Under Coats			Site Finish Coats			Remarks
		1st Coat	2nd Coat	3rd Coat	1st Coat	2nd Coat	3rd Coat	1st Coat	2nd Coat	3rd Coat	
System I	Shot Blasting 15 $\mu$ (Type i)	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	45 $\mu$ (Type iii)	-	-	-	35 $\mu$ (Type v)	30 $\mu$ (Type iv)	-	
System II	ditto	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	-	-	-	-	-	-	-	
System III	ditto	-	-	-	-	-	-	-	-	-	Damaged areas to be cleaned by power brushing immediately before concrete is poured.
System IV	ditto	80 $\mu$ (Type iv)	80 $\mu$ (Type iv)	80 $\mu$ (Type iv)	-	-	-	-	-	-	
System V	ditto	-	-	-	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	45 $\mu$ (Type iii)	35 $\mu$ (Type v)	30 $\mu$ (Type vi)	Area exposed to atmospheric conditions
ditto	ditto	-	-	-	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	-	-	-	Concealed surface not liable to wetting
ditto	ditto	-	-	-	80 $\mu$ (Type iv)	80 $\mu$ (Type iv)	80 $\mu$ (Type iv)	-	-	-	Internal surface of box girder
System IV	ditto	35 $\mu$ (Type ii)	35 $\mu$ (Type ii)	-	-	-	-	50 $\mu$ (Type vii)	-	-	Timing of finish coat should be scheduled to suit the erection sequence

Type i Paint = Etching Primer (JIS K 5633, Class 2)

Type ii Paint = Lead Suboxide (JIS K 5623, Class 1), or Basic Lead Chromate (JIS K 5624, Class 1), or Lead Cyanamide (JIS K 5625, Class 1).

Type iii Paint = Phenol MIO (or equivalent)

Type iv Paint = Tar - Epoxy Resin (JIS K 5664)

Type v Paint = Chlorinated Rubber Intermediate Coat

Type vi Paint = Chlorinated Rubber Top Coat

Type vii Paint = Approved seal resin material

Any structural steel materials (whether painted or unpainted) shipped to the site by sea transport, and positioned on board in such a way as to come into contact with salt water spray, shall be thoroughly washed with clean fresh water, using pressure hoses and stiff bristle brushes, prior to erection or application of finish coats of paint.

(d) Field Erection

The position of field splices as shown on the drawings is for information only and the Contractor is free to propose alternative procedures providing they comply with all the relevant requirements of these Specifications. The preparation of the calculations and detailed design to support the proposed alternative shall be at the Contractor's responsibility and cost.

The Contractor will provide setting drawings, templates, and directions for the installation of anchor bolts or other items to be embedded in concrete.

During erection, the parts shall be accurately assembled as shown on the approved Shop Drawings and any matchmarks shall be followed. The material shall be carefully handled so that no parts will be bent, broken or otherwise damaged. Hammering which will injure or distort the members shall not be done. Bearing surfaces and surfaces to be in permanent contact shall be cleaned before the members are assembled. Splices and field connections shall have one half of the holes filled with bolts and cylindrical erection pins (half bolts and half pins) before bolting with high-strength bolts. Fitting-up bolts shall be of the same nominal diameter as the high-strength bolts, and cylindrical erection pins shall be 1 mm larger.

The correction of minor misfits involving harmless amounts of reaming, cutting and chipping will be considered a legitimate part of the erection. However, any error in the shop fabrication or deformation resulting from handling and transportation which prevents the proper assembling and fitting up of parts by the moderate use of drift pins or by a moderate amount of reaming and slight chipping or cutting, shall be reported immediately to the Engineer and his approval of the method of correction obtained. The correction shall be made in his presence. The Contractor shall be responsible for all misfits, errors and injuries and shall make the necessary corrections and replacements.

The straightening of plates, angles, other shapes and built-up members, when permitted by the Engineer, shall be done by methods that will not produce fracture or other injury. Distorted members shall be straightened by mechanical means or, if approved by the Engineer, by the careful planned and supervised application of a limited amount of localized heat, each application subject to the approval of the Engineer.

S11.01 (4) Method of Measurement

The measurement for bridge steel work will be the unit or piece as described below. In particular there will be no separate measurement or payment for trial assemblage, transportation and shop or field painting.

The mass of the various grades of steel as shown on the contract drawings are for information only and the Contractor should check these figures himself. The figures given make no allowance for permanent or temporary bracings or joints, necessary to suit the Contractor's fabrication and erection sequence. If the Engineer instructs a design change involving a change in the mass of the steel shown in the contract drawings, then the unit price for that unit or piece will be revised. Shear studs or slab anchors which are welded to the steel deck, are not measured separately but are deemed to be included in the cost of the unit or piece to which they are fixed.

Reinforced concrete for the deck slab, expansion joints, bridge bearings, bridge railings, deck drains, electrical works and traffic signs will be measured and paid for under the other pay items in this Specification.

S11.01 (5) Basis of Payment

The quantity measured as provided above will be paid for at the contract unit price for each pay item as described below. The payment will be full compensation for all the work shown on the Drawings or described in these Specifications. In particular there will be no additional payment for the Inspection Authority, trial assemblage, transportation, and shop or field painting.

The cost of the welding, bolts, nuts, washers, and all other accessories necessary for the successful completion of the structure shall be deemed included in the schedule rate of the various structural metalwork items.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
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## SECTION 12 MISCELLANEOUS

### S12.01 Grassed Areas

#### S12.01 (1) Description

This work shall consist of providing a grass cover to areas as shown on the drawings by furnishing and planting either a) prepared grass sods, or b) sprigs of living grass plants. The work with grass sods will be divided into solid sodding and strip sodding as described further below.

#### S12.01 (2) Material

##### a) Sodding

The species of grass selected shall be rapid spreading, free of disease and noxious weeds and shall be deep rooted. The source of sods will be approved by the Engineer before cutting and delivery to the Project and the Contractor shall notify the Engineer not less than 3 days before cutting of sods begins. Sods shall be planted with their root system substantially undamaged and cut into blocks with moist earth in which they have grown. Sods shall be laid within 5 days of cutting. Sod blocks shall be hauled and stored in such manner that they will be protected from direct sun rays, provided with air circulation, and prevented against drying.

##### b) Sprigs

These shall be healthy living stems (stolons or rhizomes) with attached roots or perennial turf forming grasses harvested without adhering soil. They shall be obtained from approved sources which are quick spreading and capable of forming a thickly matted growth.

#### S12.01 (3) Construction

##### a) General

Works shall not take place until tree planting in the area has been completed. Surfaces shall be scarified and shaped after removing debris, gravel and weeds. All stones of more than 3 cm diameter shall be removed. The surfaces shall be made up as necessary with good quality topsoil so as to ensure that the finished thickness of the work (including any sod or top dressing) is not less than 20 cm. The Contractor will be responsible for ensuring a healthy growth in sodded / sprigged areas and necessary treatments before or after sodding will be at the Contractor's own expense. This may include lime to neutralize any existing sour condition of the soil and subsequently Urea or NPK fertilizer, to promote growth.

##### b) Sodding

Sod blocks shall be placed so as to cover 50% of the surface by forming sod strips at the interval of 30 cm (this will be called "Strip Sodding"), or to cover entire surfaces (which shall be called "Solid Sodding"), as noted in the Drawings or directed by the Engineer. In strip sodding joints shall be staggered to form a broken bond. Joints between adjacent sod blocks shall not exceed 0.5 cm. Sod blocks shall be placed in smooth finish and

compacted by a roller of 100 kg weight or by tamper plate. Sand shall be spread over the grass sods already laid and into the joints and the whole area shall be watered twice daily until the grass has taken firm root. Sufficient bamboo stakes shall be used to prevent the sod blocks slipping when sodding is provided on slopes.

c) Sprigging

Before harvesting of the sprigs, the grass shall be mowed to a height of 50 to 75 mm and all clippings and waste materials removed. Sprigs shall then be loosened by cross disking shallow ploughing or other acceptable methods. After loosening the sprigs from the soil they shall be promptly gathered into small piles or windrows, watered and kept moist until they are planted. The time between harvesting and planting shall not exceed 24 hours. Sprigs that have been heated in stockpiles, permitted to dry out or otherwise damaged shall be rejected.

Sprigging shall not be done during windy weather, or when the ground is dry, excessively wet, or otherwise untillable. The method shall be approved by the Engineer considering the location and condition of the area to be treated, but will generally be one, or more, of the following:

- i) Broadcast Sprigging Sprigs shall be broadcast by hand or by suitable equipment in a uniform layer with spacing between sprigs not to exceed 150 mm. The sprigs shall then be forced into the soil to a depth of 50 to 100 mm with a straight spade or similar tool, or with a disk harrow or other equipment set to cover the sprigs to the required depth.
- ii) Row Sprigging Furrows shall be opened along the approximate contours of the slopes at a spacing and depth approved by the Engineer. Sprigs shall be placed without delay in continuous rows along the open furrow with successive sprigs touching. The sprigs shall then be covered immediately.
- iii) Spot Sprigging Spot sprigging shall be performed as specified under row sprigging except that instead of planting in continuous rows, groups of four sprigs or more shall be spaced 450 mm apart in the rows.

Within 24 hours of sprigging the area shall be lightly rolled or tamped but this work shall not be done if the soil condition is such that it is picked up by the equipment.

d) Maintenance

The Contractor shall protect the newly grassed areas by means of barriers or warning signs. The Contractor shall maintain watering and other incidental operations and all treated areas will be subject to special checks, 2 and 12 months after they have been laid. Any areas in which grass is not maintaining a healthy growth shall be repaired or re-furnished by the Contractor at his own expense. The Contractor will be responsible for cutting and keeping clean any grassed areas until completion of the Period of Warranty.

S12.01 (4) Method of Measurement

The quantity of grassed area to be paid for shall be the number of square metres of treated surface measured on the slope including unsodded areas between strip sods, completed and accepted in accordance with the Drawings, Specifications and as directed by the Engineer.

S12.01 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract price per unit of measurement for the pay items listed below, which price and payment shall be full compensation for furnishing all materials, labor, equipment, tools including preparation of surface, sodding, protection and maintenance, and other incidentals to complete the work in accordance with the Drawings and Specifications, and as directed by the Engineer.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
12.01 (1)	Grassed Area, Solid sodding	square metre

S 12.02 Stone Masonry for Retaining Walls

S12.02 (1) Description

This work shall consist of stone masonry in retaining walls for both cut and embankment sections, in minor structures, and in other places where called for on the Drawings or ordered in writing by the Engineer.

S12.02 (2) Material

(a) Stone

The stone shall be sound, have sufficient strength, no seams and shall be of good quality and resistant to weathering. The quality of stone shall be approved by the Engineer prior to use unless the strength is already specified on the Drawings. The stones shall be flat, wedge or convex shaped. The base surface shall be not less than 1/16 of the front surface, and the shorter length of the base surface shall be more than 1/10 of the longer length. The standard number of stones per square metre shall be less than 14.

(b) Other Materials

Mortar, concrete, permeable backfill, etc shall all be in accordance with the appropriate requirements of these Specifications.

S12.02 (3) Construction

(a) General

The stone masonry shall be constructed on the prepared foundation bed in accordance with these Specifications and the appropriate specifications for other works involved and in conformity with lines, grades, sections, and dimensions shown on the Drawings or required by the Engineer.

(b) Foundation

Prior to placing the foundation, the soil shall be thoroughly compacted by mechanical or hand ramming and the foundation then prepared as shown on the Drawings.

(c) Placing

Placing of stone masonry shall not begin until the finishing stakes set according to the design have been inspected and approved by the Engineer. Stones shall be washed with water before placing. A mortar bed shall be spread on the sides of adjacent stones before the next stone is laid. The thickness of the mortar shall be the minimum necessary to ensure that there is no direct contact between stones. Stones shall be thoroughly hammered into place and any stone whose face is deviating more than 20 mm from the true face or more than 30 mm from the face of the adjacent stone, shall immediately be made good by lifting and relaying. Face joints between stones shall be flush-pointed as work proceeds.

(d) Weep holes

Walls of stone masonry shall be provided with weep holes. Unless otherwise shown on the Drawings or directed by the Engineer, the weep

holes shall be spaced not more than 2 metres centre to centre and shall be 50 mm in diameter.

(e) Coping

Coping shall be as shown on the Drawings. Where copings are not called for, the upper surfaces of masonry shall be mortared and finished smooth by wooden float.

(f) Joints

Expansion joints shall be formed at a maximum spacing of 20 metres. Joints shall be 30 mm in width and shall extend through the complete wall including the footing and backing concrete. Stones used for joint forming shall be selected so as to form a clean vertical joint of the dimensions specified above.

(g) Curing

In hot or dry weather the masonry shall be satisfactorily protected from the sun and shall be kept wet for a period of at least three days after completion.

S12.02 (4) Method of Measurement

The quantities to be paid for shall be the number of cubic metres of stone masonry laid in accordance with this Specification. In computing the quantity for payment, the dimensions used shall be those shown on the Drawings or ordered in writing by the Engineer. No deductions shall be made for weep holes, drain pipes, or other openings of less than 0.10 square metre in area, and no increase will be allowed for any foundation treatment that is shown on the drawings. Concrete used in the coping ( if provided ) shall be included in the measurement as though it was stone masonry.

S12.02 (5) Basis of Payment

The quantities determined as provided above, shall be paid for at the Contract price per unit of measurement for the pay items as listed below. The contract unit price shall be full compensation for furnishing and placing all materials including footing and coping and all other necessary work as specified for the proper completion of all the work as described in this Clause.

All excavation and backfilling for these pay items will be deemed to be covered by and paid for under the work described in Section 5 of these Specifications. Any extra expense due to excavation, or due to provision of foundations or of special backfill will be considered to be included in the unit price for these pay items.

Pay Item No.	Name	Unit of Measurement
12.02	Stone Masonry	cubic metre

S12.03 Slope Protection

S12.03(1) Description

This work shall consist of slope protection by means of dry placing of stone riprap, or concrete blocks, or rock filled gabion baskets. Slope protection shall be furnished and constructed in accordance with these Specifications and in conformity with the lines, grades and dimensions shown on the Drawings or required by the Engineer.

S12.03 (2) Materials

Stone for riprap shall consist of field stone or unhewn quarry stone as nearly rectangular in section as is practical. The stone shall be sound, tough, durable, dense, resistant to the action of air and water, and suitable in all respects for the purpose intended. Adobe blocks shall not be used for riprap work.

Stone pieces for protecting slopes shall range in weight from a minimum of 2 kg to a maximum of 20 kg with not less than 60 percent of the stones weighing more than 12 kg.

Concrete blocks shall be solid plain rectangular blocks of the dimensions shown on the drawings. Representative sample blocks shall be submitted to the Engineer for approval before orders are given to the suppliers or manufacturers.

Gabion baskets shall be formed of galvanized wire mesh of minimum diameter of 3.05 mm and tensile strength of 4,200 – 5,980 kg/cm<sup>2</sup>. The minimum zinc coating of the wire shall be 0.24 kg/m<sup>2</sup> of wire surface as determined by AASHTO T65. The rock fill for the gabions shall consist of hard durable rock pieces that will not deteriorate when submerged under water or exposed to severe weather conditions. The rock shall meet the requirements of AASHTO M63 except that the sodium sulphate loss shall not exceed 9% after 5 cycles. Rock pieces shall generally be from 100 mm to 200 mm. in size. The gabions shall be evenly filled and when completed, shall have a minimum density of 1,400 kg/m<sup>3</sup>.

S12.03 (3) Construction

(a) Preparation

Slope surface on which slope protection is to be placed shall be compacted and properly smoothed after removing all vegetation. Works shall not begin until the finishing stakes are set according to the Drawings and have been inspected and approved by the Engineer.

(b) Riprap

Stone shall be distributed and compacted so that the thickness of riprap is not less than that specified or shown on the Drawings. Stone shall be laid with close, broken joints and shall be firmly bedded into the slope and against the adjoining stones. The stones shall be laid perpendicular to the slope with ends in contact. Smaller stones shall be first laid on the slope and larger stones shall be used as surface cover. The riprap shall be thoroughly compacted as construction progresses and the finished surface shall present an even, tight surface. Interstices between stones shall be chinked with spalls firmly rammed into place. Unless otherwise provided, riprap shall be at least 60 cm in thickness, measured perpendicular to the slope. The surface of riprap shall not vary from the theoretical surface by more than 8 cm at any point. If the Engineer permits or instructs that stone is placed below the water line then the appropriate working method will be instructed at that time.

(c) Concrete Blocks

The concrete blocks shall be placed on the Class-G concrete bed and thoroughly tamped to produce an even surface. Joints between blocks shall be filled with mortar. The finished surface shall be such that it will

not exceed more than 6 mm from the testing edge between any two contacts of a 3 metre straight edge applied anywhere on the paved area. Blocks shall be neatly cut as necessary to completely fill the area to be covered to the depth shown on the drawings. In hot or dry weather the paved area shall be satisfactorily protected from the sun and shall be kept wet for a period of at least three days after completion.

(d) Gabion Baskets

The wire mesh shall be twisted to form hexagonal openings of uniform sizes. The maximum linear dimension of the mesh openings shall not exceed 100 mm and the mesh shall be fabricated in such a way as to be non-raveling. Gabions shall be of a single unit construction with base, lids, ends and sides either woven into a single unit or one edge of those members shall be connected to the base unit of the gabions in such a manner that the strength and flexibility at the point of connection is at least equal to that of the mesh.

The gabion shall be equally divided by diaphragms, of the same mesh and gauge as the body of the gabion, into divided into cells the length of which does not exceed the horizontal width. The gabions shall be furnished with the necessary diaphragms secured in proper position on the base in such a manner that no additional tying at this junction is necessary.

Perimetre edges shall be selvedged using 3.76 mm galvanized wire of the same tensile strength as the basket wire. Tie and connection wires shall be supplied in sufficient quantities to allow secure fastenings of all edges and diaphragms and to provide for four cross-connection wires in each cell. Tie and connection wire shall meet the same specifications as the wire used in the mesh.

Empty baskets shall be set to the line and grade as shown on the Drawings or as directed by the Engineer and a standard fence stretcher or iron bar at each corner shall be used to stretch the baskets and hold their alignment. The baskets shall then be carefully hand filled with stone so as to avoid bulges and minimize voids. After filling the lid shall be bent over and secured to the ends sides and diaphragms with tie wires.

S12.03 (4) Method of Measurement

The quantities of dry riprap or concrete blocks or gabions to be paid for shall be the number of square metres measured in place and incorporated in the completed work. In computing the area for payment the height shall be measured along the slope surface but no measurement will be made for the toe key to riprap. In computing the quantity for concrete block slope protection no measurement will be made for the concrete edge key or the concrete and blinding stone footing.

Only accepted work will be measured for payment and the computation of the quantity thereof will be based on the area within the limiting dimensions shown on the Drawings or ordered by the Engineer.

S12.03 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract price per unit of measurement for the items listed below, which price and

payment shall be full compensation for furnishing and placing all materials, labor, equipment, tools including preparation of slope bed, foundations and other incidentals to complete the work in accordance with the Drawings and Specifications, and as directed by the Engineer.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
12.03 (1)	Dry Riprap Slope Protection	square metre
12.03 (2)	Concrete Block Slope Protection	square metre
12.03 (3)	Rock-Filled Gabion Baskets	square metre



S12.04 Cement Mortar

S12.04 (1) Description

(a) General

This work shall consist of preparing and furnishing mortar in accordance with these Specifications, for masonry and for any other incidental work.

(b) Compensation

Unless otherwise instructed by the Engineer, masonry mortar shall be composed of one part Portland cement and three parts fine aggregate by volume to which hydrated lime may be added in an amount equal to 10 percent of the cement by weight.

S12.04 (2) Materials

Type I Portland cement conforming to TCVN 2682-1992 for Portland Cement (PC- 40), AASHTO M 85 or JIS R 5210 shall be used unless the Engineer gives approval for the use of another type.

Fine aggregate shall conform to the requirements of AASHTO M45. Hydrated lime shall meet the requirements of residue, popping and pitting, and water retention shown for type N lime in ASTM C 207. Water shall be of suitable quality for concrete works as defined by Section 10 of these Specifications.

Where the specification requires the use of a non-shrink mortar this shall incorporate a proprietary admixture and shall be a 1-part, self leveling, non-shrink cementitious material. The specific material shall be approved by the Engineer before use.

S12.04 (3) Construction

All the materials except water shall be mixed in an approved mortar mixer until the mixture assumes a uniform color, after which water shall be added and the mixing continued. Mortar shall be mixed only in those quantities required for immediate use. Mortar that is not used within 45 minutes after water has been added shall be discarded in an approved manner.

S12.04 (4) Method of Measurement

Cement mortar shall not be measured for direct payment.

S12.04 (5) Basis of Payment

Performance of this work shall not be paid for separately, but shall be a subsidiary obligation of the Contractor for which full payment is made in the payment of Contract prices for the work items in which it is called for or required.

S12.05 Mortared Stonework

S12.05 (1) Description

This work shall consist of mortared stonework to be used for slope protection all to be furnished and constructed in accordance with these Specifications and in conformity with lines, grades, and dimensions shown on the Drawings or as required by the Engineer.

S12.05 (2) Materials

- (a) Stone shall consist of field stone or rough unhewn quarry stone, as nearly rectangular in section as is practical. The stone shall be sound, tough, durable, dense, resistant to the action of air and water, and suitable in all respects for the purpose intended.

Quality and dimensions of stone shall be approved by the Engineer prior to use. Unless otherwise provided by the Drawings or Specifications, all stone shall be more than 0.008 cu. m in volume.

- (b) Mortar shall conform to the requirements of Clause S12.04.

S12.05 (3) Construction

- (a) The earthworks shall be completed and the foundation tamped prior to placing a blinding stone base under the mortared stonework. Stone shall be securely placed by hand, and voids shall be avoided. Concrete for the footings of the slope protection shall be in accordance with the requirements of Section 10 of these Specifications.
- (b) Where the design requires the placing of a concrete backing layer this shall be placed just in advance of the stone work and incorporated into the stone setting to form a composite structure.
- (c) The face surfaces of all stones shall form a smooth regular surface conforming to the shape of the ditch, slope of the embankment, apron or invert being protected. No stone surface shall extend more than 15 mm above or below the general level of the ditch.
- (d) All voids between stones shall be filled and flushed with mortar but the face surface of the stone shall be left exposed. Mortar shall be placed from bottom to top and the surface swept with a stiff broom. The surface shall be cured as specified in Section 10 for a period of at least three days.
- (e) Copings shall be as shown on the Drawings. Where copings are not called for the upper surface of the mortared rubble shall be mortared and finished smooth by wooden float.
- (f) Unless otherwise shown on the Drawings or directed by the Engineer, Mortared Stonework shall be provided with weep holes. These shall be spaced not more than 2 metres centre to centre and shall be 50 mm in diameter.

S12.05 (4) Method of Measurement

The quantities to be paid for shall be the number of square metres of Mortared Stonework laid in accordance with this Specification. In computing the quantity for payment, the dimensions used shall be those shown on the

Drawings or ordered in writing by the Engineer. The area for payment will be based on the height as measured along the slope surface but no deductions shall be made for weep holes, drain pipes, or other openings of less than 0.10 square metre in area. No increase in area will be allowed for any foundation treatment that is shown on the drawings. Concrete used in concrete footing and coping ( if provided ) shall be included in the measurement as though it was Mortared Stonework but no additional measurement or payment will be made for any backing stone or concrete shown on the drawings.

S12.05 (5) Basis of Payment

The quantities, determined as provided above, shall be paid for at the Contract price per unit of measurement for the pay item listed below, which price and payment shall be full compensation for furnishing all labor, equipment and materials necessary for the proper completion of the work prescribed in this clause, except that excavation will be paid for as provided in Section 4 of these Specifications.

Pay Item No.	Name	Unit of Measurement
12.05 (1)	Mortared Stonework for Slope Protection	square metre
12.05(2)	Mortared Stonework for Slope Protection (below River Water Level)	square metre

12.06 Guardrail and Fence

S12.06 (1) Description

This work shall consist of furnishing and installing the specified type of railing at locations indicated on the Drawings or as directed by the Engineer. The work shall include all required posts, rails, fixtures and fastenings, beams and attachments as well as aligning, fabricating, erecting and painting of guardrail or fence, if required, and all the process necessary to complete the work as described in the Drawings and this Specification.

S12.06 (2) Materials

(a) Materials shall conform to the relevant requirements of :

JIS G 3101: Rolled Steel for General Structures

JIS G 3452: Carbon Steel Pipes for Ordinary Piping

JIS G 3444: Carbon Steel Tubes for General Structures Purposes

JIS G 3466: Carbon Steel Square Pipes for General Structures Purposes

JIS G 3532: Low Carbon Steel Wires

JIS G 3552: Chainlink Wire Netting

JIS G 5502: Spheroidal Graphite Iron Castings

Corrugated sheet steel beams for vehicle guardrail shall conform to AASHTO M 180 - 74 Class A, Type 1.

(b) All steel railing and fittings shall be galvanized unless otherwise specified, in accordance with the requirements of Clause S12.18 of these Specifications. Where painting is required it shall also be in accordance with the requirements of Clause S12.18.

- (c) All other materials shall be in accordance with the relevant clauses of this Specification or as specified on the Drawings.

S12.06 (3) Construction

General

- (a) Pipe, railing, fittings and incidental parts shall be carefully handled and stored on blocking, racks or platforms so as not to be in contact with the ground and shall be protected from corrosion. Materials shall be kept free from dirt, oil, grease and other foreign matter. Threads shall be carefully protected from damage.
- (b) Guardrail shall be constructed to the lines and grades, and in the exact positions shown on the Drawings or as directed by the Engineer.
- (c) Steel shall not be heated or welded in the field unless with the prior written approval of the Engineer. Field operations of drilling holes or cutting steel shall be carefully conducted so as to prevent damage to steel.
- (d) Posts shall be firmly set after digging holes by means of auger or other equipment approved by the Engineer. When handwork is required, care shall be exercised not to damage existing pavement. When posts are to be set in concrete or masonry, all details of pre-formed openings and the method of fixing the post therein shall be as shown on the Drawings.

Post holes in soil shall be backfilled using material approved by the Engineer or concrete according to the details on the Drawings. Backfill material shall be thoroughly compacted to the same degree of compaction as the adjacent soil. The surface surrounding the fixed pole shall be reinstated to its original condition to the satisfaction of the Engineer.

- (e) The component parts of pipe railings shall be connected with threaded screws unless otherwise specified on the Drawings. Fitting of railings on slopes shall be leveled to fit the required grades. Screw thread fittings shall be coated with red lead and oil.

Expansion shall be provided by omitting screws on one side of fittings at designated posts. Where the rails are continuous through two or more posts, screws may be omitted between the rails and the fitting.

Barbed wire and chain-link netting shall be securely fixed to steel posts with suitable metal fittings including steel connecting plates at joints of steel angles, at corners and at ends of fence bolted as required, materials and workmanship to be approved by the Engineer.

Gates shall be supplied and fixed all in accordance with the drawings including hinges, locks, bolts and keepers and other iron-mongery required, materials and workmanship to be approved by the Engineer.

Barbed wire shall be securely fixed to steel posts with suitable metal fittings, materials and workmanship to be approved by the Engineer.

S12.06 (4) Method of Measurement

The quantities to be paid for shall be the number of linear metres of each type of guardrail or fence, completed and accepted in accordance with the Drawings, Specifications, and as directed by the Engineer. Vehicle guardrail Type C will be used at diverging noses, for protection of bridge piers and between earthwork and bridge sections and each complete unit will be measured for payment on a lump sum basis. In any case where guardrail is to be provided at a nosing or bridge pier and there is no pay item for Type C, then payment will be made based on Type A or B Guardrail as appropriate. Measurement will be made along the outside face of the guardrail installed in place. No allowance will be made for any extra factory cutting or shaping necessary to provide the guardrail system required at the site.

S12.06 (5) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price for each type of guardrail or fence as designated below. The price and payment shall be full compensation for furnishing and installing all materials, including labor, equipment, tools and all incidentals necessary to complete the work as shown on the Drawings and described in this Specification.

Pay Item No.	Name	Unit of Measurement
12.06 (1)	Vehicle guardrail, Type-A	linear metre
12.06 (2)	Pipe Guardrail, Type-B, Movable	linear metre

S12.07 Traffic Signs (Warning and Regulatory)

S12.07 (1) Description

This work shall consist of furnishing, fabricating, hauling, and establishing the specified types of traffic signs at locations indicated on the Drawings or as directed by the Engineer and as required by the Ministry of Transport.

S12.07 (2) Materials

- (a) Materials shall conform to the requirements noted in the Drawings. Steel and aluminium materials shall be of durable quality and shall be approved by the Engineer.

Material for poles shall comply with the requirements of JIS G 3444.

Bolts to be used for tightening sign boards shall be steel bolts, fully galvanized, and free from deformation and bending. Each bolt shall be tightened with a galvanized nut and washer.

- (b) Aluminium plates shall be degreased, etched, neutralized and processed prior to use as traffic sign boards.

Reflective sheeting shall conform to the requirements of AASHTO M 268 and shall be of the color specified by the Engineer or as shown on the Drawings and shall include a pre-coated adhesive on the back capable of forming a durable bond, by vacuum or roller method, to aluminium plates.

- (c) Steel poles for traffic signs shall either be processed for rust prevention by phosphoric membrane or zinc galvanizing, or if approved by the Engineer, by means of a rust prevention painting process. Rust prevention paint and galvanizing shall conform to Clause S12.18 of these Specifications and all details of materials and painting shall be approved in advance by the Engineer.

S12.07 (3) Construction

- (a) The type, and location of traffic signs shall conform to the Drawings and the instructions of the Engineer. Traffic sign locations shall be established in the presence of the Engineer.
- (b) Poles shall be set on a foundation as shown on the Drawings after digging holes by means of auger or other equipment approved by the Engineer. When handwork is required, care shall be exercised not to damage existing pavement.
- (c) Poles shall be supported as necessary until the concrete has achieved sufficient strength and the hole shall then be backfilled and thoroughly compacted with suitable material to the satisfaction of the Engineer. The adjacent surface shall be restored to its original condition as directed by the Engineer.
- (d) When traffic signs are to be installed on an existing road extreme care shall be exercised to prevent obstruction of traffic. Any damaged portion shall be repaired to its original condition immediately after installation.
- (e) Traffic signs shall be carefully handled so as not to cause damage, and the Contractor shall repair or replace signs at his own expense in the event of damage.

S12.07 (4) Method of Measurement

The quantities to be paid for shall be the actual number of permanent traffic sign poles furnished, placed and accepted in accordance with the Drawings, and as directed by the Engineer. Type A pole will include one pole and one sign, Type B pole will include one pole with two signs, and Type C will include one sign with two poles. Other Types of signs will be shown on the drawings.

S12.07 (5) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price for each type of traffic sign pole listed below.

The prices and payment shall be full compensation for furnishing and placing all materials including sign or signs as necessary, for all materials, for foundations, for all excavation, backfill and reinstatement, including labor, equipment, tools and incidentals necessary to complete the work as shown on the Drawings or described herein.

<b>Pay Item</b>	<b>No. and Name</b>	<b>Unit of Measurement</b>
12.07 (1)	Regulatory and Warning signs Type-A (one Board)	each

12.07 (2)	Regulatory and Warning Signs, Type-C (2 Board)	each
12.07 (3)	Precast Concrete Km Indicator Post	each
12.07 (4)	Precast Concrete Guide Post	each
12.07 (5)	Guide Sign, Type A	each

S12.08 Reserved.

S12.09 Road Markings

S12.09 (1) Description

This work shall consist of furnishing and applying Type A and Type B painted road markings on the finished paved area in accordance with these Specifications, at the locations and of the dimensions shown on the Drawings, or as directed by the Engineer.

The markings Type A shall be used mainly for permanent works and Type B shall be used mainly for semi-permanent works at the boundaries between contract sections.

S12.09 (2) Materials

- (a) Type A material shall be white thermoplastic material incorporating glass beads and conforming to AASHTO M249 or equivalent.
- (b) Type B material shall be white ready-mixed traffic paint conforming to AASHTO M248 or equivalent.
- (c) Glass beads applied to the surface of both Type A and Type B material shall conform to AASHTO M247 (Type 2) or equivalent.

S12.09 (3) Construction

- (a) Existing lines and markings to be removed will be designated by the Engineer and shall be removed by grit-blasting or other approved method causing minimum damage to the road surface.
- (b) The surface area to be marked shall be clean, dry and free from loose particles. Setting out and location of all markings shall be approved by the Engineer before work begins. Except where approved by the Engineer, all marks shall be laid by self propelled machines equipped with cut-off valves and nozzles capable of forming clean and sharp edged lines and markings, of the specified thickness.
- (c) Type A material shall be laid by spray or screed to the dimensions shown on the Drawings and agreed by the Engineer. The finished thickness of the material shall be a minimum 1.5 mm for spray application and 3 mm for screed application, both exclusive of the glass beads described in (e) below. Preparation and application of the material shall be in accordance with the manufacturer's instructions or as agreed by the Engineer. On concrete surfaces the Contractor shall first apply a tack coat of a type compatible with the thermoplastic material.

- (d) Type B material shall be laid by spray type machine equipped with a mechanical agitator. Each nozzle shall be equipped with suitable guide lines consisting of metallic shrouds or air blasts, and with a satisfactory cut-off valve capable of applying broken or skip lines automatically. Spread rate shall be not less than 40 litres/ 100 m<sup>2</sup>. In areas where machine laying is impossible, the Engineer may give approval to brush application.
- (e) Glass beads shall be applied to the surface of Type A and Type B markings immediately after they have been laid. Unless otherwise approved by the Engineer, all glass beads shall be applied by pressure or spray application at a rate not less than 450 gm/m<sup>2</sup>.
- (f) All road markings shall be protected from traffic as instructed by the Engineer. All markings shall present a clean cut, uniform and workmanlike appearance and the surface shall be free from streaks and cracks. All markings which do not have a uniform satisfactory appearance by day and night shall be corrected by the Contractor at his own expense.

S12.09 (4) Method of Measurement

The quantity to be paid for removal of existing markings will be the number of square metres of marking designated by the Engineer for removal and removed to his satisfaction.

The quantities of road marking to be paid for will be the number of square metres of the relevant material applied to the surface, completed and accepted in accordance with the Drawings, these Specifications, and as directed by the Engineer. For the purposes of measurement each type of material will be divided into two categories as follows :

General Application - Centre lines, edge lines, lane markings and other work which is basically parallel to the centreline of a carriageway or ramp.

Special Application - Arrows, pedestrian markings, striping and other work which is transverse or sharply angled to the direction of traffic flow.

S12.09 (5) Basis of Payment

The quantities, measured as provided above, will be paid for at the Contract unit price per square metre of traffic marking for each category of work as described above and listed below. The price and payment shall constitute full compensation for furnishing all materials, labor and equipment and for fulfilling all the work as described in this clause.

Pay Item No.	Name	Unit of Measurement
12.09 (1)	Road marking, Type-A (General Application)	square metre
12.09 (2)	Road marking, Type-A (Special Application)	square metre



S12.10 Delineators Section Not Required

S12.11 Dwarf Stone Walls Section Not Required

S12.12 Concrete Curb

S12.12 (1) Description

This work shall consist of the construction of concrete curb at the locations as shown on the Drawings or instructed by the Engineer. It consists of the concrete curb of the various shapes as shown on the Drawings together with the associated foundation or base.

S12.12 (2) Materials

Unless otherwise approved in writing by the Engineer, all concrete curb stones must be precast and the concrete class shall be as shown on the drawings. All materials and workmanship shall meet with the requirements of the relevant Clauses of the Specifications.

Preformed expansion joint fillers for curb joints shall consist of a bituminous mastic composition, formed and encased between two layers of bituminous felt, all in conformity with AASHTO M33.

S12.12 (3) Construction Requirements

The construction requirements shall conform to Clause S10.01 for concrete structures. Maximum joint spacing shall be 10 m. Before placing the exposed section of the curb all lines and levels shall be checked by the Engineer. Any junction between the precast curb unit and the concrete base shall be prepared and treated as a construction joint in accordance with Clause S10.01 of these Specifications.

When at driveway entrance crossings or for other reasons, a transition section of curb is indicated on the Drawings or ordered by the Engineer, the Contractor shall furnish concrete curbs with the required modification.

Precast curb units shall be cast in mortar-tight metal moulds sufficiently rigid to prevent any deformation of the curb. The precast curb units shall be removed from the moulds as soon as practicable and shall be kept damp for a period of at least 7 days. During this period they shall be protected from the sun and wind. Any curb units that show cracking or soft or damaged corners or surfaces shall be rejected.

Curb units shall be carefully handled, transported and off-loaded so as to avoid damage. Any curb units which become chipped, marred or cracked before or during placing shall be rejected.

Curb construction shall be carried out in accordance with the tolerances given in the Special Specifications.

On completion of curb the Contractor shall backfill and tidy up the work to the satisfaction of the Engineer.

S12.12 (4) Method of Measurement

Concrete curb of the types as shown on the Drawings will be measured by the linear metre along the face of the curb.

No additional allowance will be made for curbs constructed on curves. No deduction in length will be made for drainage structures installed in the curb section, but payment for these structures will be deemed to be full compensation for finishing the structures to the same standard and tolerance as the adjacent curb and for providing expansion joints between the units and the adjacent curbs.

Reinforced concrete curbs provided as an integral part of non-drainage structures will not be measured for payment under this clause, but will be dealt with under Section 10 of these Specifications.

S12.12 (5) Basis of Payment

The accepted quantities of concrete curbs determined as provided above, will be paid for at the Contract unit price per linear metre of curbing completed in place. This price and payment shall be full compensation for the work on the types of curb as shown in the Drawings, including excavation in any material, provision of base of foundation, expansion joint material, bedding, jointing of precast curbs, backfill and disposal of all surplus material, and all other materials, labor or equipment necessary to complete the work.

Pay Item No.	Name	Unit of Measurement
12.12 (1)	Concrete Curb, Type-A	linear metre
12.12 (2)	Concrete Curb, Type-B	linear metre
12.12 (3)	Asphalt Concrete Curb	linear metre

S12.13 Concrete Slab Paving

S12.13 (1) Description

This work shall consist of the furnishing and laying of concrete slab paving to the lines, grades and locations shown on the Drawings or instructed by the Engineer.

S12.13 (2) Materials

(a) Aggregate for Production of Concrete Slabs

(i) Coarse aggregate shall have an abrasion loss less than 22% when tested with the Los Angeles Abrasion Method.

(ii) The silt content of the sand shall be less than 3% passing a 0.075 mm sieve opening.

(iii) The mix design of the concrete mixture for concrete slab shall contain 30 - 40% of coarse aggregate (5 - 10 mm).

(b) Production of Concrete Slab

(i) Batching Plant

The slabs shall be produced in a plant equipped with a batching plant where raw materials can be batched by weight and the moisture content of the mix can be controlled automatically. The slab shall be cast using a form capable of producing slabs of uniform dimensions 30cm x 30cm x thickness as specified below

or contained in the Drawings and within the tolerances given in sub-clause (c) below.

(ii) Quality Control

The plant shall have its own laboratory to control the quality of the products of each shift, including but not limited to the following :

- Compressive test
- Abrasion resistance

(c) Concrete Slab

The shape, thickness, strength, quality, etc. shall conform to that shown on the Drawings and any thickness shown shall be a minimum with no tolerance for slabs which are thinner than that specified. Dimension tolerances shall be 2 mm for length and width.

(d) Bedding Sand

Should it be required for filling or leveling sand shall be concrete sand, which shall be clean, dry and of moisture content approximately 4 - 8%.

(e) Cement Mortar

Cement mortar for bedding the concrete slabs shall follow that specified under clause S12.04.

S12.13 (3) Construction Requirements

(a) Base

Prior to the laying of the slabs the foundation shall be prepared to the thickness as shown on the Drawings. The crushed stone foundation shall be finished with a thin sand layer vibrated into the crushed stone to prepare the surface for the laying of the slabs.

(b) Spreading of Cement Mortar

- (i) Cement mortar shall be mixed relatively dry and spread and compacted firmly approximately 5% thicker than compacted design thickness shown on the Drawings.
- (ii) Using a wooden straightedge, bedding mortar shall be leveled to follow the designed surface. Before and after being leveled, the mortar shall not be compacted. Where previously prepared mortar is compacted unintentionally, that portion shall be made loose and leveled again.

(c) Placing of Concrete Slabs

- (i) Concrete slabs shall be placed above the leveled bedding sand.
- (ii) Placing of slabs shall start from the edge of the curbs following the design pattern.
- (iii) The space between concrete slabs shall be 10mm to accommodate insertion of mortar after setting the slabs and shall be straight and controlled in this manner by string lines and straightedges.
- (iv) Damaged slabs shall be rejected and shall not be placed.

(d) Compaction

- (i) Immediately after placing a section of concrete slabs they shall be compacted with a vibrating plate compactor of specification as follows :
- Plate area                      0.35 - 0.50 sq.m
  - Centrifugal force            16 - 20 KN
  - Frequency                      75 - 100 Hz
  - No. of passes                 3 - 4 passes
- (ii) Compaction shall be stopped at 1.00 m distance from the edge of concrete slabs where there are curbs.
- (iii) Concrete slabs damaged by this initial compaction shall be replaced by new slabs.
- (iv) After initial compaction is completed, dry cement mortar shall then be spread and swept to fill the spaces between concrete slabs.
- (v) Final compaction using the same vibrating plate compactor shall comprise 3 - 4 passes.

(e) Maintenance

For several weeks or as directed by the Engineer after the concrete slab pavement is opened to traffic, maintenance is required by refilling the spaces between slabs with cement mortar.

S12.13 (4) Method of Measurement

Concrete slab paving will be measured by the square metre of paved area complete in place and accepted.

S12.13 (5) Basis of Payment

The quantities determined as provided above will be paid for at the Contract price per unit of measurement, which price and payment will be full compensation for ground preparation, supplying and laying of the crushed stone foundation, supply of concrete slabs, any sand bedding required, the cement mortar, the installation, tamping or vibrating of the paving, and for all other incidentals necessary to complete the work as shown on the Drawings.

Pay Item No	Name	Unit of Measurement
12.13	Concrete Slab Paving	square metre
S12.14	<u>Staircases</u> ]	Sections S12.14 to S12.17 not required.
S12.15	<u>Concrete Barrier</u> ]	
S12.16	<u>Bus Stop Shelter</u> ]	

S12.17 Landscaping Works

S12.17 (1) Description

This work shall consist of the provision and planting of trees and shrubs and their cultivation according to the Specifications and their positioning as detailed on the Drawings. The Contractor shall give attention to the preparatory measures required before planting is carried out, such as levels of soil; slope of ground; and topsoil requirements including turning over and leveling the soil.

S12.17 (2) References

All work such as planting of shrubs, trees, and the cultivation of vegetation to cover the bare soil, shall be executed in accordance with specifications and current standards for such work. The Contractor shall acquaint himself with the regulations and requirements of the local government authority, and shall carry out the work accordingly.

S12.17 (3) Materials

Materials used shall consist of trees and shrubs/bushes of the species as detailed on the Drawings. Supports and protection for trees shall be of wood/bamboo in accordance with detail drawings. Binding or ties shall be made of natural raffia. Fertilizer shall be as detailed in these Specifications.

S12.17 (4) Preparation

After the soil is cleaned of debris from the construction works, the height of the topsoil shall be arranged as per the drawings. To prevent any standing water occurring a slope of 0.3% (three per thousand) shall be made in the direction of flow indicated by the Engineer.

All top soil for the areas of cultivation shall consist of a soil mixture of 5 cm humus and 10 cm existing soil. These layers shall be executed after the ground to be filled is clear of debris resulting from the construction works and clear of other growths or weeds. The use of weed killers for destroying weeds etc. shall not be permitted.

The preparation of the soil forms the final stage in the soil workings. At this stage the condition and compactness of the soil shall be good, there being no further changes occurring to the heights and contours desired.

S12.17 (5) Provision of Plants

Before the plants are finally planted in position on the site they shall first be put in a location to be indicated by the Engineer. Permission to execute the planting on site will be given by the Engineer to the Contractor before planting is commenced.

The plants shall comply with the following requirements:

- Height of trees shall be between 2.0 m and 3.0 m.
- Height of shrubs shall be not less than 60 cm.
- When dispatching trees to the site the trees shall be tied to support posts or similar in order that the trees are not damaged, similarly the leaves may be trimmed to reduce evaporation.
- Plants shall be free of disease, infestation and shall have good healthy branches.

S12.17 (6) Planting

Execution of the landscaping can be commenced when all the construction and civil works are completed and the Contractor has received permission in writing from the Engineer.

Holes to be planted shall be enriched with a mixture of soil and fertilizers, and shall be cleared of debris and stones. Each plant shall be held somewhat above the bottom of the hole to receive it, then soil added gradually to the hole and around the roots, tamping the soil to the required compaction. After the roots of the plant have spread, its trunk shall be slowly pulled out to ascertain that the surrounding soil is compact enough to support its roots, and so promote healthy growth.

In promoting cultivation, care of the topsoil around the plants, similar to potted plants, requires that the top soil is cleaned up around the planted area.

S12.17 (7) Trees and Shrubs

Trees and shrubs shall be planted before grass sodding is placed but after the ground has been leveled and prepared.

- (a) Locations of trees shall first be ascertained, with reference to staking out posts, in accordance with specifications on detail drawings and as approved by the Engineer.
- (b) Unless otherwise shown on the Drawings, holes dug for planting shall be in accordance with the following:
  - for trees : 80 x 80 cm to a depth of 80 cm
  - for shrubs : 60 x 60 cm to a depth of 40 cm
- (c) To protect soil fertility and plant growth the Contractor shall complete the tree planting not more than 1 week after the holes for the trees have been dug, in order to avoid acid condition of the soil.
- (d) The mixture of soil for filling in holes for planting shall consist of red soil and stable manure or of a quality similar to compost (compost is soil containing vegetation that has already undergone a process of decomposition).

The mixture of soil for filling shall be comparable to:

- soil for planting (pH7) : 75%
- stable manure ..... : 25%
- (e) The soil mixture shall be free of stones greater than 4 cm in size. This mixture shall be put into the holes evenly to a depth of 15 cm, with another 5 cm around the tree roots.

- (f) Sufficient watering shall be carried out at every stage of planting. To avoid the possibility of water flowing away to another level when watering, the height of the top soil around trees and shrubs shall be made 4 cm lower than the surrounding level as shown on drawings.
- (g) Each tree shall be protected by support posts as shown on the Drawings. Such support posts (wooden or bamboo) shall be given a coating of creosote or its equivalent so that they do not quickly decay. Posts shall be 1.8 m in length of which 60 cm shall be buried in the soil.
- (h) Trees shall be watered until they are growing healthily up to the end of the Period of Warranty, the watering to be carried out in the mornings between 6 am to 10 am and in the afternoons from 3 pm until completed.

S12.17 (8) Cleaning Up

During and after the work of planting and other works the Contractor shall continue to clean up all refuse or debris caused by landscaping activities over the pavements and/or the drains and channels for the duration of the Period of Warranty. The Contractor shall transport the remaining materials left over and other rubbish away from the site as early as possible when the landscaping activities are completed.

S12.17 (9) Nursing

Any weeds which grow after the landscaping work is completed shall be pulled up and removed. The use of chemical weed killer is not permitted. The prevention of disease or infestation is to be dealt with by twice weekly applications of Basudin 60 or Dithane M45.

Watering shall be carried out twice daily, mornings and afternoons, until the completion of the maintenance period. Applications of fertilizers, commencing 2 weeks after planting, are to be made twice monthly using "NPK" fertilizers for all trees and shrubs.

For any and all omissions by the Contractor during the period of nursing which causes damage or death to the plant life, the Contractor will be required to replace the dead plants as quickly as possible, at the latest 3 days after the request for replacement is issued.

S12.17 (10) Method of Measurement

The quantities to be paid for shall be the number of trees and plants satisfactorily planted and nurtured in accordance with the Drawings, these Specifications and the Engineer's instructions.

S12.17 (11) Basis of Payment

The work measured as provided above will be paid for at the Contract unit prices for each type of tree and shrub as listed below.

The prices and payment shall be full compensation for complying with local government authority requirements, for furnishing, planting and nurturing the trees and shrubs, all labor, material, tools, equipment and incidentals necessary to complete the work

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
12.17(1)	Queen Crape-Myrtle (Cay Bang Lang)	each

12.18 Surface Treatment of Steel

S12.18 (1) General

This specification covers the surface treatment of all steel parts, including surface preparation and galvanizing or painting in accordance with the specifications and drawings or as required by the Engineer.

S12.18 (2) Materials

- (a) Materials used for painting steel shall be as shown on the Drawings or specified elsewhere and shall conform to the requirements of the following specifications :

JIS K 5400	Testing Methods for Organic Coatings
JIS K 5421	Boiled Oil and Boiled Linseed Oil
JIS K 5516	Ready Mixed Paint
JIS K 5492	Aluminium Paint
JIS K 5621	Anticorrosive Paint for General Use
JIS K 5622	Red-Lead Anticorrosive Paint
JIS K 5623	Lead Suboxide Anticorrosive Paint (Class 1)
JIS K 5624	Basic Lead Chromate Anticorrosive Paint (Class 1)
JIS K 5625	Lead Cyanamide Anticorrosive Paint (Class 1)
JIS K 5626	Zinc Dust Anticorrosive Paint
JIS K 5627	Zinc Chromate Anticorrosive Paint
JIS K 5628	Red-Lead Zinc Chromate Anticorrosive Paint
JIS K 5633	Etching Primer (Class 2)
JIS K 5664	Tar-Epoxy Resin Paint

Where paints are specified that do not comply with any of the above specifications, they shall be supplied only by recognized manufacturers, and samples and technical data shall be submitted to the Engineer for his approval. In any paint system (viz. primer, undercoats, intermediate coat and finishing coats) each coat of paint shall be compatible with the other, and to ensure this, all paint shall be obtained from the same approved manufacturer with a guarantee of compatibility.

- (b) Galvanizing shall in general conform to the requirements of AASHTO M-111 or JIS H 8641 class 3-55C and JIS H 0401. Material thinner than 3.2 mm may be galvanized before fabrication in conformance with the requirements of ASTM A525. Galvanizing of iron and steel hardware and nuts and bolts shall conform to the specifications of AASHTO M-232 or equal.

S12.18 (3) Work Requirements

(a) Surface Preparation

Before the application of any paint or galvanizing, the surface to be treated shall be thoroughly cleaned and freed from all scale, rust and other deleterious matters. Oil and grease shall be removed from the surface by washing with solvents or with a detergent solution before any blast cleaning operation. If any traces of oil or grease remain after blasting, they shall be removed by solvent cleaning and the area re-



blasted. If cleaned surfaces rust or are contaminated with foreign material before painting or galvanizing is accomplished, they shall be re-cleaned.

All welding areas shall be given special attention for removal of weld flux slag, weld metal splatter, weld head oxides, weld flux fumes, slivers and other foreign objects. Any rough welding seams are to be ground smooth.

(b) Painting

The execution of the painting works shall be carried out in a neat and workmanlike manner by experienced labor to the satisfaction of the Engineer. Furthermore, the application of the paints shall be carried out in accordance with the manufacturer's recommendations.

Planning and execution of the painting work shall be in conformity with the manufacturer's specifications in respect to minimum and maximum intervals between the application of the individual coats.

If a coating material requires the addition of a curing agent, the pot life under application conditions shall be clearly stated on the container label, and this pot life shall not be exceeded. When the pot life limit is reached, spray equipment shall be emptied, remaining material discarded, the equipment cleaned and new material prepared.

Each coat shall be applied uniformly over the entire surface. Skips, runs, sags and drips shall be avoided. When these occur, they shall be brushed out immediately or the material shall be allowed to dry for the time specified by the manufacturer or as directed by the Engineer before application of any succeeding coat.

The surface must be completely dry, and its temperature shall be at least 5 degrees C above the dew point. Paint shall only be applied in suitable weather conditions and any fresh paint damaged by weather shall be repaired or replaced at the Contractor's expense. Measures shall be taken to prevent dust or other extraneous matter from adhering to wet paint.

Brushes, when used, shall have sufficient body and length of bristle to spread the paint in a uniform film. Paint shall be evenly spread and thoroughly brushed out. On all surfaces which are inaccessible for painting by regular means, the paint shall be applied by sheepskin daubers, bottle brushes, or by any other means approved by the Engineer. Rollers, when used, shall be of a type which do not leave a stippled texture in the paint film.

A water trap acceptable to the Engineer shall be furnished and installed on all equipment used in spray painting. Prior to applying, the paint shall be mixed a sufficient length of time to thoroughly mix the pigment and vehicle together, and shall be kept thoroughly mixed during its application.

The dry film thickness of the paint will be measured in place with a calibrated magnetic film thickness gauge. The thickness of each application shall be as specified. When dry film thickness is less than that specified, additional coats shall be applied as required at no additional cost to the Employer. Particular attention shall be paid to the film thickness on edges, weldings, etc.

Number of coats, type of paint and dry film thickness of the paint shall be as follows unless otherwise specified or noted on the Drawings.

Number of Coats	Type of Paint	Minimum Film Thickness per Coat (micron)
Two	Lead Suboxide (JIS K 5623) or Basic Lead Chromate (JIS K 5624)	35
One	or Lead Cyanamide (JIS K 5625) Phenol M10 (or equivalent)	45
One	Chlorinated Rubber Intermediate Coat	35
One	Chlorinated Rubber Top Coat	30

Succeeding applications of paint shall be of such shade as to contrast with the paint being covered. Paint color shall be approved by the Engineer prior to commencing the work.

(c) Protection of Paintwork

The Contractor shall provide protective measures as necessary to prevent damage to the work and to other property or persons from all cleaning and painting operations. Paint or paint stains which result in an unsightly appearance on surfaces not designated to be painted shall be removed or obliterated by the Contractor at his expense. All painted surfaces that in the opinion of the Engineer are marred or damaged in any way, shall be repaired by the Contractor, at his expense, with materials and to a condition equal to that of the coating specified herein.

(d) Galvanizing

Except for pre-galvanized standard pipe, galvanizing of material 3.2 mm thick or thicker shall be performed after fabrication into the largest practical sections.

All welded areas shall be thoroughly cleaned prior to galvanizing to remove all slag or other material that would interfere with the adherence of the zinc. When it is necessary to straighten any sections after galvanizing, such work shall be performed without damage to the zinc coating.

Galvanizing surfaces that are abraded or damaged at any time after the application of the zinc coating shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with three applications of zinc anticorrosive paint as approved by the Engineer.

S12.18 (4) Method of Measurement

Painting and galvanizing will not be measured for direct payment.

S12.18 (5) Basis of Payment

Performance of this work shall not be paid for separately, but shall be a subsidiary obligation of the Contractor for which full payment is made in the payment of Contract prices for the work items in which it is called for or required.

S12.19 ] Not Used

S12.20 ]

S12.21 Bridge Name Plaques.

The type and material of bridge name plate shall conform to the requirements shown on the Drawings and as directed by the Engineer.

The quantities of name plate to be paid for shall be by the number of each type furnished, installed and accepted as directed by the Engineer.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
12.21	Bronze Bridge Name Plaques	each



## SECTION 13 UTILITIES

### S13.01 Lighting, Traffic Signals and Electrical Works

#### S13.01(1) General

- (a) This work shall consist of furnishing and installing all materials and equipment necessary to complete in place traffic signals, road lighting, and other electrical work and the modification of such existing systems, when so specified, all in accordance with the Drawings, these Specifications, or as directed by the Engineer. Unless otherwise noted, civil works necessary for the work of this Clause shall be executed and paid for under Clause S13.02 of this Specification.
- (b) The location of signals, controllers, poles and appurtenances shown on the Drawings are approximate and the exact location will be established by the Engineer in the field.

Payment under this Clause for lighting cables will terminate at the distribution panel and connection in the handhole of each pole.

#### S13.01(2) Scope of Work

The scope of work shall cover the supply, delivery to site, erection, test and commissioning of all material and equipment in connection with the Electrical Installation to the extent described and shown on the Drawings and includes but is not necessarily limited to :

- (a) Preparation and submission of Shop Drawings.
- (b) Submission of detailed Material Supply Lists.
- (c) All work associated with the removal of sections of the existing systems and the incorporation of the remaining sections in the permanent works.
- (d) All other electrical equipment and services needed to complete a usable and operable facility in accordance with the pertinent electric codes and local regulations for Electrical Installation.

#### S13.01(3) Quality Assurance

For the actual fabrication, installation, and testing of the work described in this Clause, the Contractor shall use only thoroughly trained and experienced personnel who are completely familiar with the requirements for this work and with the installation recommendations of the manufacturers of the specified items. In acceptance or rejection of the installed electrical system, no allowance will be made for lack of skill on the part of installers.

Installers shall hold the relevant valid certificates complying with the regulations of all concerned Vietnamese Companies and the Vietnam Power Authority ( Tong Cong Ty Dien Luc Viet Nam )

All work shall comply with the Drawings and this Specification, in addition to complying with the requirements of local Power Companies exploitation units and local government authority.

S13.01(4) Drawings and Documents

- (a) The Contractor shall refer to all relevant drawings to ascertain for himself the location and routes of all other utility services so as to maintain adequate clearance between electrical and other services.

The drawings supplied are to indicate generally the arrangement of the work. The Contractor is therefore required to provide working drawings showing the exact routes of all under ground or overhead cables and ducts, the exact run of all conduits and trunking, the location of manholes, drawing and junction boxes, the number and size of wires in each conduit or trunking, the final connection arrangements at street lighting panels, the detail of ducts and the method of fixing road lighting panels for the approval of the Engineer before commencing any portion of the work.

All such working drawings shall be submitted in duplicate and within the periods stipulated below :

- (i) Details of ducts and method of fixing road lighting panels and cable entry into buildings: Working drawings shall be submitted within two months of handing over the site to the Contractor.
  - (ii) All other working drawings shall be submitted within a period of one month from the date of approval of the road lighting panels by the Engineer.
  - (iii) Should however the Contractor be obliged to install electrical conduits prior to this period then he shall submit the relevant working drawings at least four weeks prior to the proposed date for commencement of the work.
  - (iv) The Contractor shall submit a programme indicating the dates on which concreting in different sections will take place, together with the submission of the working drawings.
- (b) On completion of testing, the Contractor shall make "as-built" drawings of plans and circuit diagrams, which clearly indicate any modifications which have been made to the original design.
- (c) Upon completion of the work, and as a condition of its acceptance, the Contractor shall supply to the Engineer three copies of a Manual for the maintenance and operation of all electrical installations and a parts list sufficient for the ordering of parts.

S13.01(5) Standards and Regulations

- (a) The work covered by this Contract shall be carried out in accordance with the regulations issued by the local Electricity Authority and with the applicable standards and codes of the following :

Proceedings of the Vietnam Construction Standards

12/BXD-KHCN 24 April 1995.

Building Code of Vietnam Vol. I, 682/BXD-CSXD 14 December 1996.

Building Code of Vietnam Vol. II, 439/BXD-CSXD 25 September 1997.

Building Code of Vietnam Vol. III, 439/BXD-CSXD 25 September 1997.

JIS : Japanese Industrial Standard.

- (b) Before submitting his Bid, the Contractor must carefully examine at his own expense all of the Regulations issued by the local Electricity Authority and selected materials and method of installation shall be in accordance with these Regulations. The Tenderer shall include in his unit price for any changes or modification of contract documents to ensure conformance with local regulations.

S13.01(6) General Requirements

The requirements for quality control of materials and workmanship that are obligatory for the satisfactory completion by a Contractor of the electrical works and other defined work items required for arterial or toll highways, shall be defined in accordance with the plans and specifications herein described.

All work hereunder shall comply with the latest Building codes, Electrical codes, and other relative codes, in case of the absence of any code in the locality.

All work shall be done under the administrative supervision of the Engineer. Any changes made thereof shall be with the approval in writing of the Engineer. All Electrical installation shall be done in accordance with the applicable ordinances, rules and regulations of the local power company and with requirements of the Provincial Authority. The Electrical work shall be under the supervision of a licensed Electrical Engineer at all times.

- (1) Wiring shall be 2.5m<sup>2</sup> minimum and stranded type used.
- (2) Voltage Drop shall be Total 5 % maximum,
  - Between of the supply point or / SS panel and MDP panel or DB panel it shall be less than 2% for any type of feeder;
  - Between DB panel and end of lighting circuit it shall be less than 3% maximum, for any type of cable;
- (3) Necessary wiring devices such as pull boxes, junction boxes, and utility boxes of correct dimensions shall be provided.

S13.01(7) 6.3 kV, 10 kV, and 22 kV Medium Voltage Power line and Substations

An electrical power supply system to suit the project scope and substation system requirements has been planned using branch connections from the 6.3kV, 10kV or 22 kV power transmission lines.

This will also include the materials supply, installation, and commissioning by the Contractor to a performance Specification.

Payment for this Section of the Works will be by Lump Sum incorporating the following items of equipment and work:

(a) General

A substation electrical system, as shown on the Drawings, shall consist of either 6.3 kV, 10kV or 22 kV switch gear, transformer, HT overhead cables, grounding system, isolators, protection devices, service metreing panel and termination materials.

(b) Primary High Tension Voltage - 6.3kV, 10 kV or 22kV Power Line System

A 11 kV cables will be taken from a terminal located at 8 m - 12 m high on the concrete pole of the 6.3 kV, 10kV or 22 kV distribution system lines to the project area whence it will be terminated at a padmounted substation.

The substation will contain a 6.3 kV, 10 kV or 22 kV based metal clad main ring unit, disconnection switches, splicing and isolator materials.

(c) Transformer

Pad mounted Transformer will be installed on the pole.

(d) Secondary Low Voltage 380 / 220 volts Distribution System (SS)

Secondary Voltage line, 380 volts, 3 phase, 4 wires, 50 Hz AC will be installed from the power supply receiving panel (SS) at the point of interface with the Power Supply Authority. The power supply from the secondary point of the transformer (SS) to the low voltage distribution panel (MDP) shall be by underground cable.

S13.01(8) Lighting Units

(a) General

Lighting units as shown on the Drawings shall consist of lighting lantern(s), lamps, electrical control ballast(s), and mounting accessories.

The Contractor shall submit for approval, detailed light distribution diagrams for each type of lantern he proposes to install. Furthermore, calculations shall be submitted showing the horizontal illuminance in lux at roadway level and the luminance distribution in candela per sq.m at every 2m in roadway direction and every 1.5 m across the roadway.

(b) Street Lighting Type-A1 (12 metre round-type steel pole mounted Bridge section)

Lamps for street lighting (single arm mounted type) shall be 250 watts and shall be high-pressure sodium (SON) type.

(c) Highway Lighting Type-A (12 metre round-type steel pole mounted at-grade section)

Lamps for highway lighting or Street lighting (used for Exit / Entry ramp areas, or interchange areas, single arm type) shall be 250 watts high pressure sodium (SON) type.

(d) Under Bridge Lighting, Type-D (Suspension Mounted Type)

The lanterns shall be horizontal burning type with semicut-off light distribution and shall be 150 watts high-pressure sodium (SON) type.

(e) Highway Lighting TypeB1 (12 metre double arm round-type steel pole mounted Elevated Bridge section)

Lamps used for inner median of throughway, double arm steel pole type shall be 250 x 2 watts high pressure sodium (SON) type.

(f) Highway Lighting Type B (12 metre double arm round-type steel pole mounted at grade section)



Lamp used for inner median of throughway, double arm steel pole type shall be 250 x 2 watts high pressure sodium (SON ) type.

(g) High Pressure Sodium Lantern (250 watts type)

The lanterns shall be high bay type and shall be mounted on a 12 m high steel pole carrying 250 watt x 2 high pressure sodium lamps. The lantern shall comprise three main parts; a high pressure die-cast aluminum housing; a toughened front glass, attached to the housing by one hinge and four clips of stainless steel and a hot dip galvanized mounting bracket. The lantern shall be fitted with an asymmetrical optical system of special design, made of high purity aluminum, which has been chemically polished and anodized.

The lantern shall incorporate a splash and dust proof type sealing between the housing and the glass front cover. All exposed metal parts shall be made of non-corrosive materials. In its basic mounting position with the glass front cover in an absolute horizontal position the highway-light shall keep all distributed light below the horizontal plane, providing a cut-off light distribution with perfect glare limitation in accordance with C.I.E. recommendation. (C.I.E.: Commission International del' Eclairage).

(h) Ballast for High Pressure Sodium Lamp

Ballast for high pressure sodium lamps shall be designed to properly operate the lamps of the wattage as designated in the Drawings. All ballast shall be drip-proof, canned, polyester-filled and shall be equipped with terminal blocks for the electrical connections. Instructions for making the electrical connection shall be printed clearly on the can of the ballast.

(i) High Pressure Sodium Lamp

The power factor of a lamp combination shall have a higher value than 0.95 and shall be achieved by connecting parallel capacitors with sufficient capacitance across the mains. The capacitors used for the purpose shall be suitable to operate at a normal voltage of at least 220 V 50 Hz.

S13.01(9) Electrical Power Distribution

(a) Distribution Panel (MDP) and Lighting Panel (DB)

The Distribution panels(MDP) shall be included as feeders of the power source fed each to the Lighting panel (DB), circuits of the street lightings, highway lighting, and toll gate.

The panels shall be ventilated and shall be substantial, free-standing structures mounted on a concrete foundation a minimum of 40 cm above ground level. Panel house roofs shall be double pitched, the apex being central to the panel. The panel and door shall be made from fully-finished steel sheet not less than 3.2 millimetres in thickness with the necessary steel frames. The welding for all outside joints shall be smooth finished.

The panel shall have a bottom design that will permit tack welding to channels that shall be set on the raised concrete foundation as shown on the Drawings. The panel shall be completely assembled and wired at the

factory. Main and small wiring shall be easily accessible for maintenance and inspection, and small wiring shall be effectively isolated from the main wiring. The wiring diagram, engraved or etched on an aluminum plate, shall be permanently fixed to the inner door of the panel. Each panel shall have one or more nameplates for identification. Nameplates shall be made of laminated plastic with white characters to show through a black top layer when cut or engraved. Panel housing shall be fitted with a master pad lock.

(b) Components of Devices

The Distribution panel (MDP) and lighting panels(DB) shall be as shown on the Drawings. The components shall be designed for 3-phase, 50 Hertz operation at 380/220 volts AC.

The components shall be in accordance with the following items:

(c) Circuit Breakers

The circuit breakers shall be molded case, air break type, rated for 460-volt A.C service. The circuit breakers shall have 3-poles unless otherwise noted. Each phase shall be provided with independent circuit breakers in order to prevent total failure in the event that a single phase fails.

The circuit breakers shall provided inverse time tripping for overloads and instantaneous action and overload ten times of the normal rating.

The circuit breakers shall be arc resisting contact type and be provided with trip-free operating handles and arc quenchers.

The circuit breakers interrupting capacity shall be 15,000 amperes based in JIS C 8370 standard duty cycles, except that breakers large than 100 amperes shall have 25,000 amperes interrupting capacity, or as approved by the Engineer.

The breakers for the main power feeders shall be provided with auxiliary contact that will close when the breakers is closed and 380 volts shunt trip coil. They shall be wired to prevent either breaker being closed while the other is closed.

(d) Knife Switch

Knife switches shall have 4-blades and 200 amperes capacity based on JIS C 8308, or as approved by the Engineer.

(e) Control Equipment

Multiple lighting circuits shall be controlled by a combination of time switch and remote control relays which shall be installed in the distribution panel (MDP).

(f) Timer Switch

Timer switch unit shall have two control elements, one of switch shall be for "on" control at evening and "off" at early morning, and the other which shall be for reduced current control at midnight for saving energy, all as shown on the Drawings. Both "on" and "off" time setting shall be available for any of the 24 hours, and the minimum setting increment shall be one minute.

Timer switches shall be operated on single phase, 220 volts, 50 Hz. Timer switches installed in the distribution panel (MDP) shall have an emergency driving device for 48 hours when the incoming power source fails.

MDP panels shall be fitted with a manual switch-over circuit to by-pass the timing switch.

(g) Remote Control Device

Remote control relays shall have contacts related to switch the specified JIS c 8325 or equal rating, and shall be normally opened unless otherwise specified. Relays shall be the mechanical armature type with the number of poles specified on the Drawings.

The mechanical armature type shall consist of an opening coil (250 volts), a laminated core, a laminated armature, and contact terminals, Contacts shall be silver alloy.

(h) Control Device for Illuminations

Additional control devices for illuminations will comprise an auto controller and photo sensor. The former is to be attached to the distribution panel (MDP) and the latter is to be installed at the street, road and highway. The automatic controller shall be a panel mounted type provided with a built-in timer switches for automatic or manual control. Power source requirement shall be AC single phase 220 V + 10 % 50 HZ and 40 VA at maximum.

Setting of timer for basic lighting shall be 100 % turn on between 06:00 hours and 24:00 hours and 50 % turn on between 24:00 hours and 06:00 hours. The timer switch shall have an emergency driving device for 48 hours or more when the incoming power source fails.

The photo sensor shall consist of a light receiving window and cadmium sulphide detecting device and relay unit.

S13.01(10) Poles and Masts

(a) Lighting Poles

Steel lighting poles shall be hot dip galvanized in accordance with the details shown on the Drawings, as outlined herein and in accordance with the relevant requirements of these Specifications.

All pole items and hardware shall be galvanized steel. Scratches, marks, dents or other damages to poles and fittings will be cause for rejection. Any marks or stains resulting from wrapping materials shall be removed.

All poles and arms shall be individually spiral wrapped and, in addition, shall be packed for shipping in groups with suitable form fitting wood dunnage between all poles and completely around each group at a minimum of 4 locations, and held with suitable metal strapping.

Arms shall be wrapped, packed, and shipped to the job site with a minimum of reloading between points of origin and destination. Packing not in conformance with this provision shall be cause for rejection of poles and/or arms. All loading and unloading of poles and arms shall be under the supervision of the manufacturer and/or Contractor.

All miscellaneous pole line hardware required to complete the project shall be standard material manufactured for pole line construction. All metal parts shall be hot-dip galvanized.

All poles supplied shall be of the anchor base type, and shall have a cast steel anchor base fitted over the shaft and secured with two circumferential welds.

The hand hole and cover plate for the terminal connection shall be 1.0 metre above ground level. Each lighting pole shall be fitted with a standard identification plate.

(b) Foundations

Concrete for foundations for lighting poles and pedestals of cabinets shall be of class E-3 or as shown on the Drawings. All details of concrete and reinforcement for foundations shall conform to the applicable requirements of Section 10.

(c) High Masts

The masts shall be made of steel folded in conical sections, automatically welded in one longitudinal seam. The sections shall be telescopic jointed or by means of bolts. If bolted joints are used, flanges shall not disturb the aesthetics of the silhouette of the mast. After installation of the mast, all exposed anchor bolts and securing nuts on the foundation shall be given one coat of an approved bituminous paint. All scratches and other damage of the finish occurring during transport or installation works shall be thoroughly cleaned and touched up.

The masts shall be bolted on a reinforced concrete foundation by means of steel bolts and nuts of adequate diameter and quantity. The foundation shall be made of reinforced concrete in accordance with the applicable requirements of Section 10.

The Contractor shall submit for the Engineer's approval, construction drawings of the footings and calculations showing that the footings and the anchor bolts are sufficient for their intended application under any conditions of loading.

Anchor bolts shall be of dimensions shown on the drawings and shall conform to the specification of JIS B 1180 and B 1181 or equal, and each shall be provided with 2 nuts and 2 washers.

Anchor bolts, nuts and washers shall be galvanized over their entire surface in accordance with the requirements of this Specification.

The mast shall have a lockable access door at ground level.

The lamp accessories such as fuses, ballasts, igniters and capacitors shall be mounted on a suitable frame and installed inside the mast at ground level. Provisions shall be made so that no moisture, either from condensation or from entering rain water, will drip on the lamp accessories. Rising cables from the accessories to the lamp shall be properly terminated on terminal blocks and shall be bunched and fixed in the mast. Near the accessory frame inside the mast an earth terminal of at least M10 diameter shall be provided, directly welded to the mast. At the top of the mast a head frame shall be

provided suitable to receive the lighting fittings in quantities and directions as show on the drawings.

The mast shall have a harmonious silhouette and the Contractor shall submit for approval, full information on the shape and detailed dimensions of the proposed masts.

Before manufacturing the masts, the Contractor shall provide calculations and obtain the Engineer's approval for detailed construction drawings of the mast, the calculations shall cover the complete structure, including head frame and lanterns, and shall show that no parts of the assembly are submitted to stresses above acceptable limits; the deflection caused by dynamic forces does not exceed acceptable limits; and calculation is in accordance with JIL-1001-1962. (JIL : Japan Lighting Fixtures and Equipment Industry Association).

(d) Mobile Equipment for Floodlight Masts

Mobile equipment as shown on the Drawings shall consist of head frame assembly, mobile floodlight carriage, hoisting device, and electrical equipment.

Each mast will be provided with a mechanism which shall have three locks at the top of the structure capable of supporting a mobile floodlight suspension, etc., when the raising cables area slack. Head frame assemblies shall be fitted at the top of the mast, and one carriage for supporting a maximum of six floodlights shall be provided.

Each mast structure shall be complete with three hoisting cables, a six conductor minimum 4 mm<sup>2</sup> electrical cable, and circuit breaker box and a hoist with removable common drive.

The electrical cable shall be disconnected from the circuit breaker box and securely attached to the lowering cable when the floodlights are lowered. The electric cables shall be split within the floodlight carriage with a 5 ampere in-line fuse installed in each floodlight ballast supply line. The head frame assembly shall be covered by a removable cover and the carriage ring shall be supplied in semi-circles to facilitate shipping, mounting or dismounting after the high mast pole has been erected.

The ring shall be supplied with means of supporting six floodlights equally spaced around the ring, and a plug to match a six pole socket outlet in the base shall be installed in the main power feeder for testing purposes when the ring is in the lower position.

Guides shall be provided on the head frame sleeve, to ensure correct alignment of the carriage to the locking mechanism in the raised position. Rollers shall be provided on the inside of the carriage to aid in the final alignment of the carriage in the raising operation. The carriage shall be equipped with indicating flags to confirm that the carriage is in the fully locked position. This flag shall be clearly discernible from ground level.

The locking mechanisms shall be located at a maximum of 120 degrees to each other on the head frame assembly and shall be able to support the carriage, lanterns and ballast in the fully locked position. The hoisting cables shall not be under tension when the carriage is in the raised and locked position.

A winch shall be provided in the base of each mast shaft, for raising and lowering the carriage by means of flexible steel hoisting cables. The winch shall be of the worm and gear type, having a gear ratio that will allow easy raising and lowering and prevent the free fall of the carriage in the event of an accidental release of the winch handle. A winch handle shall be provided for hand operation of the winch in an emergency.

A hinged door cover shall be provided over the access opening in the mast shaft. The opening shall be of sufficient size to permit the removal from the shaft of the equipment installed therein, for replacement or maintenance. The door shall be provided with facilities for padlocking. The access opening shall be suitably reinforced to ensure that there is no weakening of the structure in this area, also it shall be ensured that the reinforcing is such that it does not interfere with the operation or access to equipment required therein.

In addition to the cable hoist, the masts shall be provided with a grounding stud and nuts, and a code gauge epoxy-painted steel sheet metal box containing :

- \* One three pole, 20 ampere molded case circuit breaker (interrupting capacity of 30,000 amperes at 460 volts) for the area lighting luminaire.
- \* One single pole, 15 ampere circuit breaker as in the above, for the security lighting luminaire.
- \* One single pole, 15 ampere circuit breaker, as in the above, for the lowering device drive outlet.
- \* One six pole matching plug and receptacle for the six conductor hanging cable.
- \* One neutral connecting strip to which the neutral circuit from the road lighting panels shown on the drawings and the mast receptacles shall be connected.

One 220 volt, single phase socket compatible with the lowering device drive plug shall be connected to the circuit breaker above. The removable lowering and raising device drive motor (one only supplied) shall include a torque rated clutch with shaft connection for the lowering device drive. Mounting and bracing for the drive motor shall be provided. A water tight connection and control box shall be supplied with the drive motor which shall contain a reversing motor starter with cable and plug to match the socket outlet in the circuit breaker box, plus a six metre length of control cable complete with a water tight reversing push button station. The latter will allow the operator to stand back out of the possible danger zone during the "raising" and "lowering" of the luminaire mounting ring. Before placing an order for the motor, the Contractor shall submit the characteristics of the motor to be used to the Engineer to obtain his approval.

S13.01(11) Cable, Grounding, Splices and Conduit

(a) Wiring for Lighting

All cables to be used for road lighting shall be of the type and size shown on the Drawings or given in this Specification. Cables shall be pulled into the pole by using pipes prepared in the foundation of the pole, directly from under ground or from the bridge parapet through conduit prepared in the foundation of the pole, and shall be terminated at a circuit breaker installed in the pole.

For this purpose all poles shall include an approved molded case 2-pole circuit breaker rated at 15 amperes, 250 volts, installed in the base of each pole and accessible through the handhole of the pole. The circuit breaker shall protect both the pole cables and electrical control ballast.

Cables installed from the circuit breaker in the pole shall have two conductors of 2.5 mm<sup>2</sup> as prescribed in "Cable and Wire" herein. Cables shall be adequately attached to the lantern so that lantern terminals shall be free from carrying their weights. Four (4) core road lighting cables shall be used through to the last pole.

(b) Cable and Wire

All cables shall be suitable for operation at the specified voltage in open, duct or conduit, under the connection of the maximum conductor operating temperature which at rated current shall be less than 70°C.

Cable colors shall comply with color code standards in Viet Nam.

Cables shall be delivered to the Site on substantial non-returnable wooden drums, each bearing a securely fixed label stating gross weight, serial number, and length of cable and other description.

Covers shall be provided around the periphery of the drum in order to protect the cable in transit and the inner cable end shall be adequately protected by a metal guard or other approved means. Both ends of the cable shall be sealed by a suitable method to prevent the entrance of moisture.

All cables inside of the lighting pole shall have two conductors per lantern. Cables shall be 600v / 1kV, grade "Polyvinyl Chloride Insulated and Sheathed Cable" or shall be of the type approved by the Engineer.

All cables for the road lighting system to be installed underground shall be PVC insulated, Galvanized Flat Steel wire 1.6 mm armoring, and PVC sheathing type or equal approved by the Engineer.

Conductors shall have a minimum cross-sectional area of 10 mm<sup>2</sup>. for use in underground installations.

All cables to be used shall be certified as tested, and approved by the Engineer before installation.

(c) Grounding

Conduit, steel poles and cabinets(Electrical panels) shall be made mechanically and electrically secure to form a continuous system, and shall be effectively grounded. Bonding and grounding jumpers shall be

copper wire of the same cross-sectional area for all systems. Bonding jumpers shall be used in all non-metallic boxes. Metallic boxes shall employ hubs of double lock nuts and bushes. The bonding of all conduits, lighting poles and panels to form a continuous ground system shall be in accordance with applicable code standards. If directed by the Engineer each lighting pole shall be individually grounded.

Size of grounding wire shall be minimum 6 mm<sup>2</sup> Bare Copper Conductor (BBC) or as approved by the Engineer.

Ground rods shall be copper 10 mm dia x 1.5 metre length minimum, depth 1.5 metre below finished grade and welded or connected using connection hardware to the 6 mm<sup>2</sup> grounding wire.

The Contractor shall investigate each site and measure the grounding resistance of the sites. After taking the data, the Contractor shall obtain the Engineer's approval of the site.

The grounding resistance shall be 5 ohms or less, or as approved by the Engineer. Details of all grounding points shall be submitted to the Engineer for approval.

(d) Electrical Splice Materials

Splices and taps shall be made with pressure-type solderless connectors to securely join the wires both mechanically and electrically.

An epoxy resin, cast type insulation shall be formed in clear plastic molds. The material used shall be compatible with the insulation specified in the Contract Drawings or these Specifications. Materials to be used for the work shall conform to the requirements of JIS C 2804, C 2805 and C 2806, or shall have the quality approved by the Engineer. Insulating tape when specified for use in splice formation shall conform to JIS C 2336. Unfused quick-disconnect connectors such as In-line connectors or Tee connectors shall be of the quality approved by the Engineer.

(e) Conduit

Material for conduit to be installed below a bridge, above ground, in a concrete parapet or on the surface of structures shall be steel or PVC.

Conduit crossings under intersections and / or streets and roads shall be constructed at a minimum depth of 1.5 m beneath the finished surface from steel pipe that has been uniformly and adequately zinc-coated by a hot-dip galvanizing process, or concrete encased PVC conduit meeting the requirements of JIS C8430.

(f) Cable Trays

All details regarding material and installation of cable trays shall be as shown on the Drawings.

(g) Pull Boxes

Pull boxes of appropriate dimensions shall be installed in the parapet of the bridge deck as and where shown on the drawings. The body of the pull box shall be fabricated from 2.3mm mild steel sheet and hot-dip-galvanised. The cover shall be made either from 2mm type SUS 304 stainless steel or from 2.3mm mild steel sheet and hot-dip-galvanised. No sharp projections from



screws or other objects shall be permitted within the pull box. The covers shall be watertight.

Details of dimensions and pullbox type will be shown on the drawings.

S13.01(12) Traffic Signals

Each unit of traffic signals shall consist of a complete electrical mechanism for controlling the operations of traffic including the following:

- \* Control equipment housing cabinet;
- \* Timing mechanism;
- \* Auxiliary equipment for timing control; and
- \* Poles and Signal heads consisting of optical units with brackets and fittings.

Signal head lamps shall be halogen and pedestrian crossing signal lamp faces shall incorporate "walking man/stationary man", "cross/do not cross", or similar notations and symbols.

Poles shall be painted in accordance with the relevant requirements of these Specifications.

All details regarding the type and capacity of the controller and the supply and installation of traffic signals shall be in accordance with HPC's (Hanoi People's Committee's) specification, and shall be to the satisfaction of the Engineer.

Applicable standards from the Specification for the installation of lighting shall also be applied to the installation of traffic signals.

Details of flashing units shall be as shown on the Drawings and the source of manufacture shall be approved by the Engineer before any orders are placed.

S13.01(13) Modification of Existing Systems

(a) Removing

The Contractor shall remove existing materials such as lighting and lanterns, lighting panels, traffic signals, etc. which will obstruct the construction of the works, in accordance with the Drawings and these Specifications, and/or as established by the Engineer.

A detailed work method and timing schedule shall be submitted for the Engineer's approval prior to commencing any work of removal.

On completion of removal works, all holes shall be filled and the area left clean and tidy, all to the satisfaction of the Engineer. It shall be the Contractor's responsibility to remove all useless materials such as lighting fittings and ballast's, poles, traffic signals, cables, conduits, etc. which shall be dumped or stored as specified or required by the Engineer.

(b) Relocation

Part of the existing materials removed shall be relocated in accordance with the Drawings and/or as established by the Engineer.

All relocation shall be carried out by the same means of construction as additional furnished materials in this works as required in these Specifications.

Prior to re-fixing any lighting pole or control panel, accessible surfaces shall be rubbed or brushed clean of all rust, etc. and painted with 3 coats

of a zinc based rust-preventing paint as specified by the Engineer. If there are any dents or other damage to materials during the relocation, the material shall be replaced with the same kind, or repaired to the satisfaction of the Engineer.

S13.01(14) Construction

(a) General

All workmanship shall be complete and in accordance with the latest accepted standards of the industry, as determined by the Engineer. Installation of duct, construction of manholes, and excavation for cable or duct track, shall be in accordance this Specifications.

(b) Excavating and Backfilling

The excavation and backfilling required for the installation of foundations, poles and other appliances shall be performed in accordance with the requirement of these Specification, but will not be measured for payment. The cost of such extra work will be deemed to be included in the unit price of the pay item being installed.

(c) Foundations

Foundation shall be constructed of Portland cement concrete Class C-1, unless otherwise noted on the Drawings and all details shall meet the applicable requirements of Section 10 of the Specifications. The bottom of concrete foundations shall rest on firm ground.

Foundations shall be poured in one pour where practicable. The exposed portions shall be formed to present a neat appearance. The footing shown on the Drawings shall be extended if conditions require additional depth, if ordered by the Engineer.

Forms shall be true to line and grade. Tops of footings for poles, except special foundations, shall be finished to ground line or sidewalk grade, unless otherwise noted on the Drawings or directed by the Engineer.

Forms shall be rigid and securely braced in place. Conduit ends and anchor bolts shall be placed in proper position and to proper height, and shall be held in place by means of a template until concrete sets.

Plumbing of poles shall be accomplished by adjusting leveling nuts. Shims or other similar devices for plumbing or raking will not be permitted.

Both forms and ground which will be in contact with the concrete shall be thoroughly moistened before placing concrete. Forms shall not be removed until the concrete has set at least 3 days.

A "rubbed surface finish" shall be applied to exposed surface of concrete in accordance with the requirements of Clause S10.01.

Where obstructions prevent construction of planned foundations, the Contractor shall construct an effective foundation, satisfactory to the Engineer.

(d) Conduit

Installation of conduit shall be performed in accordance with these Specifications and in reasonably close conformity with the location as specified in the Drawings or as directed by the Engineer.

The size of conduit used shall be as shown on the Drawings. Conduit smaller than 50mm dia metre electrical trade size shall not be used, unless otherwise specified. It shall be the option of the Contractor, at his own expense, to use larger size conduit if desired, and where larger size conduit is used, it shall be for the entire length of the run from outlet to outlet. No reducing coupling will be permitted.

The ends of conduit shall be well reamed to remove burrs and rough edges. Field cuts shall be made square and true so that the ends will butt or come together for the full circumference thereof. Slip joints or running threads will not be permitted for coupling conduit. When a standard coupling cannot be used, an approved threaded union coupling shall be used. The threads of all steel conduits shall be well painted with a good quality of red lead or rust-preventative paint before couplings are made up. All steel couplings shall be screwed up until the ends of the conduits are brought together, so that a good electrical connection will be made throughout the entire length of the conduit run. Where coating on steel conduit has been damaged in handling or installing, such places shall be thoroughly painted with rust- preventative paint.

All conduit ends shall be threaded and capped with standard conduit couplings capped with conduit push pennies until wiring is started. When couplings and push pennies are removed the threaded ends shall be provided with approved conduit bushing. The use of any plugs, even though temporary, in lieu of the aforementioned conduit couplings and push pennies are expressly prohibited.

Conduit stubs from bases shall extend at least 15 cm from the face of foundations and at least 80 cm below the top of foundations.

Conduit bends, except factory bends, shall have a radius of not less than six times the inside diameter of the conduit. Where factory bends are not used, conduit shall be bent, using an approved conduit bending tool employing correctly sized dies, without crimping or flattening, using the longest radius practicable. All PVC conduit bends shall be pre-formed.

Conduit terminating in poles or pedestals shall extend approximately 15 cm above the foundation vertically and shall be sloped towards the handhole opening.

Conduit entering through the bottom of a pull box shall be located near the end walls to leave the major portion of the box clear. At all outlets, conduit shall enter from the direction of the run, terminate 15 to 20 cm below the pull box lid and within 9 cm of the box wall nearest its entry location.

Suitable markers shall be set at the ends of conduits which are covered so that they may be easily located.

A galvanized pull wire shall be installed in all conduits which are to receive future conductors. At least 60 cm of pull wire shall be doubled back into the conduit at each termination.

(e) Pull Boxes

Pull boxes shall be installed at the locations shown on the Drawings, and at such additional points as ordered by the Engineer. The Contractor may install, at his own expense, such additional boxes may be desired to facilitate the work.

(f) Wires

Wiring shall conform to appropriate code requirements. Wiring within cabinets, manholes, etc. shall be neatly arranged and within cabinets shall be laced.

Powdered soapstone, talc, or lubricant shall be used in placing conductors in conduit.

Splicing in conductors will be permitted only at manholes, transformer leads, in pole bases, or at control equipment.

Sufficient signal light conductors shall be provided to perform the functional operation of the signal system as shown. Spare conductors shall be provided when noted on the Drawings.

(g) Service Point

Service points are located within or close to the Site, normally, but not necessarily always, at the substation transformer nearest the project main panel designated of the Drawings by the symbol "SP".

The cable work from the service switch (SS) to the Distribution Panel (MDP) shall be installed by the Contractor. This work will not be paid for directly but considered a subsidiary obligation of the Contractor provided for under the unit rate for the "SS" service switch.

Unless otherwise noted on the Drawings, each service point shall include a metre base installed in accordance with serving utility requirements, a three wire service breaker of size noted on the Drawings, the necessary conduit risers and grounding assembly.

Service breakers shall be a standard thermal circuit breaker encased in raintight enclosure that can be padlocked.

In general, all traffic signal services will be at 220 volts, 50 Hz, and all multiple lighting will be 220 volts, 50 Hz as noted on the Drawings.

The Contractor shall prepare all drawings required and all necessary documentation for the application for the service connection, which shall be submitted to the Engineer. The Engineer shall then, upon request of the Contractor, make arrangements with the serving utility to complete the service connections.

The serving utility connection costs, but not the electrical energy consumption, will be charged to the Contractor.

(h) Field Test

Prior to completion of the work, the Contractor shall cause the following tests to be made on all traffic signal and lighting circuits, in the presence of the Engineer.

- \* Test for continuity of each circuit.
- \* Test for grounds in each circuit.

A megger test on each circuit between the conductor and ground with all switchboards, panel boards, fuse holders, switches, sockets and over current devices in place and all readings recorded. The Contractor shall furnish the Engineer with three copies of the test results identifying observed readings with their respective circuits. The insulation resistance between conductor and ground shall be not less than 4 megohms.

Any change in the above stated minimum readings must be approved by the Engineer. Such approval must be in writing, following written application by the Contractor.

A functional test in which it is demonstrated that each and every part of the system functions as specified or intended herein.

Any fault in any material or in any part of the installation revealed by these tests shall be replaced or repaired by the Contractor in a manner approved by the Engineer, and the same test shall be repeated until no fault appears.

(i) Painting

All painting required shall be in conformance with applicable portions of these Specifications.

If the enclosure of any electrical equipment (less signal heads) located above ground does not have an exterior surface of either aluminum or galvanizing, then it shall be finished with two coats of an approved zinc based paints, plus such finishing coat as the Engineer may direct.

Controller cabinets shall be finished in accordance with the above requirements for electrical equipment.

Galvanized steel lighting poles and lighting lanterns shall not be painted.

(j) Lighting Poles

Lighting poles shall be handled in loading, unloading and erecting in such a manner that they will not be damaged. Any parts that are damaged due to the Contractor's operation shall be repaired or replaced at the Contractor's expense, to the satisfaction of the Engineer.

Lighting poles shall not be erected on concrete foundations until foundations have set at least 72 hours, and shall be raked sufficiently to be plumb after all load has been placed, or as otherwise directed by the Engineer.

(k) Control Equipment

Where specifically detailed on the Drawings, for service locations where two or more lighting circuits are operated from one time switch control

device, the relays, service breakers and any other necessary control equipment shall be grouped together and installed in a suitable raintight enclosure of a sufficient size to accommodate all of the equipment installed therein.

Each electrical control ballast assembly shall be protected by molded circuit breakers.

(l) Signal Controllers

All control cabinets and control equipment shall be factory wired ready for operation. Fieldwork shall be limited to placing cabinets and equipment and connecting field wiring to filed terminal strips.

(m) Signal Heads

All signal heads shall be installed as shown on the Drawings. Signal heads shall not be installed at any intersection until all other signal equipment, including the controller, is in place and ready for operation at that intersection, except that the signal heads may be mounted if the faces are covered.

(n) "As-Built" Drawings

Upon completion of the work, the Contractor shall submit "As-Built" or corrected drawings, or any data therefore as required by the Engineer, showing in detail all construction changes, especially location and depth of conduit and completed schematic circuit diagram.

The final "As-Built" drawings shall be plotted in A3 size on sheets conforming to the standard drawing and shall be supplied to the Employer within 14 days after completion of construction.

(o) Guarantee

The Contractor shall furnish to the Employer any guarantee or warranty required as a normal trade practice in connection with the purchase of any materials or items used in the construction of the illumination or traffic signal system or system included in this Contract.

S13.01(15) Method of Measurement

The quantity of each item paid for under this clause will be the number of each, linear metres or individual items as detailed below which are furnished and installed in accordance with this Specification, the Drawings and the instructions of the Engineer.

(a) Type of Lighting Units

The furnishing, transportation, erection of poles including lighting units, installation of anchor bolts, nuts, washers, inlet and outlet conduit for cables, foundation concrete materials and associated civil works for each type of lighting unit to be installed shall be the number of each lighting unit furnished, installed in place and accepted by the Engineer.

(b) Panel MDP and Panel SS

The furnishing and mounting of panel types MDP and SS including installation of anchor bolts, nuts, washers, foundation concrete materials,

brackets, cable trenches, supports, site testing with collection of data, field painting, and associated civil works for each panel type MDP and SS furnished, mounted, and installed in place and accepted by the Engineer.

(c) Panel DB

The furnishing and mounting of panel type DB with anchor bolts, nuts, washers, concrete materials, cable duct, pull boxes, handhole of cable inlet, site testing with collection of data, field painting, and associated civil works for each panel type DB furnished, mounted, and installed in place and accepted by the Engineer.

(d) High Mast Lighting

The work of high mast lighting will include furnishing, assembly and erection of the mast, mast head, lanterns, wiring, electrical control gear, base plate and anchor bolts complete for the mast and underground concrete cable trenching. A removable lowering and raising device drive motor unit shall be furnished and payment shall be full compensation for supply of the drive motor and all its mountings, control equipment and other requirements for each of the high mast lighting units furnished, mounted, in place and accepted by the Engineer.

(e) Watt Hour Metre and Box

Before installation of the watt-hour metre and box the Contractor shall pay all fees and obtain the necessary permits from POWER COMPANY together with the approval of the Engineer.

A lump sum shall be provided by the Contractor to include for furnishing, installation and fees, as noted above, of all watt-hour metres required under this Contract including grounding cables and earth rods, testing and collection of data and all other required matters that are necessary for the installation and acceptance by the Engineer of all watt hour metres.

(f) Grounding Systems

The whole system of grounding under this item will be paid for as a lump sum for the work as provided hereunder. The lump sum payment shall be full compensation for all materials, labour, electrode rods, laying of BCC wires, clamps and fittings, PVC conduit and fittings, tools, testing and recording of data, incidentals including all those necessary for requirements in full operational and functional conditions of the grounding systems.

For purposes of progress claim a breakdown of this lump sum item shall be included in a "Schedule of Lump Sum Items" as an annex to the Bid Schedule wherein the Bidder shall enter a unit price breakdown for lump sum which shall then be subject to the review and approval of the Engineer in accordance with the Specifications and other Documents.

(g) Cables

The furnishing and installing of each cable shall be measured in place by the linear metre of the cables, including connections, splicing materials, termination materials, insulation tapes, field test and data, relative civil works and other require, the quantity measured for payment shall be the

number of metres of cables furnished, installed in place and accepted by the Engineer.

(h) Conduit and fittings

The furnishing and installation of conduit shall be measured in place by the linear metre of the conduit, including fittings.

The conduit will be paid for at the linear metre price as provided hereunder. Such payment shall also be full compensation for all materials, labor, plant, equipment, tools, and incidentals necessary to insert and pull the cable through the conduit including all permits for testing and other miscellaneous items that may be required to ensure the full operational and functional conditions of the electrical conduiting systems.

(i) Power Supply System

The System under this item will be paid for at lump sum price as provided hereunder. Lump sum price and payment shall be full compensation for all necessary material Power Company, labors, transportation for the delivery equipment, and materials and including erecting of concrete pole, framing supports, fixed transformer, isolators, insulators, connection cables, grounding, and all necessary for requirements in full operation and functional conditions.

(j) Buried Cable Protectors

After cables have been laid they shall be protected by concrete tile cable marker or protector of a design approved by the Vietnam Power Authority. (Tong Cong Ty Dien Luc Viet Nam )

(k) Underground Duct banks and Manholes

These are covered in Section 13.02 of these Specifications.

S13.01(16) Basis of Payment

The quantity measured as provided above, shall be paid at the Contract unit price per unit of measurement for each pay item as described below. The price and payment shall be full compensation for furnishing and placing all materials, labor, tools, equipment and incidentals necessary to complete the work shown on the Drawings or described in these Specifications.

Pay Item No.	Description	Unit of Measurement
13.01(1)	Road Lighting Unit, Type A2.1	each
13.01(2)	Road Lighting Unit, Type A4.1	each
13.01(3)	Road Lighting Unit, Type B2.1	each
13.01(4)	Road Lighting Unit, Type F1	each
13.01(5)	Road Lighting Unit, Type G1	each
13.01(6)	Power Supply Receiving Panel (SS)	each



13.01(7)	Low Voltage Distribution Panel (MDP)	each
13.01(8)	Lighting Panel (DB)	each
13.01(9)	Cable, X-LPE Armer, Type 4c - 50mm <sup>2</sup>	linear metre
13.01(10)	Cable, X-LPE Armer, Type 4c - 25mm <sup>2</sup>	linear metre
13.01(11)	Cable, X-LPE Armer, Type 4c - 16mm <sup>2</sup>	linear metre
13.01(12)	Cable, X-LPE Armer, Type 4c - 10mm <sup>3</sup>	linear metre
13.01(13)	Cable, X-LPE/ PVC 4c - 10mm <sup>2</sup>	linear metre
13.01(14)	Grounding Wire, BCC 6mm <sup>2</sup>	linear metre
13.01(15)	PVC Conduit, 50mm dia with Fittings	linear metre
13.01(16)	Pull Box, Type F	each
13.01(17)	Pull Box, Type G	each
13.01(18)	Power Receiving, 30 kVA	each
13.01(19)	Application for Power Connection	each
13.01(20)	Watt Hour Meter Box and Panel	each
13.01(21)	Protection of Expansion Joint	each
13.01(22)	Buried Cable Protector	linear metre
13.01(23)	Marker for Underground Cables	each
13.01(24)	Navigation Light	set
13.01(25)	Control Cable, X-LPE 7c-10mm <sup>2</sup>	linear metre
13.01(26)	Traffic Control Master Unit	each
13.01(27)	Manual Push Botton	each
13.01(28)	Traffic Signal Unit, Type 1	each
13.01(29)	Traffic Signal Unit, Type 2	each
13.01(30)	Emergency Back-Up Unit	each
13.01(32)	Power Connection	LS

S13.02 Civil Works for Electrical Items

S13.02(1) Description

The work under this clause will include anchor bolts in concrete structures, manholes, duct bank, installation of pull boxes and conduiting in bridge parapets as necessary for the installation of the Road Lighting Systems as described in Clause S13.01.

S13.02(2) Materials

All materials used shall conform to the details given on the Drawings. In the absence of any details on the Drawings, the work shall be carried out in accordance with the relevant sections of these Specifications and the instruction of the Engineer. The materials for conduit and fittings shall be as given under Clause S13.01.

S13.02(3) Construction

(a) Anchor Bolts in Concrete Structures

All details of anchor bolts shall be in accordance with the Drawings and the relevant parts of Clause S10.01. Anchor bolts shall be fixed in the concrete structure positions and held in place by means of templates until the concrete has set.

(b) PVC Conduiting in Concrete Parapets

The installation of the required conduits shall be performed in accordance with these Specifications and in reasonably close conformity with the locations as specified in the Drawings or as directed by the Engineer.

The size of PVC conduit used shall be as shown on the Drawings. Conduits smaller than 50 mm diameter electrical trade size shall not be used, unless otherwise specified. It shall be the option of the Contractor, at his own expense, to use larger size conduit if desired, and where larger size conduit is used, it shall be for the entire length of the run from pull box to pull box. No reducing coupling will be permitted.

All PVC conduit bends shall be pre-formed.

(c) Pull Box in Concrete Parapets

Pull boxes shall be installed in parapets at the location shown on the Drawing, and, at such additional point as ordered by the Engineer. The Contractor may install, at his own expense, such additional boxes as may be desired to facilitate the works.

(d) Electrical Manholes

All details of manholes shall be in accordance with the Drawings and the relevant requirements of the other Clauses of this Specification. Conduit or duct endings shall be fixed in the proper position and held in place by means of templates until the concrete has set. A rubbed surface finish shall be applied to exposed concrete surface in accordance with Section 10 of these Specifications.

Excavation for cable installation shall be of the width necessary for satisfactory laying of the cable and shall ensure that cables are at least 600 mm below finished level. The bottom of the cable track shall be level and

free from stones or other sharp objects. The depth of the cable may be increased if this is necessary to avoid existing obstructions.

(e) Underground Duct

The location of ducts will be as shown on Drawings or as instructed by the Engineer. Unless the Contractor elects at his own expense to install ducting by jacking or drilling, all work on ducts shall be completed before work is started on the sub-base course. Full details of any ducts to be installed by jacking or drilling must be submitted to the Engineer for his approval. Unless otherwise instructed, all ducts shall extend at least 600 mm beyond the edge of the pavement.

Suitable marker stakes shall be set at the ends of ducts which are buried so that they may be easily located. Existing underground ducts to be incorporated into a new system shall be blown out with compressed air and checked with a mandrel. A galvanized pull wire shall be installed in all duct which are to receive future cables. At least 600 mm of pull wire shall be doubled back into the duct at each termination. All ducts shall be laid in straight lines only, with a minimum number of joints throughout the lengths of each duct run.

Where joints must be provided the ends of all duct shall be well reamed to remove burrs and rough edges. Where metallic conduits have been specified field cuts shall be made square and true so that the ends will butt or come together for the full circumference thereof. Slip joints or running threads will not be permitted for coupling metallic ducts. When a standard coupling cannot be used an approved threaded union coupling shall be used. The threads on all ducts shall be well painted with a good quality of lead or rust preventive paint before couplings are made up. All ducts shall be checked with a mandrel after completion of each installation.

Unless otherwise approved by the Engineer ducts shall be laid to a depth of not less than 600 mm below the curb grade in the sidewalk and all other areas and to a depth of not less than 800 mm below the finished grade in road-crossing areas.

(f) Duct bank

Underground duct line shall be constructed of individual conduits encased in concrete. Except where rigid galvanized steel conduit is indicated or specified, the conduit shall be of PVC type EB (Yellow Color). The kind of conduit used shall not be mixed in any one duct bank. Ducts shall not be smaller than 100 mm in diameter unless otherwise indicated.

The top of the concrete envelope shall not be less than 450 mm below grade except that under roads and pavement, it shall be not less than 600 mm below grade.

Duct lines shall have a continuous slope downward toward underground structures and away from building with a pitch of not less than 76 mm in 30 metres. Except at conduit risers, changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by a long sweep bends having a minimum radius of curvature of 7.6 metres, sweep brands may be made up of one or more curved or straight sections or combinations thereof. Trenches shall be excavated along straight lines from structure to structure before ducts are

laid or structure constructed so the elevation can be adjusted, if necessary, to avoid unseen obstruction.

(g) Termination of Duct

Conduit shall terminate in end-bells where duct lines enter underground structures. The joints of the conduits shall be staggered by rows and layers so as to provide a duct line having the maximum strength. During construction, partially completed duct lines shall be protected from the entrance of debris such as mud, sand dirt by means of suitable conduit plugs. As each section of duct line is completed from structure to structure, a testing mandrel not less than 300 mm long with a diameter of 6 mm less than the size of the conduit, shall be drawn through each conduit, after which a brush having the diameter of the duct, and having stiff bristles shall be drawn through until the conduit is clear of all particles of earth, sand and gravel, conduit plugs shall then be immediately installed. Provide a plastic pull rope, having 1 metre of spare at each end of the ducts.

For duct line connections to concrete pads, break an opening on the pad out to the dimensions required and preserve the steel in the pad. Cut the steel and bend it out to the ties into the reinforcing of the duct line envelope. Chip out the opening in the pad to form a key for the duct line envelope.

During construction, wherever a construction joints is necessary in a duct line, debris such as mud, sand and dirt shall be prevented from entering into the ducts by providing suitable conduit plugs etc.

Fit the concrete envelope of a partially completed duct line with reinforcing steel for a minimum of 600 mm beyond the end of the envelope. Reinforcing bars shall be provided as shown in the plans.

(h) Under ground Conduit for Branch circuits

Underground conduits for branch circuits shall be PVC from the panel board and lighting pole and projections thereof. The ends of the conduits shall be protected by caps. Conduits shall be cleaned and plugged until conductors are installed. The underground portion of the conduit shall be encased in a concrete envelope and shall be buried as specified for underground ducting with concrete encasement.

(i) Excavation and Backfilling

All excavation for manholes, ducts, and cable installation shall be carried out so as to minimize damage to existing surfaces. The Contractor will reinstate all surfaces on completion of backfilling to the original condition and in accordance with the Engineer's instruction.

To facilitate reinstatement the outline of all areas to be removed in asphalt concrete pavement shall be cut to a minimum depth of 50 mm with a saw, prior to removing the pavement materials. Cut for remainder of the required depth may be made by a method satisfactory to the Engineer. Cuts shall be neat and true and surfaces outside the removal area shall not be damaged.

The Engineer may waive or modify the above requirements for excavation and reinstatement when the excavation lies within an area to be overlaid or reconstructed under other clause of the Specifications.

All backfilling for manholes, duct banks and ducts shall comply with the requirements of Section 6 of these Specifications.

S13.02(4) Method of Measurement

The quantity of each item paid for under this clause will be the number of, set, linear metre, each or other individual items as detailed below which are furnished and installed in accordance with this Specification, the Drawings and the instruction of the Engineer.

S13.02(5) Basis of Payment

The quantities, determined as provided above, shall be paid at the Contract prices per unit of measurement for the pay items as listed below, which price and payment will be full compensation for all materials, labor, equipment and other incidentals necessary to complete the work in accordance with the Drawings, these Specifications and as instructed by the Engineer.

In particular, the unit prices for the provision of anchor bolts, conduits, fittings and pull boxes shall include not only for their installation but also for such things as repairs to the concrete and reinforcement that the Engineer may consider necessary. Payment will be deemed to be included in the unit rate for furnishing, installing, and repairing.

<b>Pay Item No.</b>	<b>Description</b>	<b>Unit of Measurement</b>
S13.02 (1)	Duct Bank, Type A	linear metre
S13.02 (3)	Manhole, Type A	each



## SECTION 15 : DIVERSION AND PROTECTION OF EXISTING UTILITIES

### S15.01 Diversion and Protection of Existing Utilities

#### S15.01 (1) General

- (a) This work consists of the identification, location, replacement, relocation, diversion and protection of existing public utilities.
- (b) The locations of most of the installations are unknown at this point however the locations and routes will be established later by the Contractor together with the respective provincial utility authorities.

#### S15.01 (2) Scope of Work

The scope of this work will be covered by the allowance of a provisional sum for Item 15.01 for purposes of expenditure by the Contractor, or by others as directed, for the supply and delivery to site, installation, testing and commissioning as required of all materials, equipment and labour for the diversion or protection of the following utilities:

- (i) Clean water mains
- (ii) 20 kV medium voltage overhead lines
- (iii) 20 kV medium voltage ground cables
- (iv) 220 V/380 V low voltage overhead lines
- (v) Electric substations
- (vi) Telephone overhead lines
- (vii) Telephone ground cables (fibre optic cable)
- (viii) Other utilities as directed by the Engineer

Along with the associated civil engineering works, all to the extent and in accordance with the Drawings, Standards and Specifications for the installations issued by the Vietnam Utility Authorities being:

- Local water supply company (Cong ty cap nuoc) for all the clean water main supply pipes.
- Electricity Company of Vietnam (Tong Cong Ty Dien Luc Viet Nam) for 20 kv medium voltage overhead and underground installations, 220 V/380 V low voltage distribution overhead lines and electric substations.
- Provinces Communication Company (Cong ty dien thoai cua tinh) for the telephone overhead and in-ground cables.
- Vietnam National Railways (Đuong Sat Quoc Gia Viet nam)

#### S15.01 (3) Drawings and Documents

The Contractor refer to all relevant drawings issued by the Authorized Agencies to ascertain for himself the location and routes of all utility services so as to maintain

adequate clearance between the services. The supplied drawings will usually indicate the general arrangement of the works, the Contractor is therefore required in accordance with clause S1.28 to provide working drawings showing the exact routes of all pipes, overhead and underground installations, the exact run of conduits and trunking, the location of manholes or control holes, draw-in and junction units, the number and size of cables in each conduit, etc.

S15.01 (4) Standard, Specifications and Codes

With regards to:

- Materials Specifications
- Codes, Standards, Construction Practices
- Factory Inspections and Acceptance Test Procedures
- As built drawings

Should they be required for the Contractor to do work these will be supplied by the relevant Provincial Utility Authority.

S15.01 (5) Method of Measurement

For each utility or service to be replaced, relocated, diverted, protected or constructed the extent of work and the method of measurement will be established by the Engineer in accordance with the requirements of the work as directed by the Employer and the actual work carried out by the appropriate authorities or by the Contractor if so required.

S15.01 (6) Basis of Payment

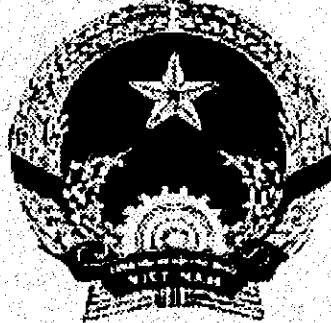
A Provisional Sum is designated in the Bid Schedule for diversion and protection of existing utilities under Item 15.01.

The work for the Provisional Sum, measured as specified above, where applicable will be valued in accordance with Clauses G.01 and G.52 of the General Conditions of Contract.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
15.01	Provisional sum for the diversion of existing utilities	Provisional Sum



**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE  
PACKAGE 2 : GIA LAM SECTION  
PACKAGE 3 : THANH TRI SECTION  
PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

**VOLUME III  
SPECIAL SPECIFICATIONS**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**

**SPECIAL SPECIFICATIONS**  
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SS.01 Night, Sunday or Official Holiday Work

In clarification of Clause G.45 of the General Conditions of Contract, it should be noted that the Engineer will not withhold permission for night, Sunday or official holiday work provided that he is satisfied with the Contractor's arrangements for compliance with Clauses G.19 and G.29 of the General Conditions of Contract and other relevant requirements of the Contract Documents. All work at night shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, costs, charges and expenses whatsoever in regard or in relation to such liability.

SS.02 Taxes and Duties and Other Matters

- i. Contractors, their personnel, their equipment and their materials will be subject to all legally established rules and regulations of the Government of the Socialist Republic of Vietnam regarding customs, taxes, immigration, importation and clearance of goods and the like applicable to this type of contract and its financing, unless otherwise agreed upon between the Government of Vietnam and other relevant parties.
- ii. However, in the preparation of the Unit Prices and Bid, Value Added Tax (VAT) to be paid in Vietnam will be treated separately from the other local taxes and duties. The Net Bid Sum shall be prepared on the basis that Vietnamese taxes except for VAT are contained within the Unit Prices and Work Items of the Net Bid Sum. Bidders shall then include their allowance for their net liability for VAT as a separate amount to be added to the local currency component of the Net Bid Sum. In this sense the Total Bid Sum will then be equal to the Net Bid Sum plus net Vietnamese Value Added Tax.
- iii. In the calculation of the allowance for net Vietnamese VAT it is fully and solely the Bidder's responsibility to consider and make all due allowance in accordance with the relevant regulations. No claims whatsoever for any additional compensation will be considered in this respect.

The Government will assist in making arrangements for the Contractor and his expatriate personnel, including dependents, if appropriate, to be provided with all necessary entry and exit visas, residence permits and travel documents required for his and their stay in Vietnam.

SS.03 Price Escalation

- SS.03.1 Adjustment for Fluctuation in Cost: In elaboration of Clause G.70 of the General Conditions of Contract the amounts payable by the Employer to the Contractor under the Contract for Major Pay Items shall be subject to adjustment due to such fluctuation in the cost of major components of the Unit Price of such Pay Items as may occur during the second and subsequent years of the execution of the Contract. The accounting and payment of all such adjustment amounts to be paid by the Employer shall be made only in the currency of VN Dong, which amounts shall be calculated in accordance with the provisions of Clause SS.03.2 hereof.

Adjustments to payments on account of cost fluctuation in accordance with this Clause shall be made for all work certified for payment within the schedule time for completion or such extended time for completion as may have been granted by the Engineer under Clause G.44 of the General Conditions of Contract. Any work certified for payment after the expiry of the scheduled time for completion, as defined in Clause G.43 of the General Conditions of Contract, or after any extension of time for completion as may have been authorized under Clause G.44 of the General Conditions of Contract shall not be subject to adjustment under this clause. If, during the execution of the Contract, the Contractor and the Engineer should agree to vary any of the Unit Prices of the Major Pay Items, in accordance with Clause G.51 or G.52 of the General Conditions of Contract, the Unit Prices so agreed shall also be subject to adjustment for fluctuation in cost in accordance with the provisions of this Clause.

Major Pay Item refers to any Pay Item, as defined in Clause G.01(1) of the General Conditions of Contract, which may have, at any time during the entire period of the Contract, a value based on the product of the Unit Price and the current estimated quantity of work which is equal to or greater than 5 (five) percent of the current Contract Sum.

**SS.03.2 Cost Fluctuation Adjustment Formula**

The amount by which the net value of work certified for payment in any given Monthly Certificate for each of the Major Pay Items is to be adjusted shall be calculated in accordance with the following formula:

$$K = \frac{80 V}{100} \left[ \frac{l(L-L^1)}{L^1} + \frac{f(F-F^1)}{F^1} + \frac{m(M-M^1)}{M^1} + \frac{e(E-E^1)}{E^1} \right]$$

where :

- K = Adjustment amount for the Major Pay Item in question
- V = Valuation of work certified for payment as having been completed during the particular month under consideration, based on the product of the net certified quantity and the local currency equivalent of the combined local and foreign currency components of the Unit Price entered in the Contract for the Pay Item concerned, but without deduction of any retention amount and without deduction in respect of the advance payment.

The currency exchange rate to be used in converting the foreign currency component of the Unit Price into an equivalent local currency component shall be the official selling rate of exchange for VN Dong quoted by Vietcom Bank applicable 30 days prior to the date of opening the Bids.

- L = General cost of living index as published by the General Statistical Office Hanoi shall be that prevailing 30 days prior to the 25th day of the particular monthly claim period (Current Index).
- L<sup>1</sup> = Index defined under L above but applicable one year from the date of Commencement of Works as defined in the Instructions To Bidders (Base Index).

- F = Index of cost for high speed diesel fuel as established by Petrolimex Vietnam shall be that prevailing 30 days prior to the 25th day of the particular monthly claim period (Current Index).
- F<sup>1</sup> = Index as defined under F above but applicable one year from the date of Commencement of Works as defined in the Instructions To Bidders (Base Index).
- M = Wholesale price index of construction materials by type of construction in Vietnam, Sub-sector Public Works on Roads, Bridges and Ports as published by the General Statistical Office Hanoi shall be that prevailing 30 days prior to the 25th day of the particular monthly claim period (Current Index).
- M<sup>1</sup> = Index as defined under M above but applicable one year from the date of Commencement of Works as defined in the Instructions To Bidders (Base Index).
- E = Wholesale price index of construction equipment in Vietnam for the group "other machinery imported", as published by the General Statistical Office Hanoi shall be that prevailing 30 days prior to the 25th day of the particular monthly claim period (Current Index)
- E<sup>1</sup> = Index as defined under E above but applicable one year from the date of Commencement of Works as defined in the Instructions To Bidders (Base Index).
- l, f, m and e = Standard factors according to Table SS.03-1 for the relative component cost of (l) Labour, (f) Fuel and Lubricant, (m) Materials and (e) Equipment for selected Pay Items.

TABLE SS.03-1 SELECTED PAY ITEMS FOR ESCALATION / DE-ESCALATION

Selected Pay Items			Component Cost Factor			
No.	Description	Unit	l	f	m	E
4.04 (1)	Borrow Material	m <sup>3</sup>	0.05	0.05	0.02	0.68
4.10 (1)	Vertical Soil Drains	m	0.05	0.03	0.65	0.07
9.07(3)	Asphalt Binder Course	m <sup>2</sup>	0.04	0.01	0.74	0.01
9.07(3)	Asphalt Surface Course	m <sup>2</sup>	0.04	0.01	0.74	0.01
9.07(3)	Asphalt Cement	Ton	0.00	0.00	0.80	0.00
10.01	Structural Concrete	m <sup>3</sup>	0.06	0.01	0.64	0.09
10.02	Reinforcing Steel Bars	kg	0.06	0.00	0.74	0.00

Note : Inclusion of a Pay Item in this table does not infer that the item is subject to adjustment in cost due to escalation/de-escalation. Only Major Pay Items as defined in Clause SS.03.1, are subject to such adjustment. For Major Pay Items not included in Table SS.03-1 values for the standard factors l, f, m and e shall be agreed between the Engineer and Contractor. In the event of the Engineer and Contractor failing to agree on values for the factors, then, with the approval of the Employer, the Engineer shall fix such values as shall, in his opinion, be reasonable and proper.

#### SS.03.3 Indices

Indices, as published by the General Statistical Office Hanoi, Vietnam are the basic source for all indices except for fuel. The indices to be used in the cost fluctuation adjustment formula shall be those published which are closest to the dates under consideration.

If during the execution of the Contract, the method of establishing the indices, or the basket of materials or items change, the Employer, in close cooperation with, the General Statistical Office and Petrolimex Vietnam or other neutral bodies, shall establish new indices that are comparable with the indices applicable 30 days prior to the date of opening the bids.

If during the execution of the Contract, it is established that an index is not adequate, in that its application leads to hardship or unreasonable gains to the Contractor, then the Employer may decide to replace such an index by a more adequate one.

#### SS.03.4 Claims for Cost Fluctuation Adjustment

Claims for cost fluctuation adjustment to the net value of work completed for each of the Major Pay Items shall be submitted by the Contractor no later than the last day of each month. The actual indices used in the calculations shall be the base indices (as defined under clause SS.03.2) and either the indices appropriate to the actual progress schedule or those appropriate to the planned progress schedule depending on whether the actual progress is ahead of or behind the planned progress schedule. The planned progress schedule is that described in Clause SS.0 9.4 of these Special Specifications.

Interim payments for materials on site will not be subject to price escalation/de-escalation. It should be anticipated that the submission of a claim for cost fluctuation adjustment on work certified for payment in a given month will be made separately in a later month after the relevant cost fluctuation indices have been published .

The Contractor shall be responsible for the collection of necessary documentation in support of the cost fluctuation indices used in his claim.

#### SS.03.5 Certification and Payment for Cost Fluctuation Adjustment

In conjunction with the monthly statements that are certified for payment in accordance with Clause G.58(5) of the General Conditions of Contract, but no later than 7 (seven) days after receipt of the Contractor's claim for cost fluctuation adjustment, the Engineer will prepare a separate monthly price escalation/de-escalation statement covering exclusively the value of the required payment adjustment for the various Pay Items affected by the change in the cost fluctuation indices.

If the Engineer should find the claim for cost fluctuation adjustment to be incorrect in any way he may either, amend the value of the claim when preparing the price escalation/ de-escalation statement and promptly notify the Contractor in writing giving the reasons for the amendment or, return the claim to the Contractor for adjustment and re-submission.

The price escalation/de-escalation statements which are prepared in this manner shall be signed by the Contractor and approved by the Engineer before the end of the tenth of the following month. However, each statement so prepared shall be considered provisional and not final on account until the total adjustment for fluctuation in cost over the whole Construction Period has been determined and certified by the Engineer. For this purpose a final Price Escalation /De-escalation Certificate will be prepared and included in the statement of final account to be issued by the Engineer pursuant to Clause G.59(3) of the General Conditions of Contract.

At intervals of three months, or such other interval as may be designated by the Engineer, the aggregated adjustment amount of the approved price escalation/de-escalation statements for the period in question shall be computed. The amount to be paid to the Contractor or in the case of a negative adjustment the amount to be deducted from the Contractor's account, shall be processed as a variation to the Contract in accordance with Clause G.51 of the General Conditions of Contract and accordingly the Engineer shall generate an Addendum to vary the Contract Sum.

In the event that the value of the cost fluctuation adjustment is a positive sum to be paid to the Contractor, such adjustment sum will not, in accordance with Clause G.51.(2) of the General Conditions of Contract, be certified for payment until after the appropriate Addendum has been formally issued. However, prior to the issue of any such Addendum, the Engineer, at his discretion and if so requested by the Contractor, may certify and make interim payments for cost fluctuation adjustment to the Contractor of up to 70 (seventy) percent of the anticipated monthly escalation amount calculated in accordance with the Contractor's planned progress schedule and the schedule of estimated indices issued by the Employer after the signing of the Contract. Any such interim payments so made shall be taken into account by the Engineer in the Final Price Escalation/De-escalation Certificate.

SS.04 Offices, Housing, Vehicles, Computers and Staffing for the Employer, Engineer and their Staff

The following elaborates on and describes the Contractor's obligations under Clause S1.09 of the General Specifications.

SS.04.1 General

Unless otherwise specifically approved, all furniture and equipment to be provided by the Contractor shall be new and of approved type.

The Contractor's obligations under this Clause will take effect from the Date of Commencement of the Works. Until the Contractor has supplied the necessary transport and completed the office and housing accommodation and supplied and fitted it out in a suitable manner for occupation, the Engineer will be entitled to take appropriate action and to charge all the relevant expenses to the Contractor.

Summary of Obligations for Engineer's Houses, Vehicles, Offices and Equipment

Item	Source	Start Date	End Date (*)	Eventual Ownership
Site Office for each Package	Constructed by Contractor	C.D.	60	Employer
Furniture, Equipment and Servicing for the above.	Purchased by Contractor.	C.D.	60	Employer
Hanoi Office	Rented	C.D.	90	Employer
Furniture, Equipment and Servicing for the above.	Purchased by Contractor	C.D.	90	Employer
Housing in Hanoi	Purchased or Rented	C.D.	90 (some earlier)	Returned to Contractor
Furniture, Equipment and Servicing for the above.	Purchased by Contractor	C.D.	90 (some earlier)	Contractor
Vehicles for Site Staff (including servicing etc.)	Purchased by Contractor	C.D.	60	Employer
Vehicles for Hanoi Staff (including servicing etc.)	Purchased by Contractor	C.D.	90 (some earlier)	Employer

C.D. - Commencement Date as given in Notice to Proceed.

(\*) Days after Provisional Handover Date

Until the above facilities are transferred to the Employer or returned to the Contractor, the Contractor will be responsible for all repair, servicing and maintenance works for all buildings, roads, facilities, equipment, fittings and household effects, including any existing facilities utilized under this contract. This obligation will include the repair or replacement of any equipment or facilities rendered unserviceable by fair wear and tear.

The Contractor's responsibility for the servicing of offices and housing will include the provision of, and payment for all telephone, gas, water, electricity charges and for the relevant usage and accommodations.



SS.04.2 Offices

Air conditioned offices shall be provided by the Contractor for the Engineer, the Employer and their staff and the size, fittings and equipment shall be as given in Table SS.04-1.

A site, or sites, will be provided by the Employer for the offices to be constructed within the project right-of-way.

(1) Office Details

The Engineers' Project Administration Office in Hanoi and the Project Administration and Construction Site Offices at Project Site shall be provided under this contract at the times and at the locations described. Where practical the construction site office will be located at or near the Contractors base camp. All locations to be approved by the Engineer. The offices shall comply with all building requirements and regulations.

At the Contractor's option the on-site buildings may be of in-situ or prefabricated construction until the completion of the permanent Project Administration and Construction Site Offices construction.

Materials, equipment and furnishings used in the buildings shall be new, serviceable and adequate for the required purpose. Sites for offices shall be filled and graded to accept the building structure, shall be free draining and provided with asphalt paved access roads and parking areas.

Buildings shall be structurally sound, water tight with floors raised above ground and shall be provided with a minimum ceiling height of 2.8 m and a roof overhang of the walls of at least 1.5 m.

All doors shall be fitted with approved cylinder type locks and all windows shall be of the opening type and fitted with insect screens. The offices shall be painted as directed by the Engineer.

The Project Administration and Construction Site Office shall be provided with all services such as electricity, telephone, gas, water and sanitation. Standby generators of 220/380V/5000VA shall also be provided at the Construction Site Office, fueled and maintained by the Contractor to provide power supply in the event of a failure in the main supply.

Lighting shall provide a minimum of 50 Lumens at desk top height and power outlets will be installed not more than 5.0 m apart when measured along walls. Exterior lighting shall be provided at the entrance door and at the building corners. Air conditioning shall be adequate to maintain a satisfactory working environment. Adequate fire fighting equipment shall also be provided.

The Contractor shall prepare and submit detailed working drawings and equipment details and brochures and shall obtain approval from the Engineer before constructing the offices or providing the equipment. The Contractor shall provide an office cleaner on a full time basis for the offices along with the necessary implements and materials and maintain the offices in a clean and presentable condition. Security of the offices shall be the Contractors responsibility as provided for in Clause G.19 of the General Conditions of Contract.

**Table SS.04-1 Fittings and Equipment for Offices**

Item/Description	ENGINEERS' HEAD OFFICE IN HANOI	PROJECT ADMINISTRATION AND CONSTRUCTION SITE OFFICE AT EACH PACKAGE
Office Building with air conditioning and utilities. Floor area (minimum)	200 m <sup>2</sup>	150 m <sup>2</sup>
Photocopy machine (A3 size reducing)	1 unit	1 unit
Writing desks (1.6 m x 0.8 m x 0.75 m)	24 units	14 units
Standard office chairs	24 units	16 units
Conference table and chairs for 10 people	1 unit	1 unit
3 Person Sofa & 2 Easy Chairs-Matching Set	1 unit	1 unit
AO size drafting tables ( with lamp and stool )	1 unit	1 unit
Lockable metal drawing cabinets (4 drawers - A1 size)	2 units	1 unit
Metal filing cabinets (4 drawers)	6 units	6 units
Open filing shelves (front area)	10 m <sup>2</sup>	6 m <sup>2</sup>
Whiteboards 90 cm x 180 cm	1 unit	1 unit
Table lamps	-	5 units
Kitchen facilities (cupboard, piped water, sink)	1 unit	1 unit
2 door refrigerator /freezer(240 litre)	1 unit	1 unit
Small Microwave Oven.	-	1 unit
Cups, glasses, etc.	24 sets	20 sets
Supply of bottled (19 litre) drinking water ("Le-Vie " or similar) together with approved Hot / Cold water dispenser	1 unit	1 unit
European water-closets	Access to 4 units	2 units
Urinal	Access to 3 units	2 units
Wash hand basin	Access to 3 units	2 units
Telephones, Fax Machines and dedicated lines	1 Facsimile machine with one dedicated line. Three telephone instruments with one dedicated line.	1 Facsimile machine with one dedicated line. Four telephone instruments and two dedicated lines.
Mobile (cellular) telephone	2 units	2 units
PC Computer Systems complete	8 systems + 1 laptop	4 systems
Digital Camera System incl. Flash RAM	-	2 systems
35mm Automatic Camera with Flash Unit	1 system	1 system
Office supplies, stationary and fees for the period of office use.	\$800 per month	\$600 per month
Waste paper baskets, desk trays, and other minor items to the requirements of the Engineer	as required	as required

(2) Computers

1. The PC desk top computer and lap top systems to be provided by the Contractor are for the use of the Employer's and Engineer's staff. And shall be of the specification as given below.
2. The Contractor shall include for the costs of supplying such miscellaneous items as uninterruptable power supplies and voltage stabilizers of suitable rating, power leads, cables and adapters as necessary to install the equipment and a desk and operator's chair for each computer system.

<p><u>DESK TOP COMPUTERS</u> (Ten for Engineer and Two for the Employer )</p>	<p>500 Mhz "Intel-Pentium III" Processor with 128 Mb Sync DRAM; 9 Gb Hard Drive; 40X Max. CD-ROM Drive</p> <p>56Kb upgradable (33.6K) Modem; 512 Kb Pipeline Burst Cache</p> <p>SVGA Color Monitor-14" compatible with the supplied computer.</p> <p>Miscellaneous items as an uninterruptable power supply and voltage stabilizer of suitable rating, power leads, cables and adapters as necessary to install the above equipment to the Employers and the Consultants requirement</p> <p>Software for digital camera systems.</p>
<p><u>LAP TOP COMPUTER</u> (One for the Employer)</p>	<p>IBM or equivalent with 333 Mhz "Intel-Pentium II" Processor with 128 Mb Sync DRAM; 9 Gb Hard Drive; 32X Max. CD-ROM Drive; internal 56 Kb Modem; Video Card 8 Mb.; 14" Monitor. Battery pack and accessories.</p>

3. The Contractor shall also supply four (4) new Laser Jet Printers (Size A3, A4 ) + Toner + Cable.

(3) Mobile Telephones

In addition to the provision of standard telephones and facsimile machines included under Table SS.04.1 above the Contractor shall supply four (4) cellular network (mobile) telephones of such design and capacity as to allow communication between the offices and the construction sites. These shall be for the sole use of the Employer and the Engineer and the Contractor's obligations shall include for the payment of all telephone charges and any servicing and batteries required during the contract period.

(4) Radio Communication System

The Contractor shall supply a licensed VHF radio system for the sole use of the Engineer's and Employer's staff. The equipment so supplied shall of sufficient design and capacity to allow communication between the site offices and a motor vehicle 5km past the furthest boundary of the site. Provision shall include the necessary base mast and equipment, aerials and vehicle fittings to provide for the mobile stations. Besides the equipment to be installed at the site offices, the Contractor shall also supply six(6) mobile sets to be installed in the project vehicles; and nine (9) hand held sets. The provision of such radio system shall also include for servicing and maintenance by the Contractor and payment of any licensing fees and installation charges.

(5) Staffing of Offices

The Contractor shall also be responsible for the satisfactory staffing of the following positions at the locations indicated in the following table:

1. ENGINEERS' ADMINISTRATION AND HEAD OFFICE HANOI		
POSITION	No. REQUIRED	PERIOD OF REQUIREMENT
Translator	2	From Commencement Date until 90 days after Provisional Handover.
Bilingual Secretary	1	
Janitor	1	
2. ENGINEERS' SITE OFFICE LOCATED AT EACH PACKAGE		
Translator	1	From Commencement Date until 60 days after Provisional Handover
Bilingual Secretary	2	
Janitor	1	

Salaries payable shall include an allowance for mobilization, social fringes, social and health insurance, trade union funds, bonus, annual wage increases, out of city allowance and accommodation together with whatsoever other liabilities and obligations are set out or may be implied by the Contract between the Employer and the Contractor.

Before final selection of a candidate for a position is made, the Engineer shall require to interview and approve the person(s) proposed by the Contractor.

(6) Payment

The offices and equipment and staffing described above will be paid for as provided under Clause S1.20 of the General Specifications. Such payment shall be considered full compensation for constructing, furnishing, servicing, repairing, maintaining, providing utilities and telephone, providing staffing and their facilities, cleaning and the removal of buildings, should this be necessary, upon completion of the Works.

SS.04.3 Housing Accommodation

(1) General

The Engineer's requirements for the housing accommodation, locations and durations shall be as given below:

LOCATION	OCCUPANT	HOUSE TYPE	DURATION

P.H. - Provisional Handover

The housing accommodation (which may be rented) shall be fully furnished, including pillows, sheets and blankets, and be completely ready to live in, and shall be subject to the approval of the Employer and the Engineer. The buildings, furnishings and equipment shall be in good condition, walls and woodwork fresh, or newly painted. The size, furnishings and equipment listed in Table SS.04-2 are given as a guide to the minimum acceptable requirement. The Contractor shall be responsible for all repairs, servicing and maintenance of the buildings, furniture, equipment, fitting and household effects.

(2) House Types Engineers' Representative and Employer's Staff

Family Style Housing shall be air conditioned shall be provided to a standard and quality suitable for the expatriate staff and their families. The accommodation shall include as a minimum three (3) bedrooms (1 of which shall be double bed size room), dining room, living room, kitchen, storage room, bathroom with shower and toilet, garage or car port. The usable enclosed floor area shall be a minimum of 100 m<sup>2</sup>.

(3) Payment

The housing accommodation described will be paid for as provided under Clause S1.20 of the General Specifications. Such payment will be considered full compensation for providing the housing units, furnishing, servicing, repairing, maintaining and providing utilities, all for the period specified.

All furniture and equipment supplied under the requirement for Housing Accommodation will remain the property of the Contractor and will be returned to him at the same time as the accommodation itself.

Table SS.04-2 Housing Accommodation, Furnishings and Equipment.

Item/Description	Engineer's Family Style		
Family Style – Three bedroom. Minimum Floor Area	100 m2		
Double Bed with pillows, sheets, blankets and mattress	1		
Single Bed with pillows, sheets, blankets and mattress	3		
Wardrobe	3		
Chest of Drawers	3		
Dressing Table with mirror	2		
Bedside cabinet with reading light	3		
Dining Table	1		
Dining chairs	6		
Floor rug	3		
Sideboard	1		
Cupboard	3		
Book Shelves	3		
Writing desk	1		
Sitting set (3 seater sofa, 2 easy chairs, 1 low table)	1		
Table fans	3		
Curtain sets	all windows		
2 Door Refrigerator/ Freezer minimum capacity 320	1		
Television with Satellite Reception for NHK, CNN etc	1		
Small Electrical Microwave Oven / grille combined.	1		
Bathroom water heater	1		
Plates, cups, glasses, utensils etc.	For 6 People		
Pots, pans, utensils for cooking	1 complete set		
Washing machine (Top Loading)	1		
Ironing board with iron	1		
Telephone	1		

SS.04.4 Vehicles

(1) General

The Contractor shall provide new vehicles for the exclusive use of the Engineer and the supervisory team and the Employer's staff. Where available, all vehicles shall be fitted with power steering, air conditioning, anti-skid braking systems (ABS) and front air bag protection, and manufacturers supplied tools. The Contractor's obligation shall include fully comprehensive insurance, repairs, maintenance and servicing, the supply of fuel, lubricants and spare parts, including tyres, and the provision of a qualified driver, all for the duration of the Contract. The types and numbers of vehicles shall be provided as given in Table SS.04-3.

On completion of the demobilization of the Engineer which will be approximately within 60 days of Provisional Hand-over, the vehicles will be transferred to the ownership of the Employer.

Table SS.04-3 Vehicle Types		User	Quantity
i)	Mitsubishi "Pajero" GLX 4-wheel drive vehicle or equivalent	Engineer's Core Team based in Hanoi	4 No.
		Engineer's Representative (Site)	1 No.
		Employer	1 No.
ii)	Pickups	Engineer's Site Staff	6 No.
iii)	Motorcycles, minimum engine size 120 cc ("Suzuki" or Equivalent)	Engineer	6 No.
		Employer	2 No.

(2) Payment

The vehicles described will be paid for as provided under Clause S1.20 of the General Specifications. Such payment shall be considered full compensation for provision of the vehicles, all maintenance and servicing as specified, and provision of driver, all for the period specified.

SS.04.5 Detailed Price Analysis

In compliance with the requirements of Instructions to Bidders, Bidders are to provide Detailed Price Analyses for certain Pay Items. Bidders should note that this requirement is applicable to all the various component items that make up Pay Item No. 1.20 and shall be included as part of the bid documents.

SS.05 Temporary Traffic Control

The following elaborates on and describes the Contractor's obligations under Clauses S1.14, S1.16 and S1.19 of the General Specifications.

SS.05.1 Description

The Contractor should thoroughly acquaint himself with existing traffic conditions and understand the importance of maintaining traffic safety and the avoidance of excessive traffic delay. The Contractor shall co-operate with the pertinent agencies regarding traffic control and all details will be subject to the Engineer's approval.

The Contractor shall be responsible for investigating and establishing the requirements for traffic control and safety at each bridge site and shall submit such details in the form of a traffic management plan for approval by the Engineer.

The requirements of clause S1.14 concerning Temporary Road Works shall include, but not be limited to, construction of detours, temporary bridge approach roads, of traffic control devices and services for the control and protection of traffic through areas of construction, all of which shall be deemed to be included under the provisions of Work Item 1.19 "Maintenance and Protection of Traffic".

SS.05.2 Vertical Clearance

In general any temporary works placed over roads or diversions used by public traffic should maintain a vertical clearance of at least 4.5 meters. Where required by the Engineer the Contractor shall erect and maintain suitable approved check-gates, fitted with warning signs indicating the vertical clearance.

SS.05.3 Materials

Materials for traffic control devices shall conform to the requirements set forth below and as specified in the contract.

(1) Retro-reflective Material

Unless otherwise specified in the contract, sign panels, barricades, cones, vertical panels, and flagger paddles shall have retro-reflective sheeting meeting the minimum requirements for retro-reflective material, Clause S12.07 of the General Specifications.

(2) Sign Panels

Sign panels shall conform to Clause S12.07 of the General Specifications and shall be orange with black legend unless otherwise specified in the contract.

(3) Sign Posts

Sign posts shall be fabricated from untreated soft wood, metal, or other materials acceptable to the Engineer. Signs shall be capable of remaining in position during normal traffic flow and wind conditions.

(4) Barricades

Barricades shall be constructed of wood, metal or plastic.

(5) Cones

Cones shall be a minimum of 75 cm in height with a broadened base and shall be capable of withstanding impact without damage to the



cones or vehicles. All cones shall be orange/white colored and highly visible both in daylight and darkness. Cones shall be capable of remaining bright and in position during normal traffic flow and wind conditions in the area where they are used. Lamps for cones shall be suitable for purpose.

(6) Temporary Fence

Temporary fence shall be fabricated in panels with timber framework and galvanized metal panels as indicated in the Drawings. The panel face towards the traffic shall be painted.

(7) Vertical Panels

Vertical panels shall be constructed of wood, metal or plastic.

(8) Warning Lights (flashing or steady)

Warning lights shall be Type A (low intensity flashing), Type B (high intensity flashing), or Type C (steady burn) as approved by the Engineer.

SS.05.4 Construction Requirements

(1) General

The Contractor shall keep the length of the project construction areas in such condition that traffic will be accommodated safely. Traffic control devices and services shall be provided and maintained both inside and outside the project limits as needed to facilitate traffic guidance should this be necessary. Such plans shall be based on the Contractor's Method Statements for Traffic Management as required by the Instructions to Bidders, modified or revised as required by the Engineer, and shall comply with the requirements of these specifications.

Prior to the start of construction operations, the Contractor shall erect such signs, barricades, and other traffic control devices as may be required by the plans and specifications or directed by the Engineer. Traffic control devices shall be operated only when they are needed and only those devices that apply to conditions actually in existence shall be operable.

Temporary fence shall be placed to provide a visual barrier between the work area and adjacent traffic or buildings and at locations directed by the Engineer.

Any devices provided under this Clause that are lost, stolen, destroyed, or deemed unacceptable while their use is required on the project shall be replaced by the Contractor without additional compensation.

During non-working hours and following completion of a particular construction operation, all warning signs, except those necessary for the safety of the public, shall be removed or entirely covered with either metal or plywood sheeting so that the sign panel will not be visible.

Retro-reflective sheeting on signs, barricades, and other devices shall be kept clean. Stretches, rips, and tears in the sheeting shall be promptly corrected by the Contractor. Retro-reflective sheeting shall have a maintained retro-reflection.

Night time operations shall be illuminated by a lighting system approved by the Engineer. The lighting system shall be positioned and operated to preclude glare. Incandescent lights will not be permitted.

SS.05.5 Method of Measurement

As the bid schedule contains a lump sum item for "Maintenance and Protection of Traffic", no measurement for payment will be made for furnishing, installing, and maintaining all traffic control devices, including temporary fences, services, road-works required by the contract for the control and protection of traffic and ordered by the Engineer.

All traffic control devices shall be prepared by the Contractor, shall remain the property of the Contractor, and shall be removed upon completion of the contract.

The Contractor's Traffic Safety Supervisor, two-way radio communications, and night lighting system will not be measured for direct payment but will be considered as a subsidiary obligation of the Contractor.

SS.05.6 Basis of Payment

Payment for temporary traffic control will be as provided in General Specifications Clause S1.19 "Maintenance and Protection of Traffic" and will be deemed full compensation for complying with the requirements of and performing the work presented in this Clause.

SS.06 Tolerances for Roadway Construction

The following tolerances for roadway construction after completion of the work shall not be exceeded. All roadway work shall be carried out in the dimensions, shapes, and levels shown on the drawings. The Engineer may waive certain requirements and apply other tolerances as he may deem necessary and as are appropriate for the case at hand.

	<u>Frequency of Inspection</u>	<u>Tolerance</u>
<b>(1) <u>Position and Elevations</u></b>		
Horizontal Alignment Deviation of Base Course		
	every 20m	20mm
Vertical Alignment and Elevations		
- Top of compacted subgrade	every 20m	+20mm ~ -50mm
- Top of compacted granular sub-base course	every 20m	±30mm
- Top of compacted granular base course	every 20m	±30mm
- Top of asphalt treated base course	every 20m	±20mm
- Top of compacted asphalt concrete binder and surface courses	-	-
- Top of concrete pavement	every 20m	±30mm
<b>(2) <u>Thickness Tolerances</u></b>		
- Compacted sub-base and base courses	every 20m	-10%
- Asphalt treated base course	every 1000m <sup>2</sup>	-10%
- Asphalt concrete binder and surface courses	every 1000m <sup>2</sup>	9mm
<b>(3) <u>When a 3 metre straightedge is laid on the surface parallel to and perpendicular to the centre line, the surface variation from the lower edge of the straightedge shall not exceed :</u></b>		
- Compacted subgrade	every 100m	12mm
- Compacted granular sub-base course	every 100m	12mm
- Compacted granular base course	every 100m	6mm
- Compacted asphalt treated base or asphalt concrete binder course	every 100m	4mm
- Compacted asphalt concrete surface course	every 100m	4mm
- Concrete pavement	every 100m	5mm

**(4) Curbs**

The tolerance for the elevations of top of curbs shall be ±25mm.

Flatness of surfaces as measured using a 3 metre straightedge laid on the top or face of the curb or on the surface of gutters shall not vary more than 4 mm from the edge of the straightedge, except at grade changes or curves.

**(5) When any tolerances in this Clause are exceeded the Contractor shall determine the full extent of the area which is out of tolerance and shall submit to the Engineer for his approval the proposed method of rectification.**

When the surface level of a surface course is not in accordance with these tolerances, the full depth of the layer shall be removed and replaced with fresh material. The width to be removed shall be the full width of paving laid in one operation and the minimum length shall be 15 m.

SS.07 Tolerances for Concrete Structures

The following tolerances of concrete structures after completion of the work shall not be exceeded. All concrete work shall be executed in the required dimensions, shapes, positions and levels shown on the Drawings. The Engineer may apply other tolerances as he may deem necessary and as are appropriate for the case at hand.

	<u>Tolerance</u>
(1) <u>Level and Positions</u>	
- Plan position of substructures	±30mm
- Elevation of substructures	-30mm ~ +10mm
- Span length	-25mm ~ +30mm
- Bridge width	0mm ~ +30mm
- Elevation concrete bridge deck	20mm over 20m
(2) <u>Dimensions of Culvert</u>	
- Tolerance for dimensions and wall and slab thicknesses	-10mm ~ +20mm
(3) <u>Flatness of Slabs</u>	
- Bridge deck slabs	20mm by 3m straightedge for longitudinal and transverse directions
(4) <u>Concrete Cover for Reinforcing Steel</u>	
- Concrete cover for concrete slabs	0mm ~ +10mm
- Concrete cover for other structures	0mm ~ +20mm
(5) <u>Spacing of Reinforcing Steel</u>	
- Concrete slabs	±10mm vertical and ±15mm horizontal
- Other concrete structures	±20mm
(6) <u>Position for Pre-stressing Tendons</u>	
- Horizontal and vertical	±5mm
(7) <u>Thickness Tolerances</u>	
- Footings	-20mm ~ +50mm
- Deck slabs	0mm ~ +20mm

SS.08 Programs to be Furnished

In preparing the detailed programs, schedules and CPM (Critical Path Method) required under Clause G.14 of the General Conditions of Contract, the latest completion dates given, for any work Item Section, shall not exceed the time for completion indicated by the Contractor on Guide Form G of the Detailed Works Schedule, Plant and Contractor Personnel List

Whenever required by the Engineer the Contractor shall revise the schedules, such as when the actual financial progress falls significantly behind the scheduled financial progress or when Change Orders or Addenda alter the estimated quantities by a significant amount.

SS.08.1 Mobilization Program

Within the time constraints given in Clause G.14 (a) of the General Conditions of Contract, the Contractor shall prepare, submit and obtain the Engineer's approval of the Mobilization Program.

The Mobilization Program shall specify the timing of the following items and shall be in the format of a bar chart showing each of the major mobilization activities and a progress curve measured in terms of percentage completion:

- Purchase or rental of land required for the Contractor's base camp and construction activities.
- Mobilization of all construction supervisory staff and labour required for the execution and completion of the contracted works.
- Mobilization and installation of Construction Plant from their existing locations to the sites where they are to be used under this Contract.
- Provision of the Contractor's base camp, including as necessary, site offices, living quarters, workshops and stores, etc.
- Provision of furnished offices and staff accommodation for the use of the Engineer.
- Provision of field laboratory and field laboratory equipment .
- The following details shall be submitted together with the program:
  - Location of Contractor's base camp with a general location plan and detailed site plan showing the locations of the Contractor's office, workshop, stores and major construction plant, together with the Engineer's offices and laboratory.
  - Equipment delivery schedule indicating the current location of all plant listed in the schedules submitted with the Bid, together with the proposed means of transport and scheduled arrival dates at site.
  - Any changes in the equipment and staffing schedules submitted with the Bid for which the Contractor needs the approval of the Engineer.
  - Site staff organization chart giving further details and elaborating on the organization chart submitted with the Bid.

SS.08.2 Construction Schedule

Within the time constraints given in Clause G.14(b) of the General Conditions of Contract, the Contractor shall prepare, submit and obtain the Engineer's

approval of the Construction Schedule which shall be in the form of a bar chart and overall progress curve with the following characteristics;

- Each Pay Item activity or group of related Pay Item activities shall be represented by a separate bar, which shall be formatted according to the work item Sections in the Bid Price Schedule.
- The horizontal time scale shall be measured on a monthly basis.
- Each bar chart shall have provision for recording actual progress measured against scheduled progress.
- The overall progress curve shall identify the scheduled financial progress at the end of each month against which the actual progress shall be recorded.

**SS.08.3 Network Analysis (Critical Path Method)**

Within the time constraints given in Clause G.14(c) of the General Conditions of Contract the Contractor shall prepare and submit for the Engineer's approval a Critical Path Method Analysis based on the approved Construction Schedule giving early and late start dates of each activity to enable critical path schedules to be prepared and provide sub-schedules to define critical items in the entire construction schedule. The analysis shall be carried out by the Contractor using the latest versions of recognised and approved proprietary software such as "Symantec Timeline or "Microsoft Project" running under "Windows 95" that is available to the Engineer. The information shall be presented to the Engineer in both disk and plan format.

**SS.08.4 Itemized Schedule**

Within 30 days of the Engineer's approval of the Construction Schedule referred to in Clause SS.10.2 the Contractor shall prepare and obtain the Engineer's approval for a bar chart schedule, based on the said approved Construction Schedule indicating quantity and financial progress on a month by month basis for the work items applicable for escalation. This schedule will form the approved planned progress schedule referred to in Clause SS.03.4 hereof and is not required in the case where Price Escalation is not applicable.

SS.09 Construction of Sand Drain

SS.09.1 General

- (1) This specification stipulates the requirement on technical construction, inspection, quality appraisal and approval for construction works using sand drain method.
- (2) This specification only applies for the works, which are constructed on the soft soil embankment with requirement of short time consolidation.
- (3) Vertical sand drain is constructed, having vertical column in the soft soil layer. Sand drain is used for draining water from lower layer up to the above sand mat layer and then draining out of the embankment. This helps to accelerate consolidation process and to strengthen the bearing force due to the change of the basic soil property (C) of the soft soil layer and accelerate settlement of the embankment.
- (4) The sand mat layer is used for draining water to the above layer and creating plan for running sand drain construction equipment. So the sand mat construction and the driving sand drain work should be construction all together.
- (5) Pre-loading method is the increasing pressure method on soil in order to accelerate consolidation of soft soil layer (if any).
- (6) Beside this specification, Supervision Consultants and Contractors shall comply with the other prevailing stipulations in construction and inspection, quality appraisal and approval to the embankment.

SS.09.2 Requirements for construction Material and Equipment

(1) Requirements of Sand Drain

- (i) Sand for filling sand mat layer must be the medium-size grain sand with the following requirements:

- The sand ratio of grain-size more than 0.5mm should be more than 50%.
- The sand ratio of grain-size less than 0.5mm should not exceed 10%.
- Permeable coefficient of sand must be more than  $10^{-4}$  m/s.
- Organic content should not exceed 5%.

However, it is possible to use coarse sand mixed with gravel, not include crushed stone.

(2) Requirements of Sand Mat

- (i) The characteristics of sand shall be the same as the sand drain materials.
- (ii) The geo-textile is used in sand mat structure (if it is mentioned in design complying with the following requirements:
  - Tensile strength must not be less than 1.0kN (ASTM-D4632).
  - Elongation:  $\leq 60\%$  (ASTM-D4632).
  - Puncture strength (CBR): 1,500 ÷ 5,000 N (BS 9606-4).

- Pore size opening  $0.075 \leq 0.15\text{mm}$  (ASTM-D4632).
  - Permeable filler:  $\geq 1.4 \times 10^{-4}$  m/s (BS 9606-3).
- (3) Material for pre-loading:
- If it is necessary to apply pre-loading, it is possible to load by different materials such as: soil, sand and stone etc. However, it is necessary to test in order to define the unit weight of material. It is necessary to use the material that is suited to the road construction equipment for loading and unloading works.
- (4) Requirement for Equipment
- Sand drain equipment must have the following technical specifications:
- Equipment must have enough driven force to drive sand drain casing into the design depth.
  - The driven equipment must be met the requirement of stability and can properly work in any weather condition.
  - The drilling machine must be equip twisted drilling rod of 400mm in diameter interlinked by bolt.
  - Water pump must have more than  $2.0\text{m}^3/\text{h}$  in capacity.
  - Theodolite must be prepared in order to define locations and level in order to define elevations of sand piles.

#### SS.09.3 Construction Method

- (1) It is necessary to design the working procedure of the driven equipment on the site of the sand mat layer in accordance to the following principles:
- When working, the equipment can not be placed on the head of the constructed sand drain.
  - Moving root of the equipment must be shortest.
- (2) Before official construction, Contractor must carry out a pilot (sample) construction within the construction scope in which equipment must run 2÷ 3 time for driving sand drain.
- Prior to carrying out a pilot construction, the Contractor shall submit the test procedure and the construction method for approval in written to the Supervision Consultant.
  - This pilot (sample) construction must be witnessed by supervision consultant and during the pilot construction should be observed and checked.
  - Checking each construction step and accurately operation of construction of sand drain process (vertical level, position on the plan and the depth).
- (3) Preparation plan for filling the sand mat layer
- Site clearance (clear tree, glass and other material)



- Establish the centerline and located pile for sand mat layer, check the elevation of the bottom of sand mat layer.
  - Pave the geo-textile if it is noted in design (joining geo-textile should be done by machine, the two edges of the geo-textile should be placed on each other about 5÷10 cm). It is necessary to base on the width of the geo-textile and width of the roadbed to pave crossly or longitudinally in order to obtain the shortest length of the sewing line.
- (4) Construction of the sand mat layer
- (i) The sand mat layer should be constructed before construction of sand drain to create condition for the equipment working in soft soil.
    - The above layer of the sand mat layer should be covered by one sand layer for covering minimum thickness of sand drain (40cm), clay should not be directly placed on the head of sand drain.
    - Filler layer at slope toe of the sand mat layer must be constructed after construction of sand drain.
    - The protection layer of the sand mat layer at the slope of the embankment (if any) should be constructed before un-loading period.
  - (ii) The implementation of sand mat layer shall comply with the regulations and specifications for embankment (30cm each layer). Compaction density of sand mat shall satisfy 2 conditions:
    - Machines for construction shall move and operate in a stable way.
    - Appropriate to the required density K in the embankment structure according to location of sand mat layer.
- (5) Technical specifications for the implementation of sand drain
- Locate all the points required to construct sand drain longitudinally and horizontally by normal measuring level strictly according to the design plan; mark the located points. Each machine shift shall be carried out for this work.
  - Use machine to construct sand drain into the location according to the steps mapped out in the working procedure mentioned in 9.3 (3). Define the starting mark on central axis in order to calculate the length of sand drain driven into the soil; examine the verticality of the central axis according to plumb-line or pendulum device placed on the rack.
  - Install sand drain into the central axis and control the machine putting the end of central axis to the sand drain-placed location.
- (6) Implementation of loading and unloading materials

- (i) Material of soil, sand filling sand mat layer are used for loading to create the process of compressing shrinkage of the ground under the vertical stress before placing the final loading of the project.
- (ii) Loading shall comply with the instructions in the design plan in terms of time, incremental loading of each stage (regularly examine the volume of loading materials in order to secure the accuracy of loading pressure).

If the incremental loading is higher than the final loading, the excess is considered as sub-loading and this is applied only when ideas from Supervising Consultants are available.

- (iii) Regularly observe if water leaks out. There shall have measures to facilitate water to run out far from the road-bed area, and create, if necessary, water-gathering holes and use pump to drain water (if the Supervising Consultants raise ideas).
- (iv) When the loading time is over, the settlement of embankment is equivalent to the design calculated settlement, then unloading is allowed by the Supervising Consultants. Unloading is conducted for each layer (avoid local unloading as it makes the embankment unstable). When unloading is up to the designed elevation, it is necessary to clean up all the materials inappropriate to the standard of embankment materials.
- (v) Put the landmark to observe the settlement and horizontal displacement while the sand mat layer is constructed in accordance with the structure in design plan. It is necessary to observe settlement and horizontal displacement right after loading is started by leveling & theodolite with high accuracy. Periodically measure once every 2 day, and finish at the time of handing over the work. If it is necessary to prolong the time of observation, then the permits of Supervision Consultants are required.
- (vi) If necessary, it is possible to install piezometers of pore-water pressure in order to observe consolidation speed of the embankment soil. Periodically measure pore-water pressure once every 2 weeks, and finish at the time of handing over the work. If it is necessary to prolong the time of observation, then the permits of Supervision Consultants are required.

#### SS.09.4 Check, Quality appraisal and approval of the project

- (1) The check before construction includes equipment, material check in accordance with the requirements in SS.09.2.
  - The machine for driving sand drain casing shall be operated as a trial first, and re-define the turning angle & range for construction.
  - Regarding sand, the test for examining the specifications mentioned in SS.09.2 shall be conducted once for every 500m<sup>3</sup>.
- (2) During the process of driving sand drain, it is needed to check the following contents for each time driving the plastic board drain:
  - Location for driving sand drain casing: the error of this location shall not exceed 15 cm against the designed location

- Verticality of the sand drain: casing check by the verticality of the central axis compared with the plumb-line. The accepted error according to the verticality of the central axis is 5cm/1m.
- (3) Quality appraisal and approval of the sand drain shall be conducted after driving it, based on verified minutes of inspection witnessed by the Supervising Consultants for each sand drain with contents said in (2).
- (4) Quality appraisal and approval of the sand drain shall be conducted in accordance with drawings by the Supervising Consultants and Contractor.

SS.10 Construction of Plastic Board Drain

SS.10.1 General

- (1) This specification stipulates the requirement on technical construction, inspection, quality appraisal and approval for construction works using plastic board drain method.
- (2) This specification only applies for the works, which are constructed on the soft soil embankment with requirement of short time consolidation.
- (3) Plastic board drain is made of band with Polypropylene core, having serrated section or cuspidate (needle-shaped) section covered by non-woven geo-textile. Plastic board drain is used for draining water from low layer up to the above sand mat layer and then draining out of the embankment. This helps to accelerate consolidation process and to strengthen the bearing force due to the change of the basic soil property (C) of the soft soil layer and accelerate settlement of the embankment.
- (4) The sand mat layer is used for draining water to the above layer and creating plan for running plastic board drain construction equipment. So the sand mat construction and the driving plastic board drain work should be construction all together.
- (5) Pre-loading method (if any) is the increasing pressure method on soil in order to accelerate consolidation of soft soil layer.
- (6) Beside this specification, Supervision Consultants and Contractors shall comply with the other prevailing stipulations in construction and inspection, quality appraisal and approval to the embankment.

SS.10.2 Requirements for construction Material and Equipment

- (1) Requirements for plastic board drain
  - (i) The permeable coefficient of non-woven geo-textile cover must be 3÷10 time higher than the permeable coefficient of its adjoining soil layer, however, it still prevents the soil of small size grain from getting through.
$$K_{cover} \geq 1,4 \times 10^{-4} \text{ m/s}$$
  - (ii) The pore diameter of the cover shall not exceed 0.08mm.
  - (iii) The cover and the core of the plastic board drain must not be broken during bearing pressure process in the period of transportation and installation.

- (iv) Plastic board drain must have following physical characteristics:
- Tensile strength (whole width of plastic board drain) must not be less than 1,6kN (ASTM-D4632).
  - Elongation (with whole width of plastic board): > 20% (ASTM-D4632).
  - Elongation with the force 0.5kN <10% (ASTM-D4632).
  - Drain probability with pressure 10kN/m<sup>2</sup> and hydraulic gradient I = 0.5 is:  $(80 \div 140) \times 10^{-6} \text{ m}^3/\text{sec}$  (ASTM-D4716).
  - Drain probability with pressure 300kN/m<sup>2</sup> and hydraulic gradient I = 0.5 is:  $(60 \div 80) \times 10^{-6} \text{ m}^3/\text{sec}$  (ASTM-D4716).
- (v) Plastic board drain must be properly preserved and avoid long time compacting directly with ultra-violet rays.

(2) Requirements for sand mat material

- (i) Sand for filling sand mat layer must be the medium-size grain sand with the following requirements:
- The sand ratio of grain-size more than 0.5mm should be more than 50%.
  - The sand ratio of grain-size less than 0.5mm should not exceed 10%.
  - Permeable coefficient of sand must be more than  $10^{-4} \text{ m/s}$ .
  - Organic content should not exceed 5%.

However, it is possible to use coarse sand mixed with gravel, not include crushed stone.

- (ii) The geo-textile is used in sand mat structure (if it is mentioned in design complying with the following requirements:
- Tensile strength must not be less than 1.0kN (ASTM-D4632).
  - Elongation:  $\leq 60\%$  (ASTM-D4632).
  - Puncture strength (CBR): 1,500  $\div$  5,000 N (BS 9606-4).
  - Pore size opening  $090 \leq 0.15\text{mm}$  (ASTM-D4632).
  - Permeable filler:  $\geq 1.4 \times 10^{-4} \text{ m/s}$  (BS 9606-3).

(3) Material for pre-loading:

If it is necessary to apply pre-loading, it is possible to load by different materials such as: soil, sand and stone etc. However, it is necessary to test in order to define the unit weight of material. It is necessary to use the material that is suited to the road construction equipment for loading and unloading works.

(4) Requirement for anchor tip

The anchor tips must have the size correspondingly to kinds of plastic board drain. The size of the anchor tip 85 x 140mm, made of steel 0.5mm in thickness.

(5) Requirements for equipment

Plastic board drain equipment must have the following technical specifications:

- Central axle for installing plastic board drain with the section of 60mm x 120mm, there are the marking line in centimeter along the axle in order to record the driven depth of the plastic board drain and must have a plumb line and pendulum for checking the vertical level.
- Equipment must have enough driven force to drive plastic board into the designed depth.
- Maximum driven speed is 65 meters/minute.
- Maximum lifting speed is 105 meters/minute.
- Maximum driven depth: this equipment can be driven the plastic board drain into the designed depth.
- The driven equipment must be met the requirement of stability and can properly work in any weather condition.

SS.09.3 Construction Method

(1) It is necessary to design the working procedure of the driven equipment on the site of the sand mat layer in accordance to the following principles:

- When working, the equipment can not be placed on the head of the constructed plastic board drain.
- Moving root of the equipment must be shortest.

(2) Before official construction, Contractor must carry out a pilot (sample) construction within the construction scope in which equipment must run 2÷ 3 time for driving plastic board drain.

- Prior to carrying out a pilot construction, the Contractor shall submit the test procedure and the construction method for approval in written to the Supervision Consultant.
- This pilot (sample) construction must be witnessed by supervision consultant and during the pilot construction should be observed and checked.
- Checking each construction step and accurately operation of driven plastic board drain process (vertical level, position on the plan and the depth).

(3) Preparation plan for filling the sand mat layer

- Site clearance (clear tree, glass and other material)
- Establish the centerline and located pile for sand mat layer, check the elevation of the bottom of sand mat layer.
- Pave the geo-textile if it is noted in design (joining geo-textile should be done by machine, the two edges of the geo-textile should be placed on each other about 5÷10 cm). It is necessary to

base on the width of the geo-textile and width of the roadbed to pave crossly or longitudinally in order to obtain the shortest length of the sewing line.

(4) Construction of the sand mat layer

(i) The sand mat layer should be constructed before driving plastic board drain to create condition for the equipment working in soft soil.

- The above layer of the sand mat layer should be covered by one sand layer for covering minimum thickness of plastic board drain (20cm), clay should not be directly placed on the head of plastic paper drain.
- Filler layer at slope toe of the sand mat layer must be constructed after driving plastic board drain and before pre-loading (ie. before water drain from plastic board drain out of the embankment).
- The protection layer of the sand mat layer at the slope of the embankment (if any) should be constructed before un-loading period.

(ii) The implementation of sand mat layer shall comply with the regulations and specifications for embankment (30cm each layer). Compaction density of sand mat shall satisfy 2 conditions:

- Machines for construction shall move and operate in a stable way.
- Appropriate to the required density K in the embankment structure according to location of sand mat layer.

(5) Technical specifications for the implementation of plastic board drain

- (i) - Locate all the points required to drive plastic board drain longitudinally and horizontally by normal measuring level strictly according to the design plan; mark the located points. Each machine shift shall be carried out for this work.
- Use machine to drive plastic drain into the location according to the steps mapped out in the working procedure mentioned in SS10.3,(1). Define the starting mark on central axis in order to calculate the length of plastic board drain driven into the soil; examine the verticality of the central axis according to plumb-line or pendulum device placed on the rack.
  - Install plastic board drain into the central axis and control the machine putting the end of central axis to the plastic board drain-placed location.
  - Make anchor tip closer to the head of plastic board drain with its length is folded 30 cm at maximum and pinned by steel pin.
  - Drive the central axis, which is already installed with plastic board drain, into the designed depth with speed within the range of  $0.15 \div 0.6$  m/second. After driving plastic board drain, pull the central axis up (at this time the anchor tip will keep the

pull the central axis up (at this time the anchor tip will keep the plastic board drain in the soil); when the all central axis is pulled up, use scissors to cut the plastic board drain so that remains 20-cm head of plastic board drain emerging on the sand mat layer, and this process restart from the beginning for the next plastic board drain-driven location.

- (ii) During the construction process, if one roll of plastic board drain is used up, it is allowed to join this plastic board drain to the next roll. When joining, two ends of the plastic board drain shall overlap at least 30 cm and shall be pinned by steel pin.
  - (iii) In case above the weak soil layer, there is a relatively hard soil layer which makes it impossible for the machine to drive the central axis through, then it shall be discovered and need the countermeasure before the implementation of sand mat layer (as proposed in the design plan).
  - (iv) In case while plastic board drain is being driven still not into the designed depth, the obstruction arise and driving work cannot continue, then it is necessary to ask for timely ideas and comments from the supervising consultants to get the approval to stop, measure and locate the driving point placing the plastic board drain to the adjoining area within 30cm.
  - (v) It is necessary to draw plan and take note in details each time driving the plastic board drain in terms of location, depth, time of construction and bad occurrences arisen during the implementation process.
  - (vi) After the plastic board drain is driven, it is necessary to clean up rags of plastic board drain and other wastes scattered on the plane; conduct the filling of the next sand layer in order to cover the plastic board drain mentioned in (4), (i).
- (6) Implementation of loading and unloading materials
- (i) Material of soil, sand filling sand mat layer are used for loading to create the process of compressing shrinkage of the ground under the vertical stress before placing the final loading of the project.
  - (ii) Loading shall comply with the instructions in the design plan in terms of time, incremental loading of each stage (regularly examine the volume of loading materials in order to secure the accuracy of loading pressure).  

If the incremental loading is higher than the final loading, the excess is considered as sub-loading and this is applied only when ideas from Supervising Consultants are available.
  - (iii) Regularly observe if water leaks out. There shall have measures to facilitate water to run out far from the road-bed area, and create, if necessary, water-gathering holes and use pump to drain water (if the Supervising Consultants raise ideas).
  - (iv) When the loading time is over, the settlement of embankment is equivalent to the design calculated settlement, then unloading is

for each layer (avoid local unloading as it makes the embankment unstable). When unloading is up to the designed elevation, it is necessary to clean up all the materials inappropriate to the standard of embankment materials.

- (v) Put the landmark to observe the settlement and horizontal displacement while the sand mat layer is constructed in accordance with the structure in design plan. It is necessary to observe settlement and horizontal displacement right after loading is started by leveling & theodolite with high accuracy. Periodically measure once every 2 day, and finish at the time of handing over the work. If it is necessary to prolong the time of observation, then the permits of Supervision Consultants are required.
- (vi) If necessary, it is possible to install piezometers of pore-water pressure in order to observe consolidation speed of the embankment soil. Periodically measure pore-water pressure once every 2 weeks, and finish at the time of handing over the work. If it is necessary to prolong the time of observation, then the permits of Supervision Consultants are required.

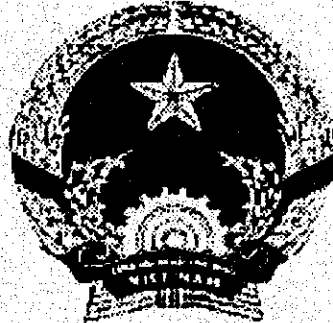
#### SS.10.4 Check, Quality appraisal and approval of the project

- (1) The check before construction includes equipment, material check in accordance with the requirements in SS10.2.
  - The machine for driving plastic board drain shall be operated as a trial first, and re-define the turning angle & range for construction.
  - Regarding sand, the test for examining the specifications mentioned in SS.10.2,(2) shall be conducted once for every 500m<sup>3</sup>.
  - Regarding plastic board drain, the quality check shall be conducted according to the specifications said in SS.10.2, (1),(v), based on the certificate enclosed with each batch of plastic board drain. The average volume for checking is test 1 sample for every 10,000m<sup>2</sup> or when the batch is changed. In addition, it is necessary to take note the length of each roll and visually observe whether the core of plastic board drain is broken or not.
  - Regarding the project using the geotextile combined with plastic board drain, it is needed to check the specifications of geotextile said in SS10.2,(2),(ii). The average volume for checking is test 1 sample for every 10,000m<sup>2</sup> or when the batch is changed.
  - Check the size of anchor tips, steel pin and the steps of testing steel pins (check once for each machine shift).
- (2) During the process of driving plastic board drain, it is needed to check the following contents for each time driving the plastic board drain:
  - Location for driving plastic board drain: the error of this location shall not exceed 15 cm against the designed location (except the case in SS.10.3,(5),(iv).
  - Verticality of the plastic board drain: check by the verticality of the central axis compared with the plumb-line. The accepted error according to the verticality of the central axis is 5cm/1m.



- Verticality of the plastic board drain: check by the verticality of the central axis compared with the plumb-line. The accepted error according to the verticality of the central axis is 5cm/1m.
  - Length of plastic board drain: check by the length of the central axis driven into the soil according to cm-mark written on the outer surface of the central axis. The accepted error between the length of plastic board drain driven into the soil and the designed depth is 1%. (except the case mentioned in SS.10.3,(5),(iv).
  - Check the residual part of plastic board drain on the surface of sand mat layer to be 20 cm at minimum.
- (3) Quality appraisal and approval of the plastic board drain shall be conducted after driving it, based on verified minutes of inspection witnessed by the Supervising Consultants for each plastic board drain with contents said in SS.10.4.(2).

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE**

**VOLUME IV**

**FORM OF BID, BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 – RED RIVER BRIDGE**

**FORM OF BID , BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

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**CHECKLIST OF DOCUMENTS TO BE SUBMITTED**

FORM REF.	DESCRIPTION OF DOCUMENTS	BINDING	CHECK
	Title of Contract Package and Name and Address of Bidder	Book I	
•	Certified copy of Partnership or of Association Agreement (for Joint Enterprise or Joint Operation)		
•	Business Cooperation Contract		
B	Affidavit Agreement for Joint Enterprise (if not submitting above)		
PA	Powers of Attorney (Form PA-1, 2, 3 as appropriate)		
E	Bid Bond		
•	Bank Reference/Balance Sheets/Owners/Management Structure		
	Title of Contract Package and Name and Address of Bidder	Book II	
•	Bid and Appendix to Bid		
•	Bid Schedule and Schedule of Rates and Prices (with floppy disk copy of the same data)		
•	Letter on Balancing Item / Bid Adjustment ( if applicable )		
	Title of Contract Package and Name and Address of Bidder	Book III	
G	Works Progress Schedule		
C	Detailed Price Analyses for Materials on Site		
D	Detailed Price Analyses for Major Pay Items		
•	Floppy disk copy of Bid Schedule & Schedule of Rates/ Prices		
•	Method Statements		
	Title of Contract Package and Name and Address of Bidder	Book IV	
H	List of Construction Plant		
I	List of Senior Staff		
J	Details of Contractor's Superintendent		
K	Details of Contractor's Deputy Superintendent		

- Notes:
1. A completed copy of this checklist shall be submitted with the Bid
  2. All documents are to be submitted as original plus three copies.
  3. All pages are to be initialed by the authorized signatory
  4. Powers of Attorney must be witnessed
  5. Bidder's full name and address and title of Contract Package is to be inserted at the beginning of each book.

BID

Gentlemen :

Having inspected the Site of Works and examined the Bid Documents comprising the Instructions to Bidders, the Invitation to Bid, the Form of Contract Agreement, the General Conditions of Contract, the Addenda (if any), the General Specifications, the Special Specifications, the Bid Schedule and Schedule of Rates and Prices, the Drawings and other related Documents relating to the construction of the following Works:

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 – RED RIVER BRIDGE**

- (1) I/We the undersigned offer to prepare the necessary working drawings and undertake the complete construction and warranty of the above Works, including the supply to the Employer of as-built drawings, for the sum of :

Yen ( ¥ ).....

.....(Yen  
Component of Total Bid Sum, in words)

Yen ¥..... (in figures)

and VNDong.....

.....(VND  
Component of Total Bid Sum, in words)

VND..... (in figures)

- (2) I/We understand that the quantities given in the Bid Schedule are approximate only and that total payments will be determined in accordance with the Conditions of Contract.
- (3)\* I/We undertake if my/our Bid is accepted to commence the Works and to substantially complete and provisionally hand-over the whole of the Works comprised in the Contract within \_\_\_\_ consecutive calendar days from the date of commencement as specified in the Notice To Proceed, this being the Construction Period.
- (4) If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Bank Guarantee as shown in Guide Form PB-1 of an amount equal to fifteen percent (15%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract;

*or alternatively [ use one or the other as appropriate ]*

If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Insurance Bond as shown in Guide Form PB-2 of an amount equal to forty percent (40%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract, such Bond to be from an insurance or bonding company approved by you.

- (5) I/We agree to abide by this Bid for a period of 150 (one hundred and fifty) days from the date fixed for opening the same, or such longer period as may be mutually agreed between us and recorded in writing, and the Bid shall remain binding upon us and may be accepted at any time before the expiration of this period.
- (6) Unless and until a formal contract is prepared and executed, this Bid together with your written acceptance thereof shall be legally binding between us. In the event that your Award of Contract requires to be approved by any funding agency I/we accept that your Award of Contract is conditional on such approval. I/We agree that my/our receipt of a conditional Award of Contract will bind me/us to enter into a formal written contract with you, if and when your Award of Contract is approved by the funding agency.
- (7) I/We have read and understood the details given in the Appendix to this Bid.
- (8) I/We understand that you are not bound to accept the lowest Bid or any Bid you may receive.

Dated this ..... day of ....., 20 .....

Signature ..... in the capacity of  
 ..... duly authorized (\*) to sign  
 the bid for and on behalf of .....

Witness : .....

Address : .....  
 .....

(\*) Copy of Power of Attorney must be attached.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1- RED RIVER BRIDGE**

<b>BID SUM</b>				
<b>WORK ITEM</b>	<b>DESCRIPTION</b>	<b>FOREIGN CURRENCY COMPONENT (YEN)</b>	<b>LOCAL CURRENCY COMPONENT (VND)</b>	<b>COMBINED EQUIVALENT TOTAL (in VND)</b>
1	GENERAL			
2	SITE CLEARING			
3	DEMOLITION			
4	ROAD EARTHWORK			
5	STRUCTURE EXCAVATION			
6	DRAINAGE			
7	SUBGRADE			
8	SUB-BASE AND BASE			
9	PAVEMENTS			
10	CONCRETE STRUCTURES			
12	MISCELLANEOUS			
13	UTILITIES			
15	DIVERSION AND PROTECTION OF UTILITIES (Provisional Sum)			
16	DAYWORKS (Force Account)			
17	PROVISIONAL SUM - based on 15% of Work Item No's 2 to 13 # to be inserted by Bidder.			
# Refer also to page 4-Preamble Note 9				#
<b>NET BID SUM</b>				
Add Net VAT at .....% of the # VNDong Equivalent of Net Bid Sum				
<b>TOTAL BID SUM</b>		*	*	
		(YEN)	(VND)	(VND-Equivalent)

(i) Foreign Currency Component of Total Bid Sum, written in words.

Yen.....  
.....

(ii) Local Currency Component of Bid Sum, written in words.

VN Dong  
.....

(iii) VNDong Equivalent of Combined Total Bid Sum, written in words

.....  
.....

(iv) Exchange rate as specified by the Employer, used to convert the foreign currency component to VNDong: One Yen = ..... VNDong

(\*) Carry Forward to Bid

## APPENDIX TO THE BID

	CLAUSE	
Amount of Bid Bond	Art. 21	US\$500,000.00
Amount of Performance Bond	G.12	15% of the VND and Yen components of the Contract Sum for Bank Guarantee, or 40% for a Bond provided by Insurance or Bonding Company
Minimum amount of third party insurance	G.23(2)	100% of the US\$ equivalent of the combined total Contract Sum
Period for commencement, from Notice to Proceed.	G.42(1)	At latest 30 calendar days
Period for completion of mobilization	S.1.20(3)	60 or 90 calendar days and 120 calendar days from date of commencement.
Time for completion (Construction Period)	G.43	___ consecutive calendar days from the date of commencement as specified in the Notice To Proceed.
Amount of Liquidated Damages	G.47(1)	0.03% of the VND equivalent of the combined total Contract Sum per day
Limit of Liquidated Damages	G.47(1)	10% of the VND equivalent of the combined total Contract Sum
Period of Warranty	G.49	730 calendar days following Decision 499-BXD/GD
Percentage of Retention	G.58(5)	10% of the gross sum of each Monthly Certificate
Time within which payment to be made after Monthly Certificate is issued	G.58(5)	90 calendar days
Advance payment	G.58(2)	15% of the respective local and foreign currency components of the Contract Sum
Price Escalation	G.70	Price escalation provisions are applicable to this Package.



**PREAMBLE  
TO BID SCHEDULE**

1. The Bid Schedule shall be read in conjunction with the Instructions to Bidders, General Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bid Schedule are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the Unit Prices in the priced Bid Schedule where applicable, and otherwise at such Unit Prices or Sums as the Engineer may fix within the terms of the Contract.
3. The Unit Prices in the Priced Bid Schedule entered herein shall include and be considered compensation for all costs incurred in:
  - i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
  - ii. plant labour, supervision, materials, erection, temporary works and other support works, maintenance, insurance, overheads and profit, together with all general risks, liabilities and obligations set out or implied in the Contract.
4. A Sum or Unit Price shall be entered against each Item for which a quantity is given in the Bid Schedule. (A Sum or Unit Price is not required for Items for which the quantity is given as Nil). The cost of Items for which a quantity is given in the Bid Schedule and against which the Contractor has failed to enter a Sum or Unit Price shall be deemed to be covered by the Contract Sum.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items for which a quantity is given in the Bid Schedule, and where no Items are provided the cost shall be deemed to be distributed among the Unit Prices entered for the related Items of Work.
6. General directions and descriptions of work and materials included in each Item are not necessarily repeated nor summarized in the Bid Schedule. References to the relevant sections of the contract documentation shall be made before entering prices in the Bid Schedule.
7. The method of measurement for payment of completed work shall be in accordance with the method of measurement applicable to each Item as given in the Specifications.
8. Errors found in the submitted Bid Schedule will be corrected in accordance with Article 18 of the Instructions to Bidders.
9. The Bid Price shall include a provisional sum calculated by each bidder to be based on fifteen percent (15%) of the total of Work Item No's 2 to 13

**PREAMBLE  
TO  
SCHEDULE OF RATES AND PRICES**

The rates and prices entered in this schedule may be used to assist in establishing new unit prices as required for Contract Change Orders and Addenda.

The rates and prices entered are to be consistent with the rates and prices used in the Detailed Price Analyses and the Detailed Unit Prices Analyses. Rates and prices which are found not to be consistent will be subject to revision by negotiation.

The prices entered for applicable materials will be utilized as the basis for payment for materials on site.

The rates and prices entered herein shall include and be considered compensation for the costs incurred in:

- i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
- ii. organization of work, overheads, profits, royalties, payment to third parties for land or the use of land, or for damage to property, incidentals, haulage, tools, housing for personnel, laboratory equipment and personnel for testing, and all other costs necessary for the performance of the work.

**A. WAGES**

These rates include in addition :

allowance, for mobilisation, social fringes, social and health insurance, trade union funds, bonus, annual wage increases, out of city allowance.

**B. OPERATING EQUIPMENT ON SITE**

These rates include in addition to the operator's wages : the consumption of fuel, oil and lubricants, the charges for depreciation, interest, repairs, spare parts, insurance, etc.

The Contractor is only required to fill in rates for the equipment that he proposes to bring onto the site for the purposes of executing the project.

If the Contractor has other items of equipment not included in this list, or of different sizes from that shown in this list, that he proposes for the project he must include such equipment and the rate per hour in the list.

**C. MATERIALS ON SITE**

These rates include in addition : all charges for the supply of the materials, loading, transport to site and unloading, as well as all the charges provided for in the General and Special Specifications and in the Contract.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 – RED RIVER BRIDGE**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**A : WAGES**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.	Superintendent	md			
2.	Foreman	md			
3.	Plant Operator	md			
4.	Electrician	md			
5.	Carpenter	md			
6.	Driver	md			
7.	Mechanic	md			
8.	Painter	md			
9.	Masonry	md			
10.	Skilled Labour	md			
11.	Heavy Labour	md			
12.	Common Labour	md			
13.	Ship Officer	md			
14.	Sailor	md			

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 – RED RIVER BRIDGE**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
101.	Bulldozer, (.....ton)	Hr			
102.	Convertible Excavator HYD Type, (..... m3)	Hr			
103.	Convertible Excavator HYD Type, (..... m3)	Hr			
104.	Clamshell HYD Crawler Type, (..... m3)	Hr			
105.	Tractor Shovel, (.....m3)	Hr			
106.	Dump Truck, (..... ton)	hr			
107.	Flat Bed Truck, *(.....(4 - 4.5 ton))	hr			
108.	Flat Bed Truck,*(.....(6 ton))	hr			
109.	Flat Bed Truck,*(.....(2 ton)) with *(.....(2 ton crane)).	hr			
110.	Flat Bed Truck, (.....ton) with..... ton Crane	hr			
111.	Truck Crane,*.....ton (4.8 – 4.9 ton)	hr			
112.	Truck Crane*..... (10-11 ton)	hr			
113.	Truck Crane,*..... (20-22 ton)	hr			
114.	Truck Crane,*..... (35-36ton)	Hr			
115.	Truck Crane,*..... (40-45ton)	Hr			
116.	Pile Driver Crawler Type,.....ton	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 1 – RED RIVER BRIDGE**  
**SCHEDULE OF RATES AND PRICES**  
**BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
117.	Macadam Roller,*.....ton (10-12 ton)	Hr			
118.	Tire Roller,*..... (8-20 ton)	Hr			
119.	Tire Roller,*..... (11-30 ton)	Hr			
120.	Rammer,*..... (60-100kg)	Day			
121.	Asphalt Finisher Crawler Type,*.....m (3.4-5.0m)				
122.	Asphalt Distributor,* .....(2,000 lit)	Hr			
123.	Line Marker Truck,*.....kg (800 kg)	Hr			
124.	Lift Car,*..... (12- 13 m)	Hr			
125.	Vibro Hammer *.....(60 kw)	Hr			
126.	Water Tank Car,*.....lit (3,800 lit)	Hr			
127.	Air Compressor*.....m <sup>3</sup> /min (7.5 m3/min)	Day			
128.	Air Compressor*.....m <sup>3</sup> /min (10.5-11 m3/min)	Day			
129.	Submersible Pump*..... D = 200 mm, H = 15 m	Day			
130.	Generator* .....KVA (5KVA)	Day			
131.	Generator*.....KVA (10KVA)	Day			
132.	Generator*.....KVA (75 KVA)	Day			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 1 – RED RIVER BRIDGE**  
**SCHEDULE OF RATES AND PRICES**  
**BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
133.	Generator*.....KVA (100 KVA)	Day			
134.	Soil Compactor*.....kg (70 - 80 kg)	Day			
135.	Tamper,*.....kg (60 – 100 kg)	Day			
136.	Welding Machine Semi Automatic *.....A (250 A)	Day			
137.	Trailer Truck,*..... ton (60 t)	Day			
138.	Crawler Crane*.....ton (35-37 t)	Hr			
139.	Reverse Circulation Drill, (.....mm diameter)	Hr			
140.	Barge with Crane,* ..... (Crawler Crane 40 ton, Barge 300 ton)	Day			
141.	Barge, Steel,* ..... ..... (300 ton)	Day			
142.	Barge, Steel,* ..... ..... (100 ton)	Day			
143.	Tug Boat, Steel,* ..... .....(200PS)	Hr			
144.	Tug Boat, Steel,* ..... .....(100PS)	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 – RED RIVER BRIDGE**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**C : MATERIALS ON SITE**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
201.	Coarse aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
202.	Fine aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
203.	Portland Cement (PC-40)	kg			
204.	Boulder/gravel at job site	cu.m			
205.	Reinforcing Steel	kg			
206.	Cut back Asphalt, MC-170/RC-250	kg			
207.	Asphalt Cement	ton			

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 1 - GENERAL

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.19	Maintenance & Protection of Traffic	LS	-					
1.20	Mobilisation	LS	-					
1.26	Working in and Dealing with Water	LS	-					
<b>SECTION 1 - TOTAL TO SUMMARY</b>								



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 2 - SITE CLEARING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
2.01	Clearing and Grubbing	sq.m						
SECTION 2 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 1**  
**RED RIVER BRIDGE**  
**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 3 - DEMOLITION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
3.01(1)	Removal of Masonry and Concrete Structures including Remaining Housing	cu.m						
3.01(2)	Removal of Existing Curb	lin.m						
3.01(3)	Removal of Existing Asphalt Pavement	cu.m						
3.01(4)	Removal of Existing Lighting Pole	each						
3.01(5)	Removal of Existing Bridge (Steel Bridge)	sq.m						
SECTION 3 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 4 - ROAD EARTHWORK

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
4.03	Common Excavation	cu.m						
4.04(1)	Borrow Material	cu.m						
4.04(2)	Surcharge with Borrow Material	cu.m						
4.05	Monitoring of Settlement	cu.m						
4.06	Unsuitable Material	cu.m						
4.07	Sand Fill Material	cu.m						
4.08	Granular Backfill	cu.m						
4.09	Permeable Backfill	cu.m						
4.10(2)	Vertical Soil Drains (Fibre)	lin.m						
4.11(2)	Geo-Textile Non-Woven Sheet	sq.m						
SECTION 4 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1  
RED RIVER BRIDGE**

**BID PRICE SCHEDULE  
BASIC BID**

WORK ITEM: SECTION 5 - STRUCTURE EXCAVATION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
5.01(1)	Structure Excavation	cu.m						
5.01(2)	Structure Excavation in the Red River Channel	cu.m						
5.01(3)	Blinding Stone	cu.m						
<b>SECTION 5 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
6.06(1)	U-Ditch, Type D-1	lin.m						
6.06(2)	U-Ditch, Type D-2	lin.m						
6.06(3)	U-Ditch, Type D-3	lin.m						
SECTION 6 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 7 - SUBGRADE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST			COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)		
7.01	Subgrade Preparation	sq.m							
<b>SECTION 7 - TOTAL TO SUMMARY</b>									

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 8 - SUB-BASES AND BASES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
8.01	Sub-Base	cu.m						
8.02	Granular Base Course	cu.m						
<b>SECTION 8 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 9 - PAVEMENTS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
9.04	Bituminous Prime Coat	kg						
9.05	Bituminous Tack Coat	kg						
9.07(1)	Asphalt Treated Base Course (thickness 10cm)	sq.m						
9.07(2)	Asphalt Concrete Binder Course (thickness 5cm)	sq.m						
9.07(3)	Asphalt Concrete Surface Course (thickness 5cm)	sq.m						
9.07(4)	Asphalt Concrete Surface Course (thickness 7.5cm)	sq.m						
9.07(5)	Asphalt Cement	ton						
SECTION 9 - TOTAL TO SUMMARY								



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
10.01(A-1)	Structural Concrete, Class A-1	cu.m						
10.01(A-2)	Structural Concrete, Class A-2	cu.m						
10.01(C-1)	Structural Concrete, Class C-1	cu.m						
10.01(D-1)	Structural Concrete, Class D-1	cu.m						
10.01(E-1)	Structural Concrete, Class E-1	cu.m						
10.01(E-2)	Structural Concrete, Class E-2	cu.m						
10.02	Reinforcing Steel Bars	kg						
10.03(2)	PC I-Girder Length 20m; Height 1.65m	each						
10.03(4)	PC I-Girder Length 28m; Height 1.65m	each						
10.03(4)	PC I-Girder Length 33m; Height 1.65m	each						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
<b>SUB-TOTAL BROUGHT FORWARD</b>								
10.07(1)	Cast-In-Place Concrete Pile, D = 1000mm	lin.m						
10.07(2)	Cast-In-Place Concrete Pile, D = 1500mm	lin.m						
10.07(3)	Cast-In-Place Concrete Pile, D = 2000mm	lin.m						
10.07(4)	Ultra-Sonic and Pile Integrity Testing	Provisional Sum						
10.08(1)	Test Drilling for Soil Investigation, General	lin.m						
10.08(2)	Test Drilling for Soil Investigation, in the Red River Channel	lin.m						
10.08(3)	Test Drilling for Soft Ground Investigation	lin.m						
10.09(1)	Bridge Parapet and Railing, Complete (Type A)	lin.m						
10.09(2)	Bridge Parapet and Railing, Complete (Type B)	lin.m						
<b>SUB-TOTAL CARRIED FORWARD</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
10.10(1)	Expansion Joint, Type A	lin.m						
10.10(2)	Expansion Joint, Type B	lin.m						
10.10(3)	Expansion Joint, Type C	lin.m						
10.10(4)	Expansion Joint, Type D	lin.m						
10.11(1)A	Reaction Distribution Bearing, Type A	each						
10.11(1)B	Reaction Distribution Bearing, Type B	each						
10.11(1)C	Reaction Distribution Bearing, Type C	each						
10.11(1)D	Reaction Distribution Bearing, Type D	each						
10.11(1)E	Reaction Distribution Bearing, Type E	each						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
10.11(2)A	Pot Bearing, Type A	each						
10.11(2)B	Pot Bearing, Type B	each						
10.11(2)C	Pot Bearing, Type C	each						
10.11(2)D	Pot Bearing, Type D	each						
10.11(2)E	Pot Bearing, Type E	each						
10.11(3)A	Elastomeric Bearing Pad, Type A	each						
10.11(3)B	Elastomeric Bearing Pad, Type B	each						
10.11(3)C	Elastomeric Bearing Pad, Type C	each						
10.11(3)D	Elastomeric Bearing Pad, Type D	each						
	SUB-TOTAL CARRIED FORWARD							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
<b>SUB-TOTAL BROUGHT FORWARD</b>								
10.12(1)	PVC Drain Pipe, D = 15cm	lin.m						
10.12(2)	PVC Drain Pipe, D = 20cm	lin.m						
10.12(3)	Deck Drain Box, Type A	each						
10.12(4)	Deck Drain Box, Type B	each						
10.12(5)	Deck Drain Box, Type C	each						
10.12(6)	Precast RC Plate, Type A	sq.m						
10.12(7)	Bridge Deck Waterproofing, Type A	sq.m						
<b>SECTION 10 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
12.01(1)	Grassed Area, Solid Sodding	sq.m						
12.02	Stone Masonry, for Retaining Walls	cu.m						
12.03(3)	Rock Filled Gabion Baskets	sq.m						
12.05(1)	Motared Stonework for Slope Protection	sq.m						
12.05(2)	Motared Stonework for Slope Protection (below River Water Level)	sq.m						
12.06(1)	Vehicle Guardrail, Type A	lin.m						
12.06(2)	Vehicle Guardrail, Type B	lin.m						
12.07(1)	Regulatory and Warning Signs Type-A (1 Board)	each						
12.07(2)	Regulatory and Warning Signs Type-C (2 Board)	each						
12.09(1)	Road Marking, Type A (General Application)	sq.m						
<b>SUB-TOTAL CARRIED FORWARD</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
12.09(2)	Road Marking, Type A (Special Application)	sq.m						
12.12(1)	Concrete Curb, Type A	lin.m						
12.12(2)	Concrete Curb, Type B	lin.m						
12.12(3)	Asphalt Concrete Curb	lin.m						
12.21	Bronze Bridge Name Plaques as described in the Drawings	each						
<b>SECTION 12 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
13.01(2)	Road Lighting Unit, Type A4.1	each	176					
13.01(4)	Road Lighting Unit, Type F1	each	6					
13.01(6)	Power Supply Receiving Panel (SS)	each	1					
13.01(7)	Low Voltage Distribution Panel (MDP)	each	1					
13.01(8)	Lighting Panel (DB)	each	14					
13.01(10)	Cable, X-LPE Armer Type 4c - 25mm <sup>2</sup>	lin.m	160					
13.01(11)	Cable, X-LPE Armer Type 4c - 16mm <sup>2</sup>	lin.m	9,138					
13.01(12)	Cable, X-LPE Armer Type 4c - 10mm <sup>3</sup>	lin.m	6,738					
13.01(13)	Cable, X-LPE/PVC 4c - 10mm <sup>2</sup>	lin.m	340					
13.01(14)	Grounding Wire, BCC 6mm <sup>2</sup>	lin.m	6,752					
SUB-TOTAL CARRIED FORWARD								



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
13.01(15)	PVC Conduit, 50mm dia with Fittings	lin.m	28,372					
13.01(16)	Pull Box, Type F	each	190					
13.01(17)	Pull Box, Type G	each	36					
13.01(18)	Power Receiving, 30 kVA	each	1					
13.01(19)	Application for Power Connection	each	1					
13.01(20)	Watt Hour Meter Box and Panel	each	1					
13.01(21)	Protection of Expansion Joint	each	120					
13.01(22)	Buried Cable Protector	lin.m	466					
13.01(23)	Marker for Underground Cables	each	233					
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1**

**RED RIVER BRIDGE**

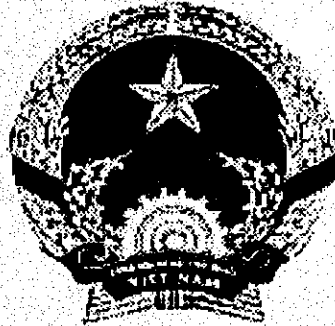
**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
13.01(24)	Navigation Light	set	6					
13.01(31)	Lighting of Bridge Monument	each	8					
13.01(32)	Power Connection for Package 1	LS	-					
13.02(1)	Duct Bank, Type A	lin.m	140					
13.02(3)	Manhole, Type A	each	6					
<b>SECTION 13 - TOTAL TO SUMMARY</b>								

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2 : GIA LAM SECTION**

**VOLUME IV**

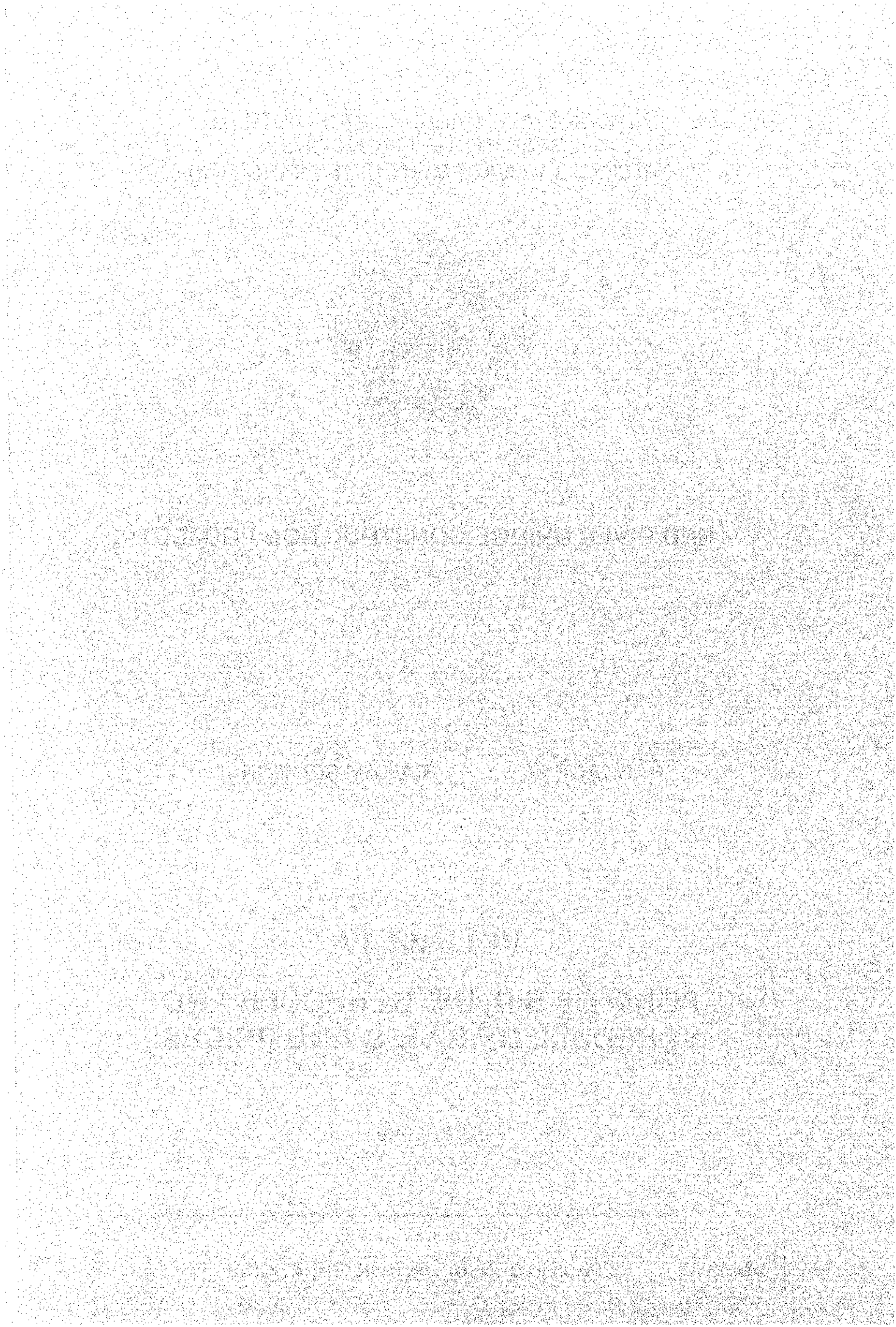
**FORM OF BID, BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

**FORM OF BID , BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

**Table of Contents**

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Preamble To Schedule of Rates and Prices	
A. Wages	
B. Operating Equipment	
C. Materials on Site	

**CHECKLIST OF DOCUMENTS TO BE SUBMITTED**

FORM REF.	DESCRIPTION OF DOCUMENTS	BINDING	CHECK
	Title of Contract Package and Name and Address of Bidder	Book I	
•	Certified copy of Partnership or of Association Agreement (for Joint Enterprise or Joint Operation)		
•	Business Cooperation Contract		
B	Affidavit Agreement for Joint Enterprise (if not submitting above)		
PA	Powers of Attorney (Form PA-1, 2, 3 as appropriate)		
E	Bid Bond		
•	Bank Reference/Balance Sheets/Owners/Management Structure		
	Title of Contract Package and Name and Address of Bidder	Book II	
•	Bid and Appendix to Bid		
•	Bid Schedule and Schedule of Rates and Prices (with floppy disk copy of the same data)		
•	Letter on Balancing Item / Bid Adjustment ( if applicable )		
	Title of Contract Package and Name and Address of Bidder	Book III	
G	Works Progress Schedule		
C	Detailed Price Analyses for Materials on Site		
D	Detailed Price Analyses for Major Pay Items		
•	Floppy disk copy of Bid Schedule & Schedule of Rates/ Prices		
•	Method Statements		
	Title of Contract Package and Name and Address of Bidder	Book IV	
H	List of Construction Plant		
I	List of Senior Staff		
J	Details of Contractor's Superintendent		
K	Details of Contractor's Deputy Superintendent		

- Notes:
1. A completed copy of this checklist shall be submitted with the Bid
  2. All documents are to be submitted as original plus three copies.
  3. All pages are to be initialed by the authorized signatory
  4. Powers of Attorney must be witnessed
  5. Bidder's full name and address and title of Contract Package is to be inserted at the beginning of each book.

BID

Gentlemen :

Having inspected the Site of Works and examined the Bid Documents comprising the Instructions to Bidders, the Invitation to Bid, the Form of Contract Agreement, the General Conditions of Contract, the Addenda (if any), the General Specifications, the Special Specifications, the Bid Schedule and Schedule of Rates and Prices, the Drawings and other related Documents relating to the construction of the following Works:

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

- (1) I/We the undersigned offer to prepare the necessary working drawings and undertake the complete construction and warranty of the above Works, including the supply to the Employer of as-built drawings, for the sum of :

Yen ( ¥ ).....

.....(Yen  
Component of Total Bid Sum, in words)

Yen ¥..... (in figures)

and VNDong.....

.....(VND  
Component of Total Bid Sum, in words)

VND..... (in figures)

- (2) I/We understand that the quantities given in the Bid Schedule are approximate only and that total payments will be determined in accordance with the Conditions of Contract.
- (3)\* I/We undertake if my/our Bid is accepted to commence the Works and to substantially complete and provisionally hand-over the whole of the Works comprised in the Contract within \_\_\_ consecutive calendar days from the date of commencement as specified in the Notice To Proceed, this being the Construction Period.
- (4) If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Bank Guarantee as shown in Guide Form PB-1 of an amount equal to fifteen percent (15%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract;

*or alternatively [ use one or the other as appropriate ]*

If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Insurance Bond as shown in Guide Form PB-2 of an amount equal to forty percent (40%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract, such Bond to be from an insurance or bonding company approved by you.

- (5) I/We agree to abide by this Bid for a period of 150 (one hundred and fifty) days from the date fixed for opening the same, or such longer period as may be mutually agreed between us and recorded in writing, and the Bid shall remain binding upon us and may be accepted at any time before the expiration of this period.
- (6) Unless and until a formal contract is prepared and executed, this Bid together with your written acceptance thereof shall be legally binding between us. In the event that your Award of Contract requires to be approved by any funding agency I/we accept that your Award of Contract is conditional on such approval. I/We agree that my/our receipt of a conditional Award of Contract will bind me/us to enter into a formal written contract with you, if and when your Award of Contract is approved by the funding agency.
- (7) I/We have read and understood the details given in the Appendix to this Bid.
- (8) I/We understand that you are not bound to accept the lowest Bid or any Bid you may receive.

Dated this ..... day of ....., 20 .....

Signature ..... in the capacity of  
 ..... duly authorized (\*) to sign  
 the bid for and on behalf of .....

Witness : .....

Address : .....

(\*) Copy of Power of Attorney must be attached.



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

<b>BID SUM</b>				
<b>WORK ITEM</b>	<b>DESCRIPTION</b>	<b>FOREIGN CURRENCY COMPONENT (YEN)</b>	<b>LOCAL CURRENCY COMPONENT (VND)</b>	<b>COMBINED EQUIVALENT TOTAL (in VND)</b>
1	GENERAL			
2	SITE CLEARING			
3	DEMOLITION			
4	ROAD EARTHWORK			
5	STRUCTURE EXCAVATION			
6	DRAINAGE			
7	SUBGRADE			
8	SUB-BASE AND BASE			
9	PAVEMENTS			
10	CONCRETE STRUCTURES			
12	MISCELLANEOUS			
13	UTILITIES			
15	DIVERSION AND PROTECTION OF UTILITIES (Provisional Sum)			
16	DAYWORKS (Force Account)			
17	<b>PROVISIONAL SUM</b> - based on 15% of Work Item No's 2 to 13 # to be inserted by Bidder			
# Refer also to page 4-Preamble Note 9				#
<b>NET BID SUM</b>				
Add Net VAT at .....% of the # VNDong Equivalent of Net Bid Sum				
<b>TOTAL BID SUM</b>		*	*	
		(YEN)	(VND)	(VND-Equivalent)

(i) Foreign Currency Component of Total Bid Sum, written in words.

Yen.....  
.....

(ii) Local Currency Component of Bid Sum, written in words.

VN Dong  
.....

(ii) VNDong Equivalent of Combined Total Bid Sum, written in words

.....  
.....

(i) Exchange rate as specified by the Employer, used to convert the foreign currency component to VNDong: One Yen = .....VNDong

(\*) Carry Forward to Bid

## APPENDIX TO THE BID

	CLAUSE	
Amount of Bid Bond	Art. 21	US\$500,000.00
Amount of Performance Bond	G.12	15% of the VND and Yen components of the Contract Sum for Bank Guarantee, or 40% for a Bond provided by Insurance or Bonding Company
Minimum amount of third party insurance	G.23(2)	100% of the US\$ equivalent of the combined total Contract Sum
Period for commencement, from Notice to Proceed.	G.42(1)	At latest 30 calendar days
Period for completion of mobilization	S.1.20(3)	60 or 90 calendar days and 120 calendar days from date of commencement.
Time for completion (Construction Period)	G.43	___ consecutive calendar days from the date of commencement as specified in the Notice To Proceed.
Amount of Liquidated Damages	G.47(1)	0.03% of the VND equivalent of the combined total Contract Sum per day
Limit of Liquidated Damages	G.47(1)	10% of the VND equivalent of the combined total Contract Sum
Period of Warranty	G.49	730 calendar days following Decision 499-BXD/GD
Percentage of Retention	G.58(5)	10% of the gross sum of each Monthly Certificate
Time within which payment to be made after Monthly Certificate is issued	G.58(5)	90 calendar days
Advance payment	G.58(2)	15% of the respective local and foreign currency components of the Contract Sum
Price Escalation	G.70	Price escalation provisions are applicable to this Package.

**PREAMBLE  
TO BID SCHEDULE**

1. The Bid Schedule shall be read in conjunction with the Instructions to Bidders, General Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bid Schedule are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the Unit Prices in the priced Bid Schedule where applicable, and otherwise at such Unit Prices or Sums as the Engineer may fix within the terms of the Contract.
3. The Unit Prices in the Priced Bid Schedule entered herein shall include and be considered compensation for all costs incurred in:
  - i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
  - ii. plant labour, supervision, materials, erection, temporary works and other support works, maintenance, insurance, overheads and profit, together with all general risks, liabilities and obligations set out or implied in the Contract.
4. A Sum or Unit Price shall be entered against each Item for which a quantity is given in the Bid Schedule. (A Sum or Unit Price is not required for Items for which the quantity is given as Nil). The cost of Items for which a quantity is given in the Bid Schedule and against which the Contractor has failed to enter a Sum or Unit Price shall be deemed to be covered by the Contract Sum.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items for which a quantity is given in the Bid Schedule, and where no Items are provided the cost shall be deemed to be distributed among the Unit Prices entered for the related Items of Work.
6. General directions and descriptions of work and materials included in each Item are not necessarily repeated nor summarized in the Bid Schedule. References to the relevant sections of the contract documentation shall be made before entering prices in the Bid Schedule.
7. The method of measurement for payment of completed work shall be in accordance with the method of measurement applicable to each Item as given in the Specifications.
8. Errors found in the submitted Bid Schedule will be corrected in accordance with Article 18 of the Instructions to Bidders.
9. The Bid Price shall include a provisional sum calculated by each bidder to be based on fifteen percent (15%) of the total of Work Item No's 2 to 13

**PREAMBLE  
TO  
SCHEDULE OF RATES AND PRICES**

The rates and prices entered in this schedule may be used to assist in establishing new unit prices as required for Contract Change Orders and Addenda.

The rates and prices entered are to be consistent with the rates and prices used in the Detailed Price Analyses and the Detailed Unit Prices Analyses. Rates and prices which are found not to be consistent will be subject to revision by negotiation.

The prices entered for applicable materials will be utilized as the basis for payment for materials on site.

The rates and prices entered herein shall include and be considered compensation for the costs incurred in:

- i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
- ii. organization of work, overheads, profits, royalties, payment to third parties for land or the use of land, or for damage to property, incidentals, haulage, tools, housing for personnel, laboratory equipment and personnel for testing, and all other costs necessary for the performance of the work.

**A. WAGES**

These rates include in addition :

allowance, for mobilisation, social fringes, social and health insurance, trade union funds, bonus, annual wage increases, out of city allowance.

**B. OPERATING EQUIPMENT ON SITE**

These rates include in addition to the operator's wages : the consumption of fuel, oil and lubricants, the charges for depreciation, interest, repairs, spare parts, insurance, etc.

The Contractor is only required to fill in rates for the equipment that he proposes to bring onto the site for the purposes of executing the project.

If the Contractor has other items of equipment not included in this list, or of different sizes from that shown in this list, that he proposes for the project he must include such equipment and the rate per hour in the list.

**C. MATERIALS ON SITE**

These rates include in addition : all charges for the supply of the materials, loading, transport to site and unloading, as well as all the charges provided for in the General and Special Specifications and in the Contract.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**A : WAGES**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.	Superintendent	md			
2.	Foreman	md			
3.	Plant Operator	md			
4.	Electrician	md			
5.	Carpenter	md			
6.	Driver	md			
7.	Mechanic	md			
8.	Painter	md			
9.	Masonry	md			
10.	Skilled Labour	md			
11.	Heavy Labour	md			
12.	Common Labour	md			

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
101.	Bulldozer, (.....ton)	Hr			
102.	Convertible Excavator HYD Type, (..... m3)	Hr			
103.	Convertible Excavator HYD Type, (..... m3)	Hr			
104.	Clamshell HYD Crawler Type, (..... m3)	Hr			
105.	Tractor Shovel, (.....m3)	Hr			
106.	Dump Truck, (..... ton)	hr			
107.	Flat Bed Truck, *(.....(4 - 4.5 ton))	hr			
108.	Flat Bed Truck,*(.....(6 ton))	hr			
109.	Flat Bed Truck,*(.....(2 ton)) with *(.....(2 ton crane)).	hr			
110.	Flat Bed Truck, (.....ton) with..... ton Crane	hr			
111.	Truck Crane,*.....ton (4.8 – 4.9 ton)	hr			
112.	Truck Crane*..... (10-11 ton)	hr			
113.	Truck Crane,*..... ..... (20-22 ton)	hr			
114.	Truck Crane,*..... (35-36ton)	Hr			
115.	Truck Crane,*..... ..... (40-45ton)	Hr			
116.	Pile Driver Crawler Type,.....ton	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
117.	Concrete Breaker,.....ton	Day			
118.	Big Breaker,*.....(800 kg)	Day			
119.	Motor Grader, *.....(3.1m)	Hr			
120.	Macadam Roller,*.....ton (10-12 ton)	Hr			
121.	Tire Roller,*..... (8-20 ton)	Hr			
122.	Tire Roller,*..... (11-30 ton)	Hr			
123.	Rammer,*..... (60-100kg)	Day			
124.	Concrete Paver.....	Hr			
125.	Asphalt Finisher Crawler Type, *.....m (3.4-5.0m)	Hr			
126.	Asphalt Distributor,*.....(2,000 lit)	Hr			
127.	Line Marker Truck,*.....kg (800 kg)	Hr			
128.	Lift Car,*..... (12- 13 m)	Hr			
129.	Vibro Hammer *.....(60 kw)	Hr			
130.	Water Tank Car,*.....lit (3,800 lit)	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
131.	Air Compressor*.....m <sup>3</sup> /min (3.5-3.7 m3/min)	Day			
132.	Air Compressor*.....m <sup>3</sup> /min (7.5 m3/min)	Day			
133.	Air Compressor*.....m <sup>3</sup> /min (10.5-11 m3/min)	Day			
134.	Submersible Pump*..... D = 200 mm, H = 15 m	Day			
135.	Generator* .....KVA (5KVA)	Day			
136.	Generator* .....KVA (10KVA)	Day			
137.	Generator* .....KVA (75 KVA)	Day			
138.	Generator* .....KVA (100 KVA)	Day			
139.	Soil Compactor*.....kg (70 - 80 kg)	Day			
140.	Tamper,*.....kg (60 – 100 kg)	Day			
141.	Welding Machine Semi Automatic *.....A (250 A)	Day			
142.	Trailer Truck,*..... ton (60 t)	Day			
143.	Crawler Crane*.....ton (35-37 t)	Hr			
144.	Sand Pile Driver, *.....m leader length (30m)	Hr			
145.	Sand Pile Driver, *.....m leader length (45m)	Hr			
146.	Reverse Circulation Drill, (.....mm diameter)	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 2 – GIA LAM SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**C : MATERIALS ON SITE**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
201.	Coarse aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
202.	Fine aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
203.	Portland Cement (PC-40)	kg			
204.	Boulder/gravel at job site	cu.m			
205.	Reinforcing Steel	kg			
206.	Cut back Asphalt, MC-170/RC-250	kg			
207.	Asphalt Cement	ton			

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 1 - GENERAL

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.19	Maintenance & Protection of Traffic	LS	-					
1.20	Mobilisation	LS	-					
1.26	Working in and Dealing with Water	LS	-					
<b>SECTION 1 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 2 - SITE CLEARING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
2.01	Clearing and Grubbing	sq.m						
<b>SECTION 2 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 3 - DEMOLITION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
3.01(1)	Removal of Masonry and Concrete Structures including Remaining Housing	cu.m						
3.01(2)	Removal of Existing Curb	lin.m						
3.01(3)	Removal of Existing Asphalt Pavement	cu.m						
3.01(4)	Removal of Existing Lighting Pole	each						
3.01(5)	Removal of Existing Bridge (Steel Bridge)	sq.m						
<b>SECTION 3 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 4 - ROAD EARTHWORK

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
4.03	Common Excavation	cu.m						
4.04(1)	Borrow Material	cu.m						
4.04(2)	Surcharge with Borrow Material	cu.m						
4.05	Monitoring of Settlement	cu.m						
4.06	Unsuitable Material	cu.m						
4.07	Sand Fill Material	cu.m						
4.08	Granular Backfill	cu.m						
4.09	Permeable Backfill	cu.m						
4.10(1)	Vertical Soil Drains (Sand, 40cm dia).	lin.m						
4.10(2)	Vertical Soil Drains (Fibre)	lin.m						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 4 - ROAD EARTHWORK

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
4.11(2)	Geo-Textile Non-Woven Sheet	sq.m						
SECTION 4 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 5 - STRUCTURE EXCAVATION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
5.01(1)	Structure Excavation	cu.m						
5.01(3)	Blinding Stone	cu.m						
<b>SECTION 5 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST			COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)		
6.04-A	Box Culvert, Type A	each	1						
6.04-B	Box Culvert, Type B	each	2						
6.05(5)	RC Pipe, D=75cm Type A	lin.m							
6.05(7)	RC Pipe, D=125cm Type A	lin.m							
6.05(8)	RC Pipe, D=125cm Type B	lin.m							
6.05(9)	RC Pipe, D=150cm Type A	lin.m							
6.05(10)	RC Pipe, D=150cm Type B	lin.m							
6.06(1)	U-Ditch, Type D-1	lin.m							
6.06(2)	U-Ditch, Type D-2	lin.m							
6.06(3)	U-Ditch, Type D-3	lin.m							
SUB-TOTAL CARRIED FORWARD									



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
	SUB-TOTAL CARRIED FORWARD							

# RED RIVER BRIDGE CONSTRUCTION PROJECT

## PACKAGE 2

### GIA LAM SECTION

#### BID PRICE SCHEDULE

#### BASIC BID

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
SECTION 6 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 7 - SUBGRADE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
7.01	Subgrade Preparation	sq.m						
SECTION 7 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 8 - SUB-BASES AND BASES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
8.01	Sub-Base	cu.m						
8.02	Granular Base Course	cu.m						
SECTION 8 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 9 - PAVEMENTS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
9.04	Bituminous Prime Coat	kg						
9.05	Bituminous Tack Coat	kg						
9.07(1)	Asphalt Treated Base Course (thickness 10cm)	sq.m						
9.07(2)	Asphalt Concrete Binder Course (thickness 5cm)	sq.m						
9.07(3)	Asphalt Concrete Surface Course (thickness 5cm)	sq.m						
9.07(4)	Asphalt Concrete Surface Course (thickness 7.5cm)	sq.m						
9.07(5)	Asphalt Cement	ton						
9.08(1)	Portland Cement Concrete Pavement (thickness 25cm)	sq.m						
9.08(2)	Lean Concrete Base (thickness 10cm)	sq.m						
<b>SECTION 9 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
10.01(C-1)	Structural Concrete, Class C-1	cu.m						
10.01(C-4)	Structural Concrete, Class C-4	cu.m						
10.01(C-5)	Structural Concrete, Class C-5	cu.m						
10.01(D-1)	Structural Concrete, Class D-1	cu.m						
10.01(E-1)	Structural Concrete, Class E-1	cu.m						
10.01(E-2)	Structural Concrete, Class E-2	cu.m						
10.01(G)	Structural Concrete, Class G	cu.m						
10.02	Reinforcing Steel Bars	kg						
10.03(2)	PC I-Girder Length 20.0m; Height 1.50m	each						
10.03(4)	PC I-Girder Length 33.0m; Height 1.65m	each						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
<b>SUB-TOTAL BROUGHT FORWARD</b>								
10.03(5)	PC I-Girder Length 35.0m; Height 1.75m	each						
10.07(1)	Cast-In-Place Concrete Pile, D = 1000mm	lin.m						
10.07(2)	Cast-In-Place Concrete Pile, D = 1500mm	lin.m						
10.07(T)	Ultra-Sonic and Pile Integrity Testing	Provisional Sum						
10.08(1)	Test Drilling for Structural Investigation	lin.m						
10.08(3)	Test Drilling for Soft Ground Investigation	lin.m						
10.09(1)	Bridge Parapet and Railing, Complete (Type A)	lin.m						
10.10(1)	Expansion Joint, Type A	lin.m						
10.11(3)A	Bridge Bearing Pad, Type A	each						
<b>SUB-TOTAL CARRIED FORWARD</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (VEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (VEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
10.11(3)B	Bridge Bearing Pad, Type B	each						
10.11(3)C	Bridge Bearing Pad, Type C	each						
10.11(3)D	Bridge Bearing Pad, Type D	each						
10.11(3)E	Bridge Bearing Pad, Type E	each						
10.11(3)F	Bridge Bearing Pad, Type F	each						
10.11(3)G	Bridge Bearing Pad, Type G	each						
10.11(3)H	Bridge Bearing Pad, Type H	each						
10.11(3)J	Bridge Bearing Pad, Type J	each						
10.12(1)	PVC Drain Pipe, D = 15cm	lin.m						
	<b>SUB-TOTAL CARRIED FORWARD</b>							



RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 2

GIA LAM SECTION

BID PRICE SCHEDULE

BASIC BID

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
10.12(2)	PVC Drain Pipe, D = 20cm	lin.m						
10.12(3)	Deck Drain Box, Type A	each						
10.12(4)	Deck Drain Box, Type B	each						
10.12(5)	Deck Drain Box, Type C	each						
10.12(6)	Precast RC Plate, Type A	sq.m						
10.12(7)	Bridge Deck Waterproofing, Type A	sq.m						
	<b>SECTION 10 - TOTAL TO SUMMARY</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
12.01(1)	Grassed Area, Solid Sodding	sq.m						
12.02	Stone Masonry, for Retaining Walls	cu.m						
12.03(3)	Rock Filled Gabion Baskets	sq.m						
12.05(1)	Motared Stonework for Slope Protection	sq.m						
12.05(2)	Motared Stonework for Slope Protection (below River Water Level)	sq.m						
12.06(1)	Vehicle Guardrail, Type A	lin.m						
12.06(2)	Vehicle Guardrail, Type B	lin.m						
12.06(3)	Pedestrian Guardrail	lin.m						
12.07(1)	Regulatory and Warning Signs Type-A (1 Board)	each						
12.07(2)	Regulatory and Warning Signs Type-C (2 Board)	each						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
12.07(3)	Precast Concrete Km Indicator Post	each						
12.07(4)	Precast Concrete Guide Post	each						
12.08(1)	Guide Sign, Type A	each						
12.08(2)	Guide Sign, Type B	each						
12.08(3)	Guide Sign, Type C	each						
12.09(1)	Road Marking, Type A (General Application)	sq.m						
12.09(2)	Road Marking, Type A (Special Application)	sq.m						
12.12(1)	Concrete Curb, Type A	lin.m						
12.12(2)	Concrete Curb, Type B	lin.m						
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
12.12(3)	Asphalt Concrete Curb	lin.m						
12.13	Concrete Slab Paving	sq.m						
12.17	Aglaia (Ngau)	each						
12.21	Bronze Bridge Name Plaques as described in the Drawings	each						
SECTION 12 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
13.01(1)	Road Lighting Unit, Type A2.1	each						
13.01(2)	Road Lighting Unit, Type A4.1	each						
13.01(3)	Road Lighting Unit, Type B2.1	each						
13.01(4)	Road Lighting Unit, Type F1	each						
13.01(5)	Road Lighting Unit, Type G1	each						
13.01(6)	Power Supply Receiving Panel (SS)	each						
13.01(7)	Low Voltage Distribution Panel (MDP)	each						
13.01(8)	Lighting Panel (DB)	each						
13.01(9)	Cable, X-LPE Armer Type 4c - 50mm <sup>2</sup>	lin.m						
13.01(10)	Cable, X-LPE Armer Type 4c - 25mm <sup>2</sup>	lin.m						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
13.01(11)	Cable, X-LPE Armer Type 4c - 16mm <sup>2</sup>	lin.m						
13.01(12)	Cable, X-LPE Armer Type 4c - 10mm <sup>3</sup>	lin.m						
13.01(13)	Cable, X-LPE/PVC 4c - 10mm <sup>2</sup>	lin.m						
13.01(14)	Grounding Wire, BCC 6mm <sup>2</sup>	lin.m						
13.01(15)	PVC Conduit, 50mm dia with Fittings	lin.m						
13.01(16)	Pull Box, Type F	each						
13.01(17)	Pull Box, Type G	each						
13.01(18)	Power Receiving, 30 kVA	each						
13.01(19)	Application for Power Connection	each						
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
13.01(20)	Watt Hour Meter Box and Panel	each						
13.01(21)	Protection of Expansion Joint	each						
13.01(22)	Buried Cable Protector	lin.m						
13.01(23)	Marker for Underground Cables	each						
13.01(24)	Navigation Light	set						
13.01(25)	Control Cable, X-LPE 7c-10mm2	lin.m						
13.01(26)	Traffic Control Master Unit	each						
13.01(27)	Manual Push Button	each						
13.01(28)	Traffic Signal Unit, Type 1	each						
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2**

**GIA LAM SECTION**

**BID PRICE SCHEDULE**

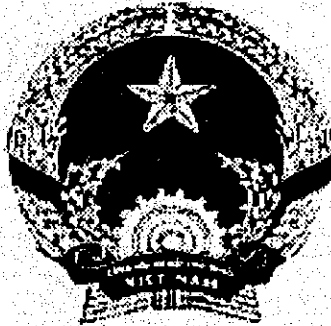
**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
13.01(29)	Traffic Signal Unit, Type 2	each						
13.01(30)	Emergency Back-Up Unit	each						
13.01(32)	Power Connection for Package 3	LS						
13.02(1)	Duct Bank, Type A	lin.m						
13.02(2)	Duct Bank, Type B	lin.m						
13.02(3)	Manhole, Type A	each						
13.02(4)	Manhole, Type B	each						
<b>SECTION 13 - TOTAL TO SUMMARY</b>								



**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3 : THANH TRI SECTION**

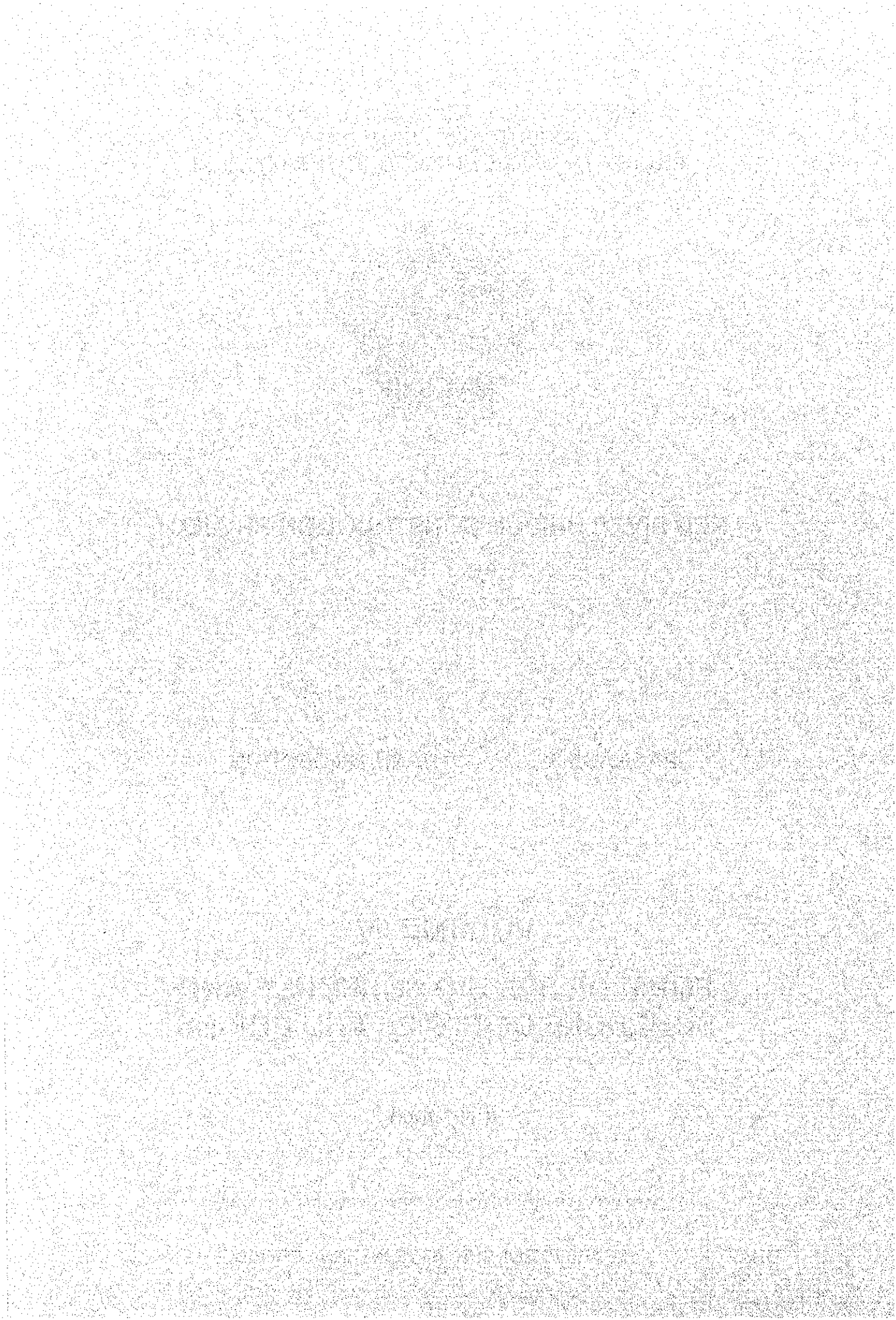
**VOLUME IV  
FORM OF BID, BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

**FORM OF BID , BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

**Table of Contents**

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**CHECKLIST OF DOCUMENTS TO BE SUBMITTED**

FORM REF.	DESCRIPTION OF DOCUMENTS	BINDING	CHECK
	Title of Contract Package and Name and Address of Bidder	Book I	
•	Certified copy of Partnership or of Association Agreement (for Joint Enterprise or Joint Operation)		
•	Business Cooperation Contract		
B	Affidavit Agreement for Joint Enterprise (if not submitting above)		
PA	Powers of Attorney (Form PA-1, 2, 3 as appropriate)		
E	Bid Bond		
•	Bank Reference/Balance Sheets/Owners/Management Structure		
	Title of Contract Package and Name and Address of Bidder	Book II	
•	Bid and Appendix to Bid		
•	Bid Schedule and Schedule of Rates and Prices (with floppy disk copy of the same data)		
•	Letter on Balancing Item / Bid Adjustment ( if applicable )		
	Title of Contract Package and Name and Address of Bidder	Book III	
G	Works Progress Schedule		
C	Detailed Price Analyses for Materials on Site		
D	Detailed Price Analyses for Major Pay Items		
•	Floppy disk copy of Bid Schedule & Schedule of Rates/ Prices		
•	Method Statements		
	Title of Contract Package and Name and Address of Bidder	Book IV	
H	List of Construction Plant		
I	List of Senior Staff		
J	Details of Contractor's Superintendent		
K	Details of Contractor's Deputy Superintendent		

- Notes:
1. A completed copy of this checklist shall be submitted with the Bid
  2. All documents are to be submitted as original plus three copies.
  3. All pages are to be initialed by the authorized signatory
  4. Powers of Attorney must be witnessed
  5. Bidder's full name and address and title of Contract Package is to be inserted at the beginning of each book.

BID

Gentlemen :

Having inspected the Site of Works and examined the Bid Documents comprising the Instructions to Bidders, the Invitation to Bid, the Form of Contract Agreement, the General Conditions of Contract, the Addenda (if any), the General Specifications, the Special Specifications, the Bid Schedule and Schedule of Rates and Prices, the Drawings and other related Documents relating to the construction of the following Works:

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

- (1) I/We the undersigned offer to prepare the necessary working drawings and undertake the complete construction and warranty of the above Works, including the supply to the Employer of as-built drawings, for the sum of :

Yen ( ¥ ).....

.....(Yen  
Component of Total Bid Sum, in words)

Yen ¥..... (in figures)

and VNDong.....

.....(VND  
Component of Total Bid Sum, in words)

VND..... (in figures)

- (2) I/We understand that the quantities given in the Bid Schedule are approximate only and that total payments will be determined in accordance with the Conditions of Contract.
- (3)\* I/We undertake if my/our Bid is accepted to commence the Works and to substantially complete and provisionally hand-over the whole of the Works comprised in the Contract within \_\_\_\_ consecutive calendar days from the date of commencement as specified in the Notice To Proceed, this being the Construction Period.
- (4) If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Bank Guarantee as shown in Guide Form PB-1 of an amount equal to fifteen percent (15%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract;

*or alternatively [ use one or the other as appropriate ]*

If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Insurance Bond as shown in Guide Form PB-2 of an amount equal to forty percent (40%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract, such Bond to be from an insurance or bonding company approved by you.

- (5) I/We agree to abide by this Bid for a period of 150 (one hundred and fifty) days from the date fixed for opening the same, or such longer period as may be mutually agreed between us and recorded in writing, and the Bid shall remain binding upon us and may be accepted at any time before the expiration of this period.
- (6) Unless and until a formal contract is prepared and executed, this Bid together with your written acceptance thereof shall be legally binding between us. In the event that your Award of Contract requires to be approved by any funding agency I/we accept that your Award of Contract is conditional on such approval. I/We agree that my/our receipt of a conditional Award of Contract will bind me/us to enter into a formal written contract with you, if and when your Award of Contract is approved by the funding agency.
- (7) I/We have read and understood the details given in the Appendix to this Bid.
- (8) I/We understand that you are not bound to accept the lowest Bid or any Bid you may receive.

Dated this ..... day of ....., 20 .....

Signature ..... in the capacity of  
 ..... duly authorized (\*) to sign  
 the bid for and on behalf of .....

Witness : .....

Address : .....

.....

(\*) Copy of Power of Attorney must be attached.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

<b>BID SUM</b>				
<b>WORK ITEM</b>	<b>DESCRIPTION</b>	<b>FOREIGN CURRENCY COMPONENT (YEN)</b>	<b>LOCAL CURRENCY COMPONENT (VND)</b>	<b>COMBINED EQUIVALENT TOTAL (in VND)</b>
1	GENERAL			
2	SITE CLEARING			
3	DEMOLITION			
4	ROAD EARTHWORK			
5	STRUCTURE EXCAVATION			
6	DRAINAGE			
7	SUBGRADE			
8	SUB-BASE AND BASE			
9	PAVEMENTS			
10	CONCRETE STRUCTURES			
12	MISCELLANEOUS			
13	UTILITIES			
15	DIVERSION AND PROTECTION OF UTILITIES (Provisional Sum)			
16	DAYWORKS (Force Account)			
17	<u>PROVISIONAL SUM</u> - based on 15% of Work Item No's 2 to 13 # to be inserted by Bidder			
# Refer also to page 4-Preamble Note 9				#
<b>NET BID SUM</b>				
Add Net VAT at .....% of the # VNDong Equivalent of Net Bid Sum				
<b>TOTAL BID SUM</b>		*	*	
		(YEN)	(VND)	(VND-Equivalent)

(i) Foreign Currency Component of Total Bid Sum, written in words.

Yen.....  
.....

(ii) Local Currency Component of Bid Sum, written in words.

VN Dong  
.....

(ii) VNDong Equivalent of Combined Total Bid Sum, written in words

.....  
.....

(i) Exchange rate as specified by the Employer, used to convert the foreign currency component to VNDong: One Yen = ..... VNDong

(\*) Carry Forward to Bid

## APPENDIX TO THE BID

	CLAUSE	
Amount of Bid Bond	Art. 21	US\$500,000.00
Amount of Performance Bond	G.12	15% of the VND and Yen components of the Contract Sum for Bank Guarantee, or 40% for a Bond provided by Insurance or Bonding Company
Minimum amount of third party insurance	G.23(2)	100% of the US\$ equivalent of the combined total Contract Sum
Period for commencement, from Notice to Proceed.	G.42(1)	At latest 30 calendar days
Period for completion of mobilization	S.1.20(3)	60 or 90 calendar days and 120 calendar days from date of commencement.
Time for completion (Construction Period)	G.43	___ consecutive calendar days from the date of commencement as specified in the Notice To Proceed.
Amount of Liquidated Damages	G.47(1)	0.03% of the VND equivalent of the combined total Contract Sum per day
Limit of Liquidated Damages	G.47(1)	10% of the VND equivalent of the combined total Contract Sum
Period of Warranty	G.49	730 calendar days following Decision 499-BXD/GD
Percentage of Retention	G.58(5)	10% of the gross sum of each Monthly Certificate
Time within which payment to be made after Monthly Certificate is issued	G.58(5)	90 calendar days
Advance payment	G.58(2)	15% of the respective local and foreign currency components of the Contract Sum
Price Escalation	G.70	Price escalation provisions are applicable to this Package.



**PREAMBLE  
TO BID SCHEDULE**

1. The Bid Schedule shall be read in conjunction with the Instructions to Bidders, General Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bid Schedule are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the Unit Prices in the priced Bid Schedule where applicable, and otherwise at such Unit Prices or Sums as the Engineer may fix within the terms of the Contract.
3. The Unit Prices in the Priced Bid Schedule entered herein shall include and be considered compensation for all costs incurred in:
  - i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
  - ii. plant labour, supervision, materials, erection, temporary works and other support works, maintenance, insurance, overheads and profit, together with all general risks, liabilities and obligations set out or implied in the Contract.
4. A Sum or Unit Price shall be entered against each Item for which a quantity is given in the Bid Schedule. (A Sum or Unit Price is not required for Items for which the quantity is given as Nil). The cost of Items for which a quantity is given in the Bid Schedule and against which the Contractor has failed to enter a Sum or Unit Price shall be deemed to be covered by the Contract Sum.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items for which a quantity is given in the Bid Schedule, and where no Items are provided the cost shall be deemed to be distributed among the Unit Prices entered for the related Items of Work.
6. General directions and descriptions of work and materials included in each Item are not necessarily repeated nor summarized in the Bid Schedule. References to the relevant sections of the contract documentation shall be made before entering prices in the Bid Schedule.
7. The method of measurement for payment of completed work shall be in accordance with the method of measurement applicable to each Item as given in the Specifications.
8. Errors found in the submitted Bid Schedule will be corrected in accordance with Article 18 of the Instructions to Bidders.
9. The Bid Price shall include a provisional sum calculated by each bidder to be based on fifteen percent (15%) of the total of Work Item No's 2 to 13

**PREAMBLE  
TO  
SCHEDULE OF RATES AND PRICES**

The rates and prices entered in this schedule may be used to assist in establishing new unit prices as required for Contract Change Orders and Addenda.

The rates and prices entered are to be consistent with the rates and prices used in the Detailed Price Analyses and the Detailed Unit Prices Analyses. Rates and prices which are found not to be consistent will be subject to revision by negotiation.

The prices entered for applicable materials will be utilized as the basis for payment for materials on site.

The rates and prices entered herein shall include and be considered compensation for the costs incurred in:

- i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
- ii. organization of work, overheads, profits, royalties, payment to third parties for land or the use of land, or for damage to property, incidentals, haulage, tools, housing for personnel, laboratory equipment and personnel for testing, and all other costs necessary for the performance of the work.

**A. WAGES**

These rates include in addition :

allowance, for mobilisation, social fringes, social and health insurance, trade union funds, bonus, annual wage increases, out of city allowance.

**B. OPERATING EQUIPMENT ON SITE**

These rates include in addition to the operator's wages : the consumption of fuel, oil and lubricants, the charges for depreciation, interest, repairs, spare parts, insurance, etc.

The Contractor is only required to fill in rates for the equipment that he proposes to bring onto the site for the purposes of executing the project.

If the Contractor has other items of equipment not included in this list, or of different sizes from that shown in this list, that he proposes for the project he must include such equipment and the rate per hour in the list.

**C. MATERIALS ON SITE**

These rates include in addition : all charges for the supply of the materials, loading, transport to site and unloading, as well as all the charges provided for in the General and Special Specifications and in the Contract.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**A : WAGES**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.	Superintendent	md			
2.	Foreman	md			
3.	Plant Operator	md			
4.	Electrician	md			
5.	Carpenter	md			
6.	Driver	md			
7.	Mechanic	md			
8.	Painter	md			
9.	Masonry	md			
10.	Skilled Labour	md			
11.	Heavy Labour	md			
12.	Common Labour	md			

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
101.	Bulldozer, (.....ton)	Hr			
102.	Convertible Excavator HYD Type, (..... m3)	Hr			
103.	Convertible Excavator HYD Type, (..... m3)	Hr			
104.	Clamshell HYD Crawler Type, (..... m3)	Hr			
105.	Tractor Shovel, (.....m3)	Hr			
106.	Dump Truck, (..... ton)	hr			
107.	Flat Bed Truck, *(.....(4 - 4.5 ton))	hr			
108.	Flat Bed Truck,*(.....(6 ton))	hr			
109.	Flat Bed Truck,*(.....(2 ton)) with *(.....(2 ton crane)).	hr			
110.	Flat Bed Truck, (.....ton) with..... ton Crane	hr			
111.	Truck Crane,*.....ton (4.8 – 4.9 ton)	hr			
112.	Truck Crane*..... (10-11 ton)	hr			
113.	Truck Crane,*..... (20-22 ton)	hr			
114.	Truck Crane,*..... (35-36ton)	Hr			
115.	Truck Crane,*..... (40-45ton)	Hr			
116.	Pile Driver Crawler Type,.....ton	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
117.	Concrete Breaker,.....ton	Day			
118.	Big Breaker,*.....(800 kg)	Day			
119.	Motor Grader, *.....(3.1m)	Hr			
120.	Macadam Roller,*.....ton (10-12 ton)	Hr			
121.	Tire Roller,*..... (8-20 ton)	Hr			
122.	Tire Roller,*..... (11-30 ton)	Hr			
123.	Rammer,*..... (60-100kg)	Day			
124.	Concrete Paver.....	Hr			
125.	Asphalt Finisher Crawler Type, *.....m (3.4-5.0m)	Hr			
126.	Asphalt Distributor,*.....(2,000 lit)	Hr			
127.	Line Marker Truck,*.....kg (800 kg)	Hr			
128.	Lift Car,*..... (12- 13 m)	Hr			
129.	Vibro Hammer *.....(60 kw)	Hr			
130.	Water Tank Car,*.....lit (3,800 lit)	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
131.	Air Compressor*.....m <sup>3</sup> /min (3.5-3.7 m <sup>3</sup> /min)	Day			
132.	Air Compressor*.....m <sup>3</sup> /min (7.5 m <sup>3</sup> /min)	Day			
133.	Air Compressor*.....m <sup>3</sup> /min (10.5-11 m <sup>3</sup> /min)	Day			
134.	Submersible Pump*..... D = 200 mm, H = 15 m	Day			
135.	Generator* .....KVA (5KVA)	Day			
136.	Generator* .....KVA (10KVA)	Day			
137.	Generator* .....KVA (75 KVA)	Day			
138.	Generator* .....KVA (100 KVA)	Day			
139.	Soil Compactor*.....kg (70 - 80 kg)	Day			
140.	Tamper,*.....kg (60 – 100 kg)	Day			
141.	Welding Machine Semi Automatic *.....A (250 A)	Day			
142.	Trailer Truck,*..... ton (60 t)	Day			
143.	Crawler Crane*.....ton (35-37 t)	Hr			
144.	Sand Pile Driver, *.....m leader length (30m)	Hr			
145.	Sand Pile Driver, *.....m leader length (45m)	Hr			
146.	Reverse Circulation Drill, (.....mm diameter)	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 – THANH TRI SECTION**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**C : MATERIALS ON SITE**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
201.	Coarse aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
202.	Fine aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
203.	Portland Cement (PC-40)	kg			
204.	Boulder/gravel at job site	cu.m			
205.	Reinforcing Steel	kg			
206.	Cut back Asphalt, MC-170/RC-250	kg			
207.	Asphalt Cement	ton			

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 1 - GENERAL

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.19	Maintenance & Protection of Traffic	LS	-					
1.20	Mobilisation	LS	-					
1.26	Working in and Dealing with Water	LS	-					
<b>SECTION 1 - TOTAL TO SUMMARY</b>								



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE  
BASIC BID**

WORK ITEM: SECTION 2 - SITE CLEARING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
2.01	Clearing and Grubbing	sq.m						
<b>SECTION 2 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 3 - DEMOLITION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
3.01(1)	Removal of Masonry and Concrete Structures including Remaining Housing	cu.m						
3.01(2)	Removal of Existing Curb	lin.m						
3.01(3)	Removal of Existing Asphalt Pavement	cu.m						
3.01(4)	Removal of Existing Lighting Pole	each						
3.01(5)	Removal of Existing Bridge (Steel Bridge)	sq.m						
<b>SECTION 3 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 4 - ROAD EARTHWORK

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
4.03	Common Excavation	cu.m						
4.04(1)	Borrow Material	cu.m						
4.04(2)	Surcharge with Borrow Material	cu.m						
4.05	Monitoring of Settlement	cu.m						
4.06	Unsuitable Material	cu.m						
4.07	Sand Fill Material	cu.m						
4.08	Granular Backfill	cu.m						
4.09	Permeable Backfill	cu.m						
4.10(1)	Vertical Soil Drains (Sand, 40cm dia.)	lin.m						
4.10(2)	Vertical Soil Drains (Fibre)	lin.m						
<b>SUB-TOTAL CARRIED FORWARD</b>								

RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 3

THANH TRI SECTION

BID PRICE SCHEDULE

BASIC BID

WORK ITEM: SECTION 4 - ROAD EARTHWORK

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
4.11(2)	Geo-Textile Non-Woven Sheet	sq.m						
SECTION 4 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 5 - STRUCTURE EXCAVATION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
5.01(1)	Structure Excavation	cu.m						
5.01(3)	Blinding Stone	cu.m						
SECTION 5 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
6.04-A	Box Culvert, Type A	each	1					
6.04-B	Box Culvert, Type B	each	2					
6.05(5)	RC Pipe, D=75cm Type A	lin.m						
6.05(7)	RC Pipe, D=125cm Type A	lin.m						
6.05(8)	RC Pipe, D=125cm Type B	lin.m						
6.05(9)	RC Pipe, D=150cm Type A	lin.m						
6.05(10)	RC Pipe, D=150cm Type B	lin.m						
6.06(1)	U-Ditch, Type D-1	lin.m						
6.06(2)	U-Ditch, Type D-2	lin.m						
6.06(3)	U-Ditch, Type D-3	lin.m						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
	SUB-TOTAL CARRIED FORWARD							

RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 3

THANH TRI SECTION

BID PRICE SCHEDULE

BASIC BID

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
SECTION 6 - TOTAL TO SUMMARY								



# RED RIVER BRIDGE CONSTRUCTION PROJECT

## PACKAGE 3

### THANH TRI SECTION

#### BID PRICE SCHEDULE BASIC BID

WORK ITEM: SECTION 7 - SUBGRADE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
7.01	Subgrade Preparation	sq.m						
<b>SECTION 7 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 8 - SUB-BASES AND BASES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
8.01	Sub-Base	cu.m						
8.02	Granular Base Course	cu.m						
SECTION 8 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

**WORK ITEM: SECTION 9 - PAVEMENTS**

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
9.04	Bituminous Prime Coat	kg						
9.05	Bituminous Tack Coat	kg						
9.07(1)	Asphalt Treated Base Course (thickness 10cm)	sq.m						
9.07(2)	Asphalt Concrete Binder Course (thickness 5cm)	sq.m						
9.07(3)	Asphalt Concrete Surface Course (thickness 5cm)	sq.m						
9.07(4)	Asphalt Concrete Surface Course (thickness 7.5cm)	sq.m						
9.07(5)	Asphalt Cement	ton						
9.08(1)	Portland Cement Concrete Pavement (thickness 25cm)	sq.m						
9.08(2)	Lean Concrete Base (thickness 10cm)	sq.m						
<b>SECTION 9 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
10.01(C-1)	Structural Concrete, Class C-1	cu.m						
10.01(C-4)	Structural Concrete, Class C-4	cu.m						
10.01(C-5)	Structural Concrete, Class C-5	cu.m						
10.01(D-1)	Structural Concrete, Class D-1	cu.m						
10.01(E-1)	Structural Concrete, Class E-1	cu.m						
10.01(E-2)	Structural Concrete, Class E-2	cu.m						
10.01(G)	Structural Concrete, Class G	cu.m						
10.02	Reinforcing Steel Bars	kg						
10.03(2)	PC I-Girder Length 20.0m; Height 1.50m	each						
10.03(4)	PC I-Girder Length 33.0m; Height 1.65m	each						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
<b>SUB-TOTAL BROUGHT FORWARD</b>								
10.03(5)	PC I-Girder Length 35.0m; Height 1.75m	each						
10.07(1)	Cast-In-Place Concrete Pile, D = 1000m	lin.m						
10.07(2)	Cast-In-Place Concrete Pile, D = 1500m	lin.m						
10.07(T)	Ultra-Sonic and Pile Integrity Testing	Provisional Sum						
10.08(1)	Test Drilling for Structural Investigation	lin.m						
10.08(3)	Test Drilling for Soft Ground Investigation	lin.m						
10.09(1)	Bridge Parapet and Railing, Complete (Type A)	lin.m						
10.10(1)	Expansion Joint, Type A	lin.m						
10.11(3)A	Bridge Bearing Pad, Type A	each						
<b>SUB-TOTAL CARRIED FORWARD</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
10.11(3)B	Bridge Bearing Pad, Type B	each						
10.11(3)C	Bridge Bearing Pad, Type C	each						
10.11(3)D	Bridge Bearing Pad, Type D	each						
10.11(3)E	Bridge Bearing Pad, Type E	each						
10.11(3)F	Bridge Bearing Pad, Type F	each						
10.11(3)G	Bridge Bearing Pad, Type G	each						
10.11(3)H	Bridge Bearing Pad, Type H	each						
10.11(3)J	Bridge Bearing Pad, Type J	each						
10.12(1)	PVC Drain Pipe, D = 15cm	lin.m						
	SUB-TOTAL CARRIED FORWARD							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
10.12(2)	PVC Drain Pipe, D = 20cm	lin.m						
10.12(3)	Deck Drain Box, Type A	each						
10.12(4)	Deck Drain Box, Type B	each						
10.12(5)	Deck Drain Box, Type C	each						
10.12(6)	Precast RC Plate, Type A	sq.m						
10.12(7)	Bridge Deck Waterproofing, Type A	sq.m						
<b>SECTION 10 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
12.01(1)	Grassed Area, Solid Sodding	sq.m						
12.02	Stone Masonry, for Retaining Walls	cu.m						
12.03(3)	Rock Filled Gabion Baskets	sq.m						
12.05(1)	Motared Stonework for Slope Protection	sq.m						
12.05(2)	Motared Stonework for Slope Protection (below River Water Level)	sq.m						
12.06(1)	Vehicle Guardrail, Type A	lin.m						
12.06(2)	Vehicle Guardrail, Type B	lin.m						
12.06(3)	Pedestrian Guardrail	lin.m						
12.07(1)	Regulatory and Warning Signs Type-A (1 Board)	each						
12.07(2)	Regulatory and Warning Signs Type-C (2 Board)	each						
SUB-TOTAL CARRIED FORWARD								



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST			COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)		
	<b>SUB-TOTAL BROUGHT FORWARD</b>								
12.07(3)	Precast Concrete Km Indicator Post	each							
12.07(4)	Precast Concrete Guide Post	each							
12.08(1)	Guide Sign, Type A	each							
12.08(2)	Guide Sign, Type B	each							
12.08(3)	Guide Sign, Type C	each							
12.09(1)	Road Marking, Type A (General Application)	sq.m							
12.09(2)	Road Marking, Type A (Special Application)	sq.m							
12.12(1)	Concrete Curb, Type A	lin.m							
12.12(2)	Concrete Curb, Type B	lin.m							
	<b>SUB-TOTAL CARRIED FORWARD</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
12.12(3)	Asphalt Concrete Curb	lin.m						
12.13	Concrete Slab Paving	sq.m						
12.17	Aglaia (Ngau)	each						
12.21	Bronze Bridge Name Plaques as described in the Drawings	each						
SECTION 12 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
13.01(1)	Road Lighting Unit, Type A2.1	each						
13.01(2)	Road Lighting Unit, Type A4.1	each						
13.01(3)	Road Lighting Unit, Type B2.1	each						
13.01(4)	Road Lighting Unit, Type F1	each						
13.01(5)	Road Lighting Unit, Type G1	each						
13.01(6)	Power Supply Receiving Panel (SS)	each						
13.01(7)	Low Voltage Distribution Panel (MDP)	each						
13.01(8)	Lighting Panel (DB)	each						
13.01(9)	Cable, X-LPE Armer Type 4c - 50mm <sup>2</sup>	lin. m						
13.01(10)	Cable, X-LPE Armer Type 4c - 25mm <sup>2</sup>	lin. m						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
13.01(11)	Cable, X-LPE Armer Type 4c - 16mm <sup>2</sup>	lin.m						
13.01(12)	Cable, X-LPE Armer Type 4c - 10mm <sup>3</sup>	lin.m						
13.01(13)	Cable, X-LPE/PVC 4c - 10mm <sup>2</sup>	lin.m						
13.01(14)	Grounding Wire, BCC 6mm <sup>2</sup>	lin.m						
13.01(15)	PVC Conduit, 50mm dia with Fittings	lin.m						
13.01(16)	Pull Box, Type F	each						
13.01(17)	Pull Box, Type G	each						
13.01(18)	Power Receiving, 30 kVA	each						
13.01(19)	Application for Power Connection	each						
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
13.01(20)								
	Watt Hour Meter Box and Panel	each						
13.01(21)								
	Protection of Expansion Joint	each						
13.01(22)								
	Buried Cable Protector	lin.m						
13.01(23)								
	Marker for Underground Cables	each						
13.01(24)								
	Navigation Light	set						
13.01(25)								
	Control Cable, X-LPE 7c-10mm2	lin.m						
13.01(26)								
	Traffic Control Master Unit	each						
13.01(27)								
	Manual Push Button	each						
13.01(28)								
	Traffic Signal Unit, Type 1	each						
SUB-TOTAL CARRIED FORWARD								

RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 3

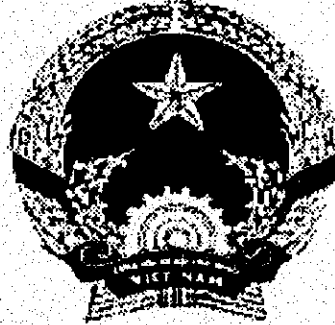
THANH TRI SECTION

BID PRICE SCHEDULE  
BASIC BID

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
13.01(29)								
	Traffic Signal Unit, Type 2	each						
13.01(30)								
	Emergency Back-Up Unit	each						
13.01(32)								
	Power Connection for Package 3	LS						
13.02(1)								
	Duct Bank, Type A	lin.m						
13.02(2)								
	Duct Bank, Type B	lin.m						
13.02(3)								
	Manhole, Type A	each						
13.02(4)								
	Manhole, Type B	each						
SECTION 13 - TOTAL TO SUMMARY								

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

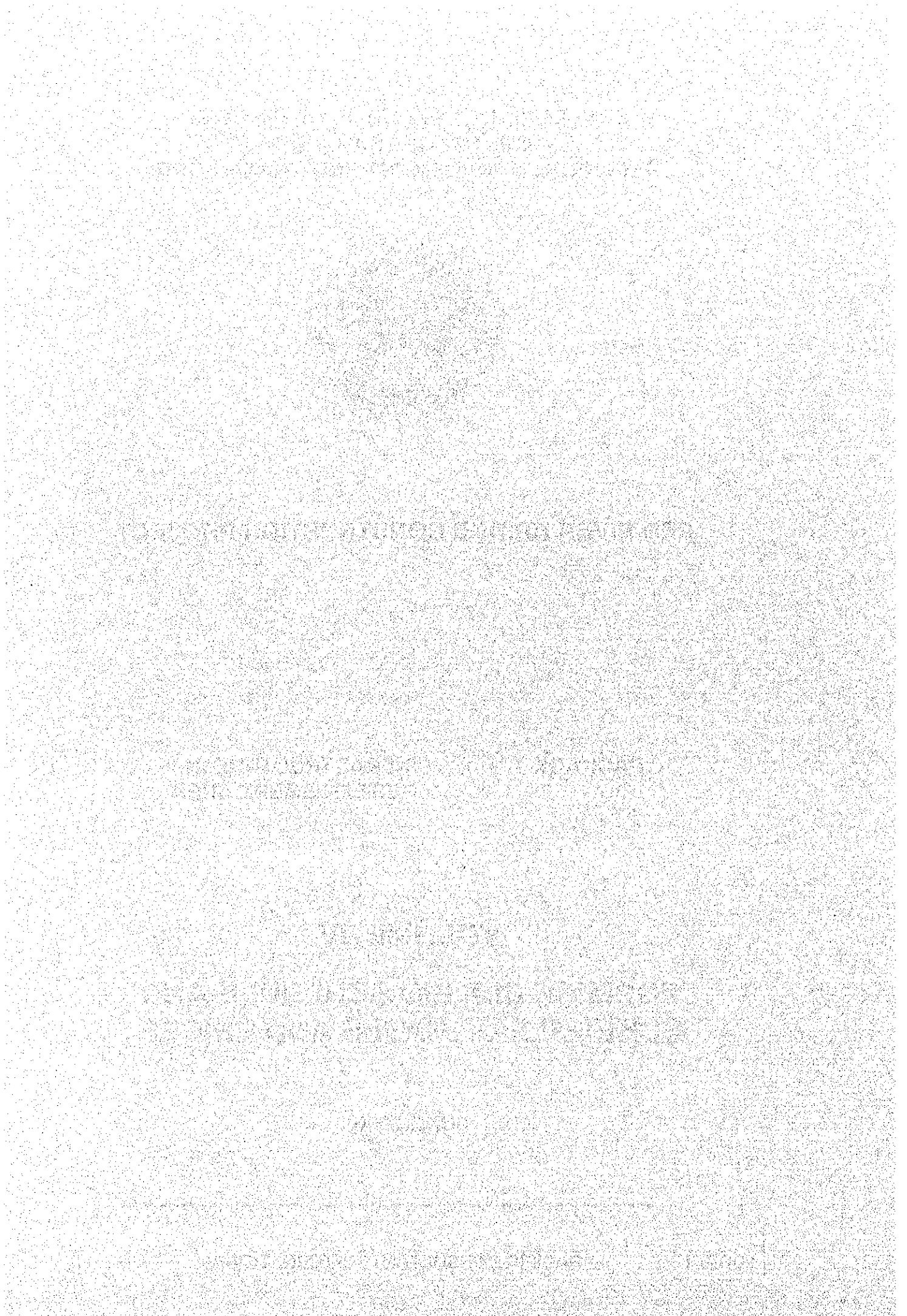
**VOLUME IV  
FORM OF BID, BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**





**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

**FORM OF BID , BID SCHEDULE AND  
SCHEDULE OF RATES AND PRICES**

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**CHECKLIST OF DOCUMENTS TO BE SUBMITTED**

FORM REF.	DESCRIPTION OF DOCUMENTS	BINDING	CHECK
	Title of Contract Package and Name and Address of Bidder	Book I	
•	Certified copy of Partnership or of Association Agreement (for Joint Enterprise or Joint Operation)		
•	Business Cooperation Contract		
B	Affidavit Agreement for Joint Enterprise (if not submitting above)		
PA	Powers of Attorney (Form PA-1, 2, 3 as appropriate)		
E	Bid Bond		
•	Bank Reference/Balance Sheets/Owners/Management Structure		
	Title of Contract Package and Name and Address of Bidder	Book II	
•	Bid and Appendix to Bid		
•	Bid Schedule and Schedule of Rates and Prices (with floppy disk copy of the same data)		
•	Letter on Balancing Item / Bid Adjustment ( if applicable )		
	Title of Contract Package and Name and Address of Bidder	Book III	
G	Works Progress Schedule		
C	Detailed Price Analyses for Materials on Site		
D	Detailed Price Analyses for Major Pay Items		
•	Floppy disk copy of Bid Schedule & Schedule of Rates/ Prices		
•	Method Statements		
	Title of Contract Package and Name and Address of Bidder	Book IV	
H	List of Construction Plant		
I	List of Senior Staff		
J	Details of Contractor's Superintendent		
K	Details of Contractor's Deputy Superintendent		

- Notes:
1. A completed copy of this checklist shall be submitted with the Bid
  2. All documents are to be submitted as original plus three copies.
  3. All pages are to be initialed by the authorized signatory
  4. Powers of Attorney must be witnessed
  5. Bidder's full name and address and title of Contract Package is to be inserted at the beginning of each book.

BID

Gentlemen :

Having inspected the Site of Works and examined the Bid Documents comprising the Instructions to Bidders, the Invitation to Bid, the Form of Contract Agreement, the General Conditions of Contract, the Addenda (if any), the General Specifications, the Special Specifications, the Bid Schedule and Schedule of Rates and Prices, the Drawings and other related Documents relating to the construction of the following Works:

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

- (1) I/We the undersigned offer to prepare the necessary working drawings and undertake the complete construction and warranty of the above Works, including the supply to the Employer of as-built drawings, for the sum of :

Yen ( ¥).....

.....(Yen  
Component of Total Bid Sum, in words)

Yen ¥..... (in figures)

and VNDong.....

.....(VND  
Component of Total Bid Sum, in words)

VND..... (in figures)

- (2) I/We understand that the quantities given in the Bid Schedule are approximate only and that total payments will be determined in accordance with the Conditions of Contract.
- (3)\* I/We undertake if my/our Bid is accepted to commence the Works and to substantially complete and provisionally hand-over the whole of the Works comprised in the Contract within \_\_\_ consecutive calendar days from the date of commencement as specified in the Notice To Proceed, this being the Construction Period.
- (4) If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Bank Guarantee as shown in Guide Form PB-1 of an amount equal to fifteen percent (15%)of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract;

*or alternatively [ use one or the other as appropriate ]*

If my/our Bid is accepted, I/we shall submit to you a Performance Bond in the form of a Insurance Bond as shown in Guide Form PB-2 of an amount equal to forty percent (40%) of the VND Equivalent of the contract sum less taxes as guarantee for the due performance of the Contract, such Bond to be from an insurance or bonding company approved by you.

- (5) I/We agree to abide by this Bid for a period of 150 (one hundred and fifty) days from the date fixed for opening the same, or such longer period as may be mutually agreed between us and recorded in writing, and the Bid shall remain binding upon us and may be accepted at any time before the expiration of this period.
- (6) Unless and until a formal contract is prepared and executed, this Bid together with your written acceptance thereof shall be legally binding between us. In the event that your Award of Contract requires to be approved by any funding agency I/we accept that your Award of Contract is conditional on such approval. I/We agree that my/our receipt of a conditional Award of Contract will bind me/us to enter into a formal written contract with you, if and when your Award of Contract is approved by the funding agency.
- (7) I/We have read and understood the details given in the Appendix to this Bid.
- (8) I/We understand that you are not bound to accept the lowest Bid or any Bid you may receive.

Dated this ..... day of ....., 20 .....

Signature ..... in the capacity of  
 ..... duly authorized (\*) to sign  
 the bid for and on behalf of .....

Witness : .....

Address : .....

.....

(\*) Copy of Power of Attorney must be attached.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

<b>BID SUM</b>				
<b>WORK ITEM</b>	<b>DESCRIPTION</b>	<b>FOREIGN CURRENCY COMPONENT (YEN)</b>	<b>LOCAL CURRENCY COMPONENT (VND)</b>	<b>COMBINED EQUIVALENT TOTAL (in VND)</b>
1	GENERAL			
2	SITE CLEARING			
3	DEMOLITION			
4	ROAD EARTHWORK			
5	STRUCTURE EXCAVATION			
6	DRAINAGE			
7	SUBGRADE			
8	SUB-BASE AND BASE			
9	PAVEMENTS			
10	CONCRETE STRUCTURES			
12	MISCELLANEOUS			
13	UTILITIES			
15	DIVERSION AND PROTECTION OF UTILITIES (Provisional Sum)			
16	DAYWORKS (Force Account)			
17	PROVISIONAL SUM - based on 15% of Work Item No's 2 to 13 # to be inserted by Bidder			
# Refer also to page 4-Preamble Note 9				#
<b>NET BID SUM</b>				
Add Net VAT at .....% of the # VNDong Equivalent of Net Bid Sum				
<b>TOTAL BID SUM</b>		*	*	
		(YEN)	(VND)	(VND-Equivalent)

(i) Foreign Currency Component of Total Bid Sum, written in words.

Yen.....

(ii) Local Currency Component of Bid Sum, written in words.

VN Dong  
.....

(ii) VNDong Equivalent of Combined Total Bid Sum, written in words

.....

(i) Exchange rate as specified by the Employer, used to convert the foreign currency component to VNDong: One Yen = .....VNDong

(\*) Carry Forward to Bid

## APPENDIX TO THE BID

	CLAUSE	
Amount of Bid Bond	Art. 21	US\$ _____
Amount of Performance Bond	G.12	15% of the VND and Yen components of the Contract Sum for Bank Guarantee, or 40% for a Bond provided by Insurance or Bonding Company
Minimum amount of third party insurance	G.23(2)	100% of the US\$ equivalent of the combined total Contract Sum
Period for commencement, from Notice to Proceed.	G.42(1)	At latest 30 calendar days
Period for completion of mobilization	S.1.20(3)	60 or 90 calendar days and 120 calendar days from date of commencement.
Time for completion (Construction Period)	G.43	___ consecutive calendar days from the date of commencement as specified in the Notice To Proceed.
Amount of Liquidated Damages	G.47(1)	0.03% of the VND equivalent of the combined total Contract Sum per day
Limit of Liquidated Damages	G.47(1)	10% of the VND equivalent of the combined total Contract Sum
Period of Warranty	G.49	730 calendar days following Decision 499-BXD/GD
Percentage of Retention	G.58(5)	10% of the gross sum of each Monthly Certificate
Time within which payment to be made after Monthly Certificate is issued	G.58(5)	90 calendar days
Advance payment	G.58(2)	15% of the respective local and foreign currency components of the Contract Sum
Price Escalation	G.70	Price escalation provisions are applicable to this Package.

**PREAMBLE  
TO BID SCHEDULE**

1. The Bid Schedule shall be read in conjunction with the Instructions to Bidders, General Conditions of Contract, Specifications and Drawings.
2. The quantities given in the Bid Schedule are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the Unit Prices in the priced Bid Schedule where applicable, and otherwise at such Unit Prices or Sums as the Engineer may fix within the terms of the Contract.
3. The Unit Prices in the Priced Bid Schedule entered herein shall include and be considered compensation for all costs incurred in:
  - i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
  - ii. plant labour, supervision, materials, erection, temporary works and other support works, maintenance, insurance, overheads and profit, together with all general risks, liabilities and obligations set out or implied in the Contract.
4. A Sum or Unit Price shall be entered against each Item for which a quantity is given in the Bid Schedule. (A Sum or Unit Price is not required for Items for which the quantity is given as Nil). The cost of Items for which a quantity is given in the Bid Schedule and against which the Contractor has failed to enter a Sum or Unit Price shall be deemed to be covered by the Contract Sum.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items for which a quantity is given in the Bid Schedule, and where no Items are provided the cost shall be deemed to be distributed among the Unit Prices entered for the related Items of Work.
6. General directions and descriptions of work and materials included in each Item are not necessarily repeated nor summarized in the Bid Schedule. References to the relevant sections of the contract documentation shall be made before entering prices in the Bid Schedule.
7. The method of measurement for payment of completed work shall be in accordance with the method of measurement applicable to each Item as given in the Specifications.
8. Errors found in the submitted Bid Schedule will be corrected in accordance with Article 18 of the Instructions to Bidders.
9. The Bid Price shall include a provisional sum calculated by each bidder to be based on fifteen percent (15%) of the total of Work Item No's 2 to 13

**PREAMBLE  
TO  
SCHEDULE OF RATES AND PRICES**

The rates and prices entered in this schedule may be used to assist in establishing new unit prices as required for Contract Change Orders and Addenda.

The rates and prices entered are to be consistent with the rates and prices used in the Detailed Price Analyses and the Detailed Unit Prices Analyses. Rates and prices which are found not to be consistent will be subject to revision by negotiation.

The prices entered for applicable materials will be utilized as the basis for payment for materials on site.

The rates and prices entered herein shall include and be considered compensation for the costs incurred in:

- i. overseas taxes and taxes and duties incurred within Vietnam, except that local Value Added Tax will be dealt with separately as described in the Special Specifications,
- ii. organization of work, overheads, profits, royalties, payment to third parties for land or the use of land, or for damage to property, incidentals, haulage, tools, housing for personnel, laboratory equipment and personnel for testing, and all other costs necessary for the performance of the work.

**A. WAGES**

These rates include in addition :

allowance, for mobilisation, social fringes, social and health insurance, trade union funds, bonus, annual wage increases, out of city allowance.

**B. OPERATING EQUIPMENT ON SITE**

These rates include in addition to the operator's wages : the consumption of fuel, oil and lubricants, the charges for depreciation, interest, repairs, spare parts, insurance, etc.

The Contractor is only required to fill in rates for the equipment that he proposes to bring onto the site for the purposes of executing the project.

If the Contractor has other items of equipment not included in this list, or of different sizes from that shown in this list, that he proposes for the project he must include such equipment and the rate per hour in the list.

**C. MATERIALS ON SITE**

These rates include in addition : all charges for the supply of the materials, loading, transport to site and unloading, as well as all the charges provided for in the General and Special Specifications and in the Contract.



**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**A : WAGES**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.	Superintendent	md			
2.	Foreman	md			
3.	Plant Operator	md			
4.	Electrician	md			
5.	Carpenter	md			
6.	Driver	md			
7.	Mechanic	md			
8.	Painter	md			
9.	Masonry	md			
10.	Skilled Labour	md			
11.	Heavy Labour	md			
12.	Common Labour	md			
13.	Ship Officer	md			
14.	Sailor	md			

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
101.	Bulldozer, (.....ton)	Hr			
102.	Convertible Excavator HYD Type, (..... m3)	Hr			
103.	Convertible Excavator HYD Type, (..... m3)	Hr			
104.	Clamshell HYD Crawler Type, (..... m3)	Hr			
105.	Tractor Shovel, (.....m3)	Hr			
106.	Dump Truck, (..... ton)	hr			
107.	Flat Bed Truck, *(.....(4 - 4.5 ton))	hr			
108.	Flat Bed Truck,*(.....(6 ton))	hr			
109.	Flat Bed Truck,*(.....(2 ton)) with *(.....(2 ton crane)).	hr			
110.	Flat Bed Truck, (.....ton) with..... ton Crane	hr			
111.	Truck Crane,*.....ton (4.8 – 4.9 ton)	hr			
112.	Truck Crane*..... (10-11 ton)	hr			
113.	Truck Crane,*..... (20-22 ton)	hr			
114.	Truck Crane,*..... (35-36ton)	Hr			
115.	Truck Crane,*..... (40-45ton)	Hr			
116.	Pile Driver Crawler Type,.....ton	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
117.	Macadam Roller,* .....ton (10-12 ton)	Hr			
118.	Tire Roller,* ..... (8-20 ton)	Hr			
119.	Tire Roller,* ..... (11-30 ton)	Hr			
120.	Rammer,* ..... (60-100kg)	Day			
121.	Asphalt Finisher Crawler Type, * .....m (3.4-5.0m)				
122.	Asphalt Distributor,* .....(2,000 lit)	Hr			
123.	Line Marker Truck, * .....kg (800 kg)	Hr			
124.	Lift Car,* ..... (12- 13 m)	Hr			
125.	Vibro Hammer * .....(60 kw)	Hr			
126.	Water Tank Car,* .....lit (3,800 lit)	Hr			
127.	Air Compressor* .....m <sup>3</sup> /min (7.5 m3/min)	Day			
128.	Air Compressor* .....m <sup>3</sup> /min (10.5-11 m3/min)	Day			
129.	Submersible Pump* ..... D = 200 mm, H = 15 m	Day			
130.	Generator* .....KVA (5KVA)	Day			
131.	Generator* .....KVA (10KVA)	Day			
132.	Generator* .....KVA (75 KVA)	Day			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 -- INFRASTRUCTURE IN RESETTLEMENT AREA**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**B : OPERATING EQUIPMENT**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
133.	Generator*.....KVA (100 KVA)	Day			
134.	Soil Compactor*.....kg (70 - 80 kg)	Day			
135.	Tamper,*.....kg (60 - 100 kg)	Day			
136.	Welding Machine Semi Automatic *.....A (250 A)	Day			
137.	Trailer Truck,*..... ton (60 t)	Day			
138.	Crawler Crane*.....ton (35-37 t)	Hr			
139.	Reverse Circulation Drill, (.....mm diameter)	Hr			

\* Value in brackets minimum sizes. Bidder to complete using their own available equipment on which the bid is based

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4 – INFRASTRUCTURE IN RESETTLEMENT AREA**

**SCHEDULE OF RATES AND PRICES  
BASIC BID**

**C : MATERIALS ON SITE**

ITEM NO.	DESCRIPTION	UNIT	UNIT COST		COMBINED TOTAL COST IN VND
			FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
201.	Coarse aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
202.	Fine aggregate for Portland cement concrete and asphalt concrete at job site	cu.m			
203.	Portland Cement (PC-40)	kg			
204.	Boulder/gravel at job site	cu.m			
205.	Reinforcing Steel	kg			
206.	Cut back Asphalt, MC-170/RC-250	kg			
207.	Asphalt Cement	ton			

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 1 - GENERAL

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
1.19	Maintenance & Protection of Traffic	LS	-					
1.20	Mobilisation	LS	-					
1.26	Working in and Dealing with Water	LS	-					
SECTION 1 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 2 - SITE CLEARING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
2.01	Clearing and Grubbing	sq.m						
SECTION 2 - TOTAL TO SUMMARY								

# RED RIVER BRIDGE CONSTRUCTION PROJECT

## PACKAGE 4

### INFRASTRUCTURE IN RESETTLEMENT AREA

#### BID PRICE SCHEDULE

##### BASIC BID

WORK ITEM: SECTION 3 - DEMOLITION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
3.01(1)	Removal of Masonry and Concrete Structures including Remaining Housing	cu.m						
3.01(2)	Removal of Existing Curb	lin.m						
3.01(3)	Removal of Existing Asphalt Pavement.	cu.m						
3.01(4)	Removal of Existing Lighting Pole	each						
3.01(5)	Removal of Existing Bridge (Steel Bridge)	sq.m						
SECTION 3 - TOTAL TO SUMMARY								



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**

**BASIC BID**

**WORK ITEM: SECTION 4 - ROAD EARTHWORK**

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
4.03	Common Excavation	cu.m						
4.04(1)	Borrow Material	cu.m						
4.04(2)	Surcharge with Borrow Material	cu.m						
4.05	Monitoring of Settlement	cu.m						
4.06	Unsuitable Material	cu.m						
4.07	Sand Fill Material	cu.m						
4.08	Granular Backfill	cu.m						
4.09	Permeable Backfill	cu.m						
4.10(2)	Vertical Soil Drains (Fibre)	lin.m						
4.11(2)	Geo-Textile Non-Woven Sheet	sq.m						
<b>SECTION 4 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 4  
INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE  
BASIC BID**

WORK ITEM: SECTION 5 - STRUCTURE EXCAVATION

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
5.01(1)	Structure Excavation	cu.m						
5.01(2)	Structure Excavation in the Red River Channel	cu.m						
5.01(3)	Blinding Stone	cu.m						
SECTION 5 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 6 - DRAINAGE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
6.06(1)	U-Ditch, Type D-1	lin.m						
6.06(2)	U-Ditch, Type D-2	lin.m						
6.06(3)	U-Ditch, Type D-3	lin.m						
SECTION 6 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 7 - SUBGRADE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
7.01	Subgrade Preparation	sq.m						
<b>SECTION 7 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 8 - SUB-BASES AND BASES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
8.01	Sub-Base	cu.m						
8.02	Granular Base Course	cu.m						
SECTION 8 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 9 - PAVEMENTS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
9.04	Bituminous Prime Coat	kg						
9.05	Bituminous Tack Coat	kg						
9.07(1)	Asphalt Treated Base Course (thickness 10cm)	sq.m						
9.07(2)	Asphalt Concrete Binder Course (thickness 5cm)	sq.m						
9.07(3)	Asphalt Concrete Surface Course (thickness 5cm)	sq.m						
9.07(4)	Asphalt Concrete Surface Course (thickness 7.5cm)	sq.m						
9.07(5)	Asphalt Cement	ton						
<b>SECTION 9 - TOTAL TO SUMMARY</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE  
BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST			TOTAL COST			COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
10.01(A-1)	Structural Concrete, Class A-1	cu.m								
10.01(A-2)	Structural Concrete, Class A-2	cu.m								
10.01(C-1)	Structural Concrete, Class C-1	cu.m								
10.01(D-1)	Structural Concrete, Class D-1	cu.m								
10.01(E-1)	Structural Concrete, Class E-1	cu.m								
10.01(E-2)	Structural Concrete, Class E-2	cu.m								
10.02	Reinforcing Steel Bars	kg								
10.03(2)	PC I-Girder Length 20m; Height 1.65m	each								
10.03(4)	PC I-Girder Length 28m; Height 1.65m	each								
10.03(4)	PC I-Girder Length 33m; Height 1.65m	each								
SUB-TOTAL CARRIED FORWARD										

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
10.07(1)	Cast-In-Place Concrete Pile, D = 1000mm	lin.m						
10.07(2)	Cast-In-Place Concrete Pile, D = 1500mm	lin.m						
10.07(3)	Cast-In-Place Concrete Pile, D = 2000mm	lin.m						
10.07(T)	Ultra-Sonic and Pile Integrity Testing	Provisional Sum						
10.08(1)	Test Drilling for Soil Investigation, General	lin.m						
10.08(2)	Test Drilling for Soil Investigation, in the Red River Channel	lin.m						
10.08(3)	Test Drilling for Soft Ground Investigation	lin.m						
10.09(1)	Bridge Parapet and Railing, Complete (Type A)	lin.m						
10.09(2)	Bridge Parapet and Railing, Complete (Type B)	lin.m						
	<b>SUB-TOTAL CARRIED FORWARD</b>							



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4**

**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
10.10(1)								
	Expansion Joint, Type A	lin.m						
10.10(2)								
	Expansion Joint, Type B	lin.m						
10.10(3)								
	Expansion Joint, Type C	lin.m						
10.10(4)								
	Expansion Joint, Type D	lin.m						
10.11(1)A	Reaction Distribution Bearing, Type A	each						
10.11(1)B	Reaction Distribution Bearing, Type B	each						
10.11(1)C	Reaction Distribution Bearing, Type C	each						
10.11(1)D	Reaction Distribution Bearing, Type D	each						
10.11(1)E	Reaction Distribution Bearing, Type E	each						
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
10.11(2)A	Pot Bearing, Type A	each						
10.11(2)B	Pot Bearing, Type B	each						
10.11(2)C	Pot Bearing, Type C	each						
10.11(2)D	Pot Bearing, Type D	each						
10.11(2)E	Pot Bearing, Type E	each						
10.11(3)A	Elastomeric Bearing Pad, Type A	each						
10.11(3)B	Elastomeric Bearing Pad, Type B	each						
10.11(3)C	Elastomeric Bearing Pad, Type C	each						
10.11(3)D	Elastomeric Bearing Pad, Type D	each						
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 10 - CONCRETE STRUCTURE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
10.12(1)	PVC Drain Pipe, D = 15cm	lin.m						
10.12(2)	PVC Drain Pipe, D = 20cm	lin.m						
10.12(3)	Deck Drain Box, Type A	each						
10.12(4)	Deck Drain Box, Type B	each						
10.12(5)	Deck Drain Box, Type C	each						
10.12(6)	Precast RC Plate, Type A	sq.m						
10.12(7)	Bridge Deck Waterproofing, Type A	sq.m						
SECTION 10 - TOTAL TO SUMMARY								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 12 - MISCELLANEOUS

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST			COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)		
12.01(1)	Grassed Area, Solid Sodding	sq.m							
12.02	Stone Masonry, for Retaining Walls	cu.m							
12.03(3)	Rock Filled Gabion Baskets	sq.m							
12.05(1)	Motared Stonework for Slope Protection	sq.m							
12.05(2)	Motared Stonework for Slope Protection (below River Water Level)	sq.m							
12.06(1)	Vehicle Guardrail, Type A	lin.m							
12.06(2)	Vehicle Guardrail, Type B	lin.m							
12.07(1)	Regulatory and Warning Signs Type-A (1 Board)	each							
12.07(2)	Regulatory and Warning Signs Type-C (2 Board)	each							
12.09(1)	Road Marking, Type A (General Application)	sq.m							
<b>SUB-TOTAL CARRIED FORWARD</b>									



**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
13.01(2)	Road Lighting Unit, Type A4.1	each	176					
13.01(4)	Road Lighting Unit, Type F1	each	6					
13.01(6)	Power Supply Receiving Panel (SS)	each	1					
13.01(7)	Low Voltage Distribution Panel (MDP)	each	1					
13.01(8)	Lighting Panel (DB)	each	14					
13.01(10)	Cable, X-LPE Armer Type 4c - 25mm <sup>2</sup>	lin.m	160					
13.01(11)	Cable, X-LPE Armer Type 4c - 16mm <sup>2</sup>	lin.m	9,138					
13.01(12)	Cable, X-LPE Armer Type 4c - 10mm <sup>3</sup>	lin.m	6,738					
13.01(13)	Cable, X-LPE/PVC 4c - 10mm <sup>2</sup>	lin.m	340					
13.01(14)	Grounding Wire, BCC 6mm <sup>2</sup>	lin.m	6,752					
SUB-TOTAL CARRIED FORWARD								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
13.01(15)	PVC Conduit, 50mm dia with Fittings	lin.m	28,372					
13.01(16)	Pull Box, Type F	each	190					
13.01(17)	Pull Box, Type G	each	36					
13.01(18)	Power Receiving, 30 kVA	each	1					
13.01(19)	Application for Power Connection	each	1					
13.01(20)	Watt Hour Meter Box and Panel	each	1					
13.01(21)	Protection of Expansion Joint	each	120					
13.01(22)	Buried Cable Protector	lin.m	466					
13.01(23)	Marker for Underground Cables	each	233					
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4**  
**INFRASTRUCTURE IN RESETTLEMENT AREA**

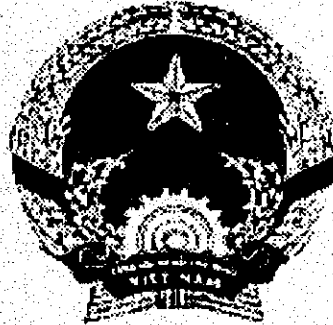
**BID PRICE SCHEDULE**  
**BASIC BID**

WORK ITEM: SECTION 13 - UTILITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
SUB-TOTAL BROUGHT FORWARD								
13.01(24)	Navigation Light	set	6					
13.01(31)	Lighting of Bridge Monument	each	8					
13.01(32)	Power Connection for Package 1	LS						
13.02(1)	Duct Bank, Type A	lin.m	140					
13.02(3)	Manhole, Type A	each	6					
SECTION 13 - TOTAL TO SUMMARY								



**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3 : THANH TRI SECTION**

**VOLUME VI  
ADDENDA AND SUPPLEMENTS**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**

**ADDENDA AND SUPPLEMENTS**

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## SECTION 14 TOLL PLAZA AND CONTROL BUILDING

### S14.01 General

Section 14 of these Specifications refers to the area designated on the drawings as the Toll Plaza and Control Building.

### S14.02 Toll Plaza

Toll Plaza means the plaza area where the toll gates are provided and consists of the works shown below:

- Toll gates including roof structure;
- Refuge island construction;
- Toll booth construction.
- Equipment installation in the toll booths; and
- Portland cement concrete pavement construction and lighting for the toll plaza.

#### S14.02(1) Roof Structure

A roof structure to cover the toll booths and toll collection area for the protection from the weather. The roof and the supporting pillars for the rollf structure will be made of steel frame and concrete.

#### S14.02(2) Refuge Island

The refuge island is needed to provide a foundation for the toll booth and protection from approaching vehicles. A manhole and conduit pipes are installed in the refuge island to carry the wiring for the varous electrical and communication facilities. The manholes of the refuge islands will be interconnected.

#### S14.02(3) Toll Booth

The toll booth is used as a space for the toll collection operation. The booth structure is to be made in accordance with the suppliers recommendations.

#### S14.02(4) Method of Measurement

The quantities to be paid for shall be the actual number of square metres, each, set or individual items which are constructed or furnished and installed in accordance with this Specification, the Drawings and the instructions of the Engineer.

#### S14.02(5) Basis of Payment

The work measured as provided above shall be paid for at the Contract unit price per unit of measurement as described below. The price and payment shall be full compensation for furnishing and placing all materials, labor, tools,

equipment and incidentals necessary to complete the work shown on the Drawings or described in these Specifications.

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
14.02(1)	Roof Structure for Toll Gates, including Foundations	square metre
14.02(2)	Toll Booth, Type A (Standard Type)	each
14.02(3)	Toll Booth, Type B (Long Type)	each

S14.03 Control Building and Supporting Facilities

S14.03(1) General

Section 14.03 of these Specifications refers only to the area designated on the drawings as the Control Building and Supporting Facilities unless specified to the contrary within this Section 14.03 the requirements of the General Specifications, the Special Specifications and any Addenda thereto shall apply.

S14.03(2) Site Preparation and Other Exterior Works

(a) Scope of Works

(i) General

The scope of works is as follows hereafter. Such descriptions do not limit the extent of the works which are fully defined in the total Specifications and Drawings but merely provide a preliminary overall description.

(ii) Description of Works

The work to be executed consists of the following:

- Grading and preparation of ground or embankment as necessary under and around the Control Building and Supporting Facilities;
- Construction of Approach Road and Parking lot;
- Construction of Drainage Facilities;
- Landscaping i.e. planting, etc.;

(b) Site Clearing, Demolition, Excavation and Filling

(i) Specification Requirements

Site Clearing, Demolition, Excavation and Filling will be carried out in accordance with the requirements of Section 2 "Site Clearing", Section 3 "Demolition" and Section 4 "Road Earthwork" of these Specifications.

Excavation and Backfilling for structures shall be carried out in accordance with the requirements of Section 5 "Structure Excavation of these Specifications.

(ii) Method of Measurement

The quantities to be paid for shall be measured in accordance with the respective provisions of Section 2, Section 3 and Section 4 of these Specifications.

(iii) Basis of Payment

The work measured as provided above shall be paid for in accordance with the provisions of Section 2, Section 3 and Section 4 of these Specifications.

Performance of excavation and backfilling for structures, drainage, piping, etc. is not payable directly but shall be

considered as a subsidiary obligation of the Contractor covered under the Pay Items in Clause S14.03(1)~(10) for performance of the respective works.

(c) Approach Road and Parking Lot

(i) General

The whole of the roadworks shall be constructed in accordance with the Drawings.

(ii) Subgrade

Subgrade shall comply with the requirements of Clause S7.01 of these Specifications.

(iii) Sub-base and Base Course

Sub-base and base course shall comply with the requirement of Clauses 8.01 and 8.02 of these Specifications.

(iv) Pavements

Bituminous prime coat and tack coat, asphalt concrete binder course and asphalt concrete surface course shall comply with the requirement of Clauses 9.04, 9.05, 9.06 and 9.07 of these Specifications.

(d) Drainage

This work shall consist of the construction of drainage pipes and culverts, box culverts and other drainage facilities in accordance with Section 6 of these Specifications and the specifications for other work items involved, all in conformity with the lines, grades and dimensions instructed by the Engineer.

(e) Landscaping

(i) General

Landscaping shall comply with the requirement of Clause S12.17 of these Specifications.

(ii) Description of Work

- Landscape work includes but is not limited to furnishing and installing ground cover, vines, trees and shrubs as indicated on the Drawings and shall conform to local Standards; and
- Excavation, filling and grading shall comply with the elevations, cross sections and grades shown on the Drawings.

14.03 (3) Concrete Structure and Building Works

(a) Scope of Works

(i) General

The scope of works is as follows hereafter. Such description do not limit the extent of the works which are fully defined in the total Specifications and Drawings but merely provide a preliminary overall description.

(ii) Description of Work

The main work to be executed consists of the construction of:

1. Control Building;
2. Guard House;
3. Garage and Motorbike Keeping;
4. Pump House;
5. Elevated Water Tank;
6. Deep Well and Water Treatment;
7. Underground Water Storage Tank; and
8. Concrete Septic Tank.

(b) Concrete Structures

Concrete structures shall comply with the requirement of Clauses S10.01 and S10.02 of these Specifications.

(c) Brick Wall

(i) Bricks

Bricks to be used will be of local product best quality approved by the Engineer and have a thickness of 6cm. The bricks shall have plane and clean surfaces, sharp edges, uniform in dimensions and without cracks.

(ii) Mortar

From the upper edge of the ground beam or floor slab until 20cm above finished floor level the brick wall masonry shall be executed with water proofed mortar 1 part of Portland cement to 2 parts of sand. For wet places (toilets) the masonry shall be constructed with 1 part of Portland cement to 2 parts of sand mortar up to 150cm above floor level of walling. The materials of mortar shall comply with the requirement of Clause S12.04(2) of these Specifications.

(d) Carpentry

(i) Timber

All timber shall be of the best quality for the kind specified by the Engineer and shall be free from sap wood, shakes, large loose or dead knots, wavey edges, borers and other serious defects.

The moisture content of the timber used for internal finish carpentry and joinery shall be less than 15%, and less than 20% for timber used for structures. Said moisture contents are specified for the materials delivered to the site, and the moisture content shall be maintained until the building is finished.

(ii) Dimensions

Unwrought timber shall be full to the dimensions stated except that occasional light variation in sawing is permissible. Wrought

timber is to be planed, drilled or otherwise machined or worked at the correct sizes and as shown on the drawings. Only a maximum tolerance of 3mm in size is allowed.

(iii) Exposed Faces

All timber that is to be exposed on the finished surface or joinery work shall be wrought on the appropriate faces, to the satisfaction of the Engineer. All exposed faces of timber must be planed and smoothed by fine sanding until a smooth surface is obtained.

(iv) Knots

Surface for painting may contain sound or tight knots on one side if their average diameter does not exceed 4cm and does not occupy more than half the width of the surfaces. In surfaces to be natural finished, only small, sound and tight knots will be accepted.

(v) Fabrication

The Contractor shall perform all necessary mortising tenoning, grooving, matching, tonguing, housing, rebating and all other works necessary for correct jointing. He shall also provide all metal plates, screws, nails and other fixings that may be necessary for the proper construction of all framings, lining, etc. and for their support and fixing in the building.

(vi) Partitions

Partitions made of timber shall be constructed in several rooms at floor plan level. Imported high grade of plywood shall be used for the panels.

The construction and dimensions shall be according to the Drawings. The solid frame shall be framed together with tenon and mortise joints and half lap joints at the crossing in such a manner as to secure rigidity throughout the frame. The joints shall be secured with timber wedges and timber glue and not with timber pins. Frames adjoining concrete structural columns shall be fixed with galvanized screws and fisher or ramset of the specified diameter.

(vii) Doors, Windows, and Frames

The doors shall be manufactured exactly to the dimensions and detailing given on the relevant drawings. Tenon and mortise joints shall be secured by using wedge and not timber pins.

Timber windows shall be framed together with fitting tenon and mortise joints secured with timber wedges and not with timber pins. Glazing rebates and beads shall be straight and true to form.

The solid frames shall be framed together with tenon and mortise joints in such a manner as to secure rigidity and soundness throughout the frame.



The frames shall be provided with timber as shown on the Drawings or as instructed by the Engineer. Frames adjoining concrete structure columns shall be fixed with timber wedges or ramset. All vertical surfaces adjoining walls or columns shall be provided with a mortar groove. The tenon and mortise joints shall be secured with timber wedges and not with timber pins.

The doors, windows and frames shall be truly square and flat. The surface exposed to view shall be true, smooth, free from machines marks and finished for varnishing. The surfaces coming into contact with mortar or masonry and all joints shall be painted two coats of redlead of best quality approved by the Engineer.

Each door and window shall be accurately fitted to each frame, with suitable allowance for finishing by painting and possible swelling and shrinking.

Hardware shall be fitted accurately at the positions shown on the drawings.

The clearance at the lock and hanging stiles at the top rail shall not exceed 2.5mm. The clearance at the bottom shall not exceed 3mm. All sharp edges shall be rounded.

(viii) Projection and Fixed-In of Joinery

Joinery shall not be brought on to the site until it is required for building-on or fixing-in. Material for joinery which is to be fabricated shall not be brought prematurely to the site, nor shall joinery works be assembled until the building has progressed sufficiently to receive such works. If stored, the materials and assembled units are to be protected from the weather.

Facilities are to be given to the Engineer to inspect all works in progress in shops and on site.

The Contractor shall further provide all temporary doors and closing-in of all openings necessary for the protection of the joinery works during progress. He shall provide and maintain any boxing or other temporary coverings required for the protection of dressed or finished joinery, projections, mouldings, steps or the like that might be damaged during the progress of the work.

Where joinery works are to be fixed-in after the surrounding building carcass is completed, the Contractor shall ensure that the necessary fixings are incorporated in the carcasses.

Vertical junctions between frames and buildings carcasses shall be filled solid with mortar but a clearance shall be maintained at the head. Joinery shall not be fixed in position until carcassing of the floor, walls and ceilings is completed.

(e) Hardware

(i) General

Based on the hardware requirements indicated in the final hardware schedule to be planned by the Contractor and approved

by the Engineer, each item of hardware shall be furnished for use on doors, windows, and frames for proper installation and function. The Contractor shall submit a sample of each device to the Engineer before ordering.

(ii) Materials

Hinges, pivots bolts, spring loaded bolts and casement adjusters shall be good quality approved by the Engineer.

Lock-cases, cylinders, handles, back plates, door pulls, pull bars and push plates, escutcheons, panic exit devices shall be "Yale" or equal approved by the Engineer.

The Contractor shall provide a key control system including labels, tags, card index, as recommended by the system manufacturer.

(iii) Installation

Each hardware item shall be installed in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished, each item shall be completely installed and then removed and stored in a secure place during the finish application. After completion of the finishes, each item shall be reinstalled. Surface-mounted items shall not be installed until finishes have been completed on the substrate.

Units shall be set level, plumb and true to line and location. The attachment substrate shall be adjusted and reinforced as necessary for proper installation and operation.

S14.03(4) Method of Measurement

The quantity of each item paid for under Clause S14.03 will be the number of individual items as detailed below which are finished and installed in accordance with these Specifications, the Drawings and the instructions of the Engineer.

S14.03(5) Basis of Payment

The work measured as provided above shall be paid for on the basis of linear metres, square metres, cubic metres, each, full set of individual items (lump sum) to cover all the work of each item. Such payment shall be full compensation for all the work shown on the Drawings or described in these Specifications and shall include excavation and backfilling, interior works of electrical, control signal, mechanical (i.e. water, sewer, air conditioning, etc.), public telephone system and other incidental works.

Pay Item No.	Name	Unit of Measurement
14.03(1)	Control Building	square metre
14.03(2)	Guard House	square metre
14.03(3)	Garage and Motorbike Keeping	square metre
14.03(4)	Pump Station	square metre
14.03(5)	Elevated Water Tank, 5 cu.m	LS
14.03(6)	Deep Well and Water Treatment	LS
14.03(7)	Underground Water Storage Tank, 80 cu.m	LS
14.03(8)	Fire Pump and Hydrant, and Exterior Water Lines	LS
14.03(9)	Concrete Septic Tank, 27 cu.m	LS
14.03(10)	Exterior Storm Sewer and Sanitary Sewer Lines	LS
14.03(11)	Landscaping	square metre

S14.04 Exterior Electrical Works

S14.04(1) General

This work shall consist of furnishing and installing all materials and equipment necessary to complete in place road lighting, exterior lighting of Control Building area, and other electrical work when so specified, all in accordance with the Drawings, these Specifications, or as directed by the Engineer. Unless otherwise noted, the work of this Clause shall be executed under Clause S13.01 of these Specifications.

14.04(2) Measurement and Payment

Measurement and payment shall be made in accordance with Clause S13.02 of these Specifications.

Pay Item No.	Name	Unit of Measurement
14.04(1)	Road Lighting Unit, Type A2.1	each
14.04(2)	Power Supply Receiving Panel (SS)	each
14.04(3)	Low Voltage Distribution Panel (MDP)	each
14.04(4)	Lighting Panel (DB)	each
14.04(5)	Cable, X - LPE Armor Type 4c – 16mm <sup>2</sup>	linear metre
14.04(6)	Cable, X – LPE Armor Type 4c – 10mm <sup>2</sup>	linear metre
14.04(7)	PVC Conduit, 50mm dia with Fittings	linear metre
14.04(8)	Power Receiving, 50 kVA	each
14.04(9)	Application for Power Connection	each
14.04(10)	Watt Hour Meter Box and Panel	each
14.04(11)	Buried Cable Protector	linear metre
14.04(12)	Marker for Underground Cables	each
14.04(13)	Manhole, Type A	each
14.04(14)	Duct Bank, Type B	linear metre
14.04(15)	Generator, 30 kVA	set

S14.05 Toll Collection Equipment

S14.05(1) General

The Project Management Unit Thang Long of the Ministry of Transport, the Government of the Socialist Republic of Vietnam is desirous of the procurement of toll collection equipment from supplier(s) to provide a semi automatic toll collection equipment at a combination of toll plaza and control building in Red River Bridge Construction Project.

The entire toll collection system may require extensive and sophisticated installations and therefore it is undesirable both technically and economically to provide all devices and units at one time. Therefore, a development program on a staged bases should be planned in order to optimise the investment benefit relation.

S14.05(2) Toll Collection Equipment in the Initial Stage

Installation in a combination of toll plaza and control building is grouped as follows:

Item Nos .14.05A(1) ~ (16) : Installation for Toll Plaza

Item Nos 14.05B (1) ~ (11) : Installation for Control Building

Item Nos 14.05C : Training

S 14.05(3) Reserved Cost as Provisional Sum

(a) Measurement

The quantity of each item paid for under Clause S14.05 will be the number of individual items as described below which are furnished and installed in accordance with the predetermined specifications and drawings which are to be approved by the Engineer.

(b) Payment

The quantity measured as provided above, shall be paid at the unit price per unit of each item as described below. The price and payment shall be full compensation for furnishing and installing devices and equipment, including all materials, labor, tools, testing and incidents necessary to complete the work shown on the predetermined drawings and specifications which are to be furnished by the supplier(s) and approved by the Engineer.

Pay Item No.	Name	Unit of Measurement
14.05A(1)	Fare Display and Toll Collection Terminal	set
14.05A(2)	Receipt Printer	each
14.05A(3)	Toll Collection Terminal Switch Boad	each
14.05A(4)	Overhead Traffic Light	each
14.05A(5)	Lane Traffic Light	each
14.05A(6)	Violation Alarm Unit	each
14.05A(7)	Loop Coil Vehicle Detection Unit	each
14.05A(8)	Automatic Vehicle Classification Unit	each
14.05A(9)	Lane Open/Close Barrier	set
14.05A(10)	Uninterruptible Power Supply, 5kVA 40 minutes	each

<b>Pay Item No.</b>	<b>Name</b>	<b>Unit of Measurement</b>
14.05A(11)	Power Distribution Board	each
14.05A(12)	Booth Communication Unit	set
14.05A(13)	Car Call System	set
14.05A(14)	Closed Circuit Television System	set
14.05A(15)	Documentation Device	LS
14.05A(16)	Spare Parts	LS
14.05B(1)	Central Data Processing Unit	each
14.05B(2)	Printer	each
14.05B(3)	Central Data Server	each
14.05B(4)	Closed Circuit Television Master Unit	each
14.05B(5)	Video and Cabling	LS
14.05B(6)	Real Time Monitoring Console	each
14.05B(7)	Booth Communication Master Unit	each
14.05B(8)	Modulation and Demodulation Interface Unit	set
14.05B(9)	Uninterruptible Power Supply, 5kVA 40 minutes	each
14.05B(10)	Power Distribution Board	each
14.05B(11)	Spare Parts	LS
14.05C	Training	LS

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**WORK ITEM: SECTION 14 - TOLL PLAZA AND CONTROL BUILDING**

**BASIC BID**

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
14.02(1)	Roof Structure for Toll Gate, including Foundations	sq.m	228					
14.02(2)	Toll Booth, Type A (Standard Type)	each	4					
14.02(3)	Toll Booth, Type B (Long Type)	each	1					
14.03(1)	Control Building	sq.m	779					
14.03(2)	Guard House	sq.m	8					
14.03(3)	Garage and Motorbike Keeping	sq.m	107					
14.03(4)	Pump Station	sq.m	35					
14.03(5)	Elevated Water Tank, 5cu.m	LS	-					
14.03(6)	Deep Well and Water Treatment	LS	-					
<b>SUB-TOTAL CARRIED FORWARD</b>								

RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 3

THANH TRI SECTION

BID PRICE SCHEDULE

BASIC BID

WORK ITEM: SECTION 14 - TOLL PLAZA AND CONTROL BUILDING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
14.03(7)	Underground Water Storage Tank, 80cu.m	LS						
14.03(8)	Fire Pump and Hydrant and Exterior Water Lines	LS						
14.03(9)	Concrete Septic Tank, 27 cu.m	LS						
14.03(10)	Exterior Storm Sewer and Sanitary Sewer Lines	LS						
14.03(11)	Landscaping	sq.m	320					
14.04(1)	Road Lighting Unit, Type A2.1	each	26					
14.04(2)	Power Supply Receiving Panel, (SS)	each	1					
14.04(3)	Low Voltage Distribution Panel (MDP)	each	1					
	<b>SUB-TOTAL CARRIED FORWARD</b>							



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 14 - TOLL PLAZA AND CONTROL BUILDING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
14.04(4)	Lighting Panel (DB)	each	3					
14.04(5)	Cable, X-LPE Armor Type 4c-16mm <sup>2</sup>	lin.m	57					
14.04(6)	Cable, X-LPE Armor Type 4c-10mm <sup>2</sup>	lin.m	184					
14.04(7)	PVC Conduit, 50mm dia. with Fittings	lin.m	42					
14.04(8)	Power Receiving, 50kVA	each	1					
14.04(9)	Application of Power Connection	each	1					
14.04(10)	Watt Hour Meter Box and Panel	each	1					
14.04(11)	Buried Cable Protector	lin.m	945					
14.04(12)	Marker for Underground Cables	each	32					
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**WORK ITEM: SECTION 14 - TOLL PLAZA AND CONTROL BUILDING BASIC BID**

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
14.04(13)	Manhole, Type A	each	12					
14.04(14)	Duct Bank, Type B	lin.m	96					
14.04(15)	Generator, 30kVA	set	1					
14.05A(1)	Fare Display and Toll Collection Terminal	set	6					
14.05A(2)	Receipt Printer	each	6					
14.05A(3)	Toll Collection Terminal Switch Board	each	6					
14.05A(4)	Overhead Traffic Light	each	6					
14.05A(5)	Lane Traffic Light	each	6					
	<b>SUB-TOTAL CARRIED FORWARD</b>							

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**WORK ITEM: SECTION 14- TOLL PLAZA AND CONTROL BUILDING**

**BASIC BID**

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
<b>SUB-TOTAL BROUGHT FORWARD</b>								
14.05A(6)	Violation Alarm Unit	each	6					
14.05A(7)	Loop Coil Vehicle Detection Unit	each	12					
14.05A(8)	Automatic Vehicle Classification Unit	each	6					
14.05A(9)	Lane Open/Close Barrier	set	12					
14.05A(10)	Uninterruptible Power Supply, 5kVA 40 minutes	each	6					
14.05A(11)	Power Distribution Board	each	1					
14.05A(12)	Booth Communication Unit	set	6					
14.05A(13)	Car Call System	set	6					
14.05A(14)	Closed Circuit Television System	set	6					
<b>SUB-TOTAL CARRIED FORWARD</b>								

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3**

**THANH TRI SECTION**

**BID PRICE SCHEDULE**

**BASIC BID**

WORK ITEM: SECTION 14 - TOLL PLAZA AND CONTROL BUILDING

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	<b>SUB-TOTAL BROUGHT FORWARD</b>							
14.05A(15)	Documentation Device	LS	-					
14.05A(16)	Spare Parts	LS	-					
14.05B(1)	Central Data Processing Unit	each	1					
14.05B(2)	Printer	each	1					
14.05B(3)	Central Data Server	each	1					
14.05B(4)	Closed Circuit Television Master Unit	each	1					
14.05B(5)	Video and Cabling	LS	-					
14.05B(6)	Real Time Monitoring Console	each	1					
	<b>SUB-TOTAL CARRIED FORWARD</b>							

RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 3

THANH TRI SECTION

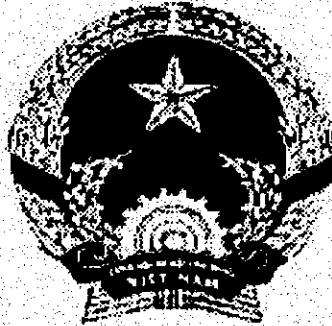
BID PRICE SCHEDULE

WORK ITEM: SECTION 14 - TOLL PLAZA AND CONTROL BUILDING

BASIC BID

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL COST		COMBINED EQUIVALENT TOTAL COST (VND)
				FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	FOREIGN CURRENCY COMPONENT (YEN)	LOCAL CURRENCY COMPONENT (VND)	
	SUB-TOTAL BROUGHT FORWARD							
14.05B(7)	Booth Communication Master Unit	each	1					
14.05B(8)	Modulation and Demodulation Interface Unit	set	1					
14.05B(9)	Uninterruptible Power Supply, 5kVA 40 minutes	each	1					
14.05B(10)	Power Distribution Board	each	1					
14.05B(11)	Spare Parts	LS	-					
14.05C	Training	LS	-					
	SECTION 14 - TOTAL TO SUMMARY							

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE**

**VOLUME VII  
DETAILED WORK SCHEDULE, PLANT AND  
CONTRACTORS PERSONNEL LIST**

**JUNE 2000**

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**DRAFT**

**PACIFIC CONSULTANTS INTERNATIONAL**

**DETAILED WORK SCHEDULE, PLANT AND  
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GUIDE FORM I	List of Contractor's Senior Staff	(*)

(\*) Additional Forms to be photocopied as necessary

RED RIVER BRIDGE CONSTRUCTION PROJECT

PACKAGE 1 - RED RIVER BRIDGE

WORKS PROGRESS SCHEDULE

(Bar Chart with Scheduled Monthly Percentages)

WORK SECTION	COMPLETION TIME MONTHS	MONTHS																																																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48									
1 General																																																										
2 Site Clearing																																																										
3 Demolition																																																										
4 Road Earthwork																																																										
5 Structure Excavation																																																										
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15 Diversion and Protection of Utilities																																																										
TOTAL PERCENTAGE COMPLETED																																																										

Signature of Contractor

Note: Contract Period to be taken from the Appendix to the Bid.  
 Each line to be used to indicate time duration of each Work Section with percentage completed at the end of each month.



**GUIDFORM H**

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 - RED RIVER BRIDGE**

**LIST OF CONSTRUCTION PLANT**

(Proposed for use on this Contract)

QUANTITY	DESCRIPTION	MANUFACTURER AND MODEL	YEAR OF MANUFACTURE	SIZE-CAPACITY OR Kw	OWNED OR TO BE PURCHASED OR LEASED	CONDITION	PRESENT LOCATION

We, the undersigned, hereby declare that we understand that the above information forms part of the Bid, and that any mistake or omission in it would be a sufficient reason for the said Bid to be disqualified. We acknowledge the right of the Employer to visit the above declared sites and inspect any and all equipment so listed above.

Signature of Contractor.....

**GUIDFORM I**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 1 - RED RIVER BRIDGE**

**LIST OF CONTRACTOR'S SENIOR STAFF**

POSITION TO BE HELD	NAME	NATIONALITY	AGE	EDUCATION (1)	YEARS OF SERVICE IN COMPANY	YEARS OF EXPERIENCE IN BRIDGE & HIGHWAY CONSTRUCTION	OTHER YEARS OF EXPERIENCE IN THE INDUSTRY
1. General Superintendent (*or Project Manager)							
2. Deputy General Superintendent (*or Technical Manager)							
3. Bridge Engineer							
4. Assistant Bridge Engineer							
5. Highway Engineer							
6. Assistant Highway Engineer							
7. Materials Engineer							
8. Planning Engineer							
9. Measurement Engineer							
10. Geotechnical Engineer							
11. Others**							

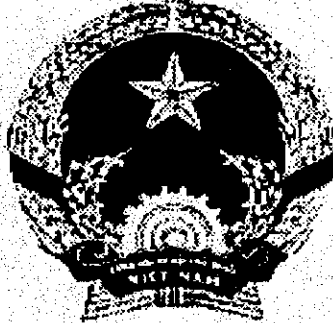
Note : (1) Insert University/Academy, High School or Secondary School and year of finishing.

(\*) : Information to be inserted by the Contractor. Reference to Pre-qualifying Documents.

(\*\*) : Information to be inserted by the Contractor.

Signature of Contractor.....

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 2 : GIA LAM SECTION**

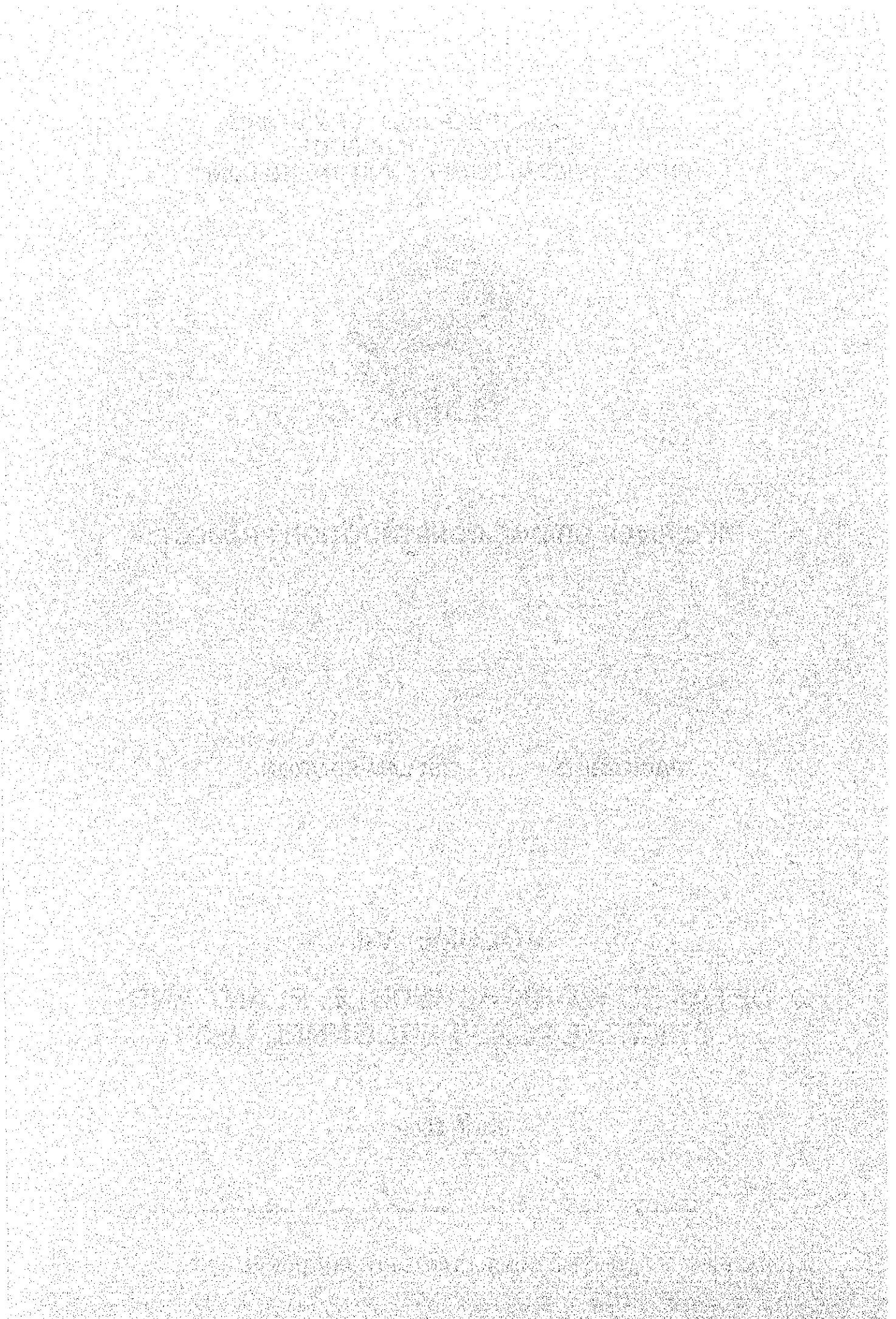
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RED RIVER BRIDGE CONSTRUCTION PROJECT  
 PACKAGE 2 - GIA LAM SECTION

WORKS PROGRESS SCHEDULE  
 (Bar Chart with Scheduled Monthly Percentages)

WORK SECTION	COMPLETION TIME MONTHS	MONTHS																																																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42								
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Signature of Contractor

Note: Contract Period to be taken from the Appendix to the Bid.  
 Each line to be used to indicate time duration of each Work  
 Section with percentage completed at the end of each month.

**RED RIVER BRIDGE CONSTRUCTION PROJECT**

GUIDFORM H

**PACKAGE 2 - GIA LAM SECTION**

**LIST OF CONSTRUCTION PLANT**

(Proposed for use on this Contract)

QUANTITY	DESCRIPTION	MANUFACTURER AND MODEL	YEAR OF MANUFACTURE	SIZE-CAPACITY OR Kw	OWNED OR TO BE PURCHASED OR LEASED	CONDITION	PRESENT LOCATION

We, the undersigned, hereby declare that we understand that the above information forms part of the Bid, and that any mistake or omission in it would be a sufficient reason for the said Bid to be disqualified. We acknowledge the right of the Employer to visit the above declared sites and inspect any and all equipment so listed above.

Signature of Contractor.....

RED RIVER BRIDGE CONSTRUCTION PROJECT  
 PACKAGE 2 - GIA LAM SECTION

LIST OF CONTRACTOR'S SENIOR STAFF

POSITION TO BE HELD	NAME	NATIONALITY	AGE	EDUCATION (1)	YEARS OF SERVICE IN COMPANY	YEARS OF EXPERIENCE IN BRIDGE & HIGHWAY CONSTRUCTION	OTHER YEARS OF EXPERIENCE IN THE INDUSTRY
1. General Superintendent (*or Project Manager)							
2. Deputy General Superintendent (*or Technical Manager)							
3. Bridge Engineer							
4. Assistant Bridge Engineer							
5. Highway Engineer							
6. Assistant Highway Engineer							
7. Materials Engineer							
8. Planning Engineer							
9. Measurement Engineer							
10. Geotechnical Engineer							
11. Others**							

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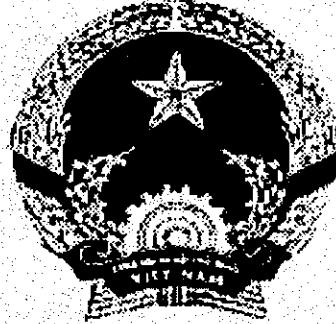
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Signature of Contractor.....



**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 3 : THANH TRI SECTION**

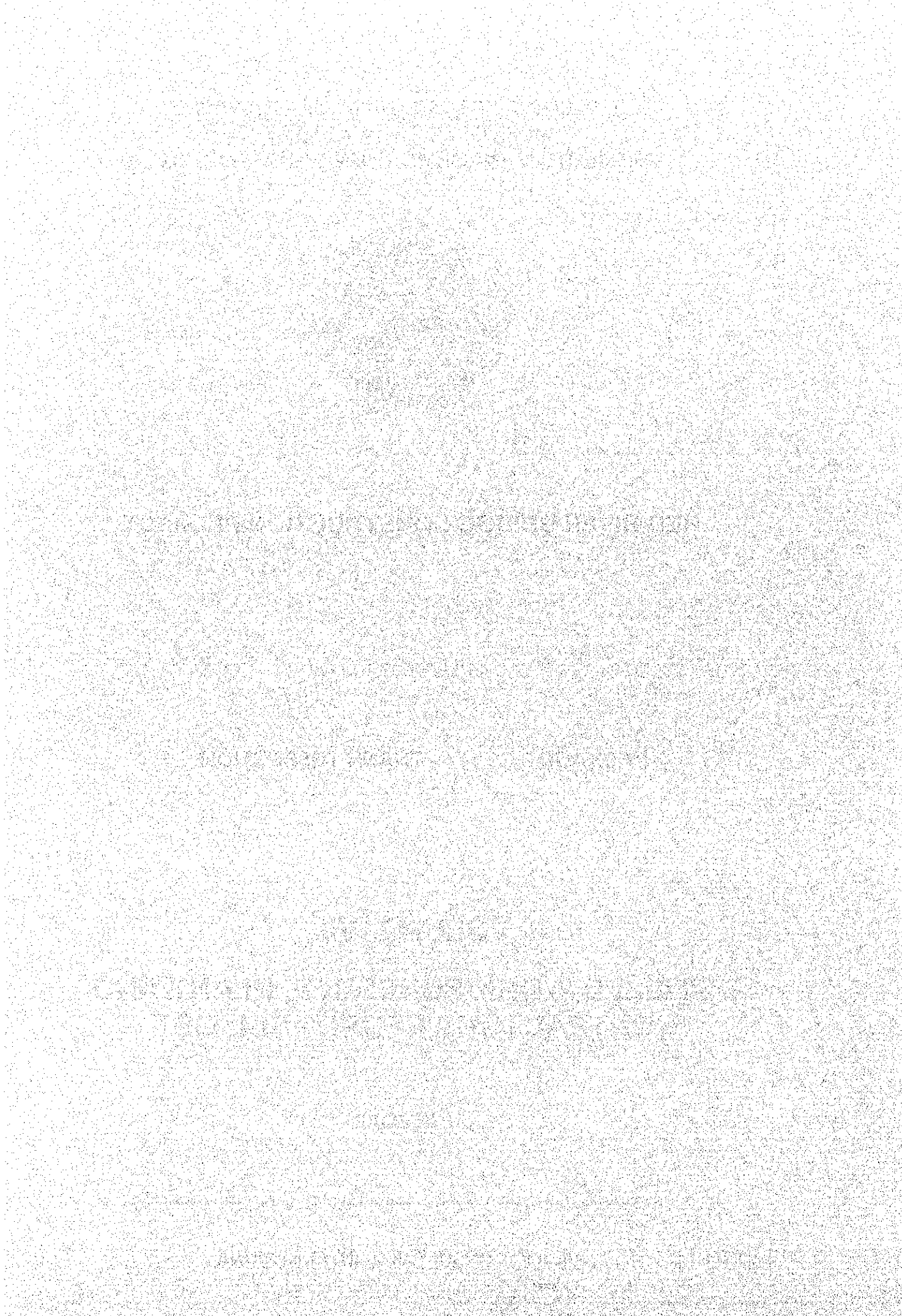
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RED RIVER BRIDGE CONSTRUCTION PROJECT  
 PACKAGE 3 - THANH TRI SECTION

WORKS PROGRESS SCHEDULE  
 (Bar Chart with Scheduled Monthly Percentages)

WORK SECTION	COMPLETION TIME MONTHS	MONTHS																																																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42										
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Signature of Contractor

Note: Contract Period to be taken from the Appendix to the Bid.

Each line to be used to indicate time duration of each Work Section with percentage completed at the end of each month.

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 - THANH TRI SECTION**

**GUIDFORM H**

**LIST OF CONSTRUCTION PLANT**

(Proposed for use on this Contract)

QUANTITY	DESCRIPTION	MANUFACTURER AND MODEL	YEAR OF MANUFACTURE	SIZE-CAPACITY OR Kw	OWNED OR TO BE PURCHASED OR LEASED	CONDITION	PRESENT LOCATION

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Signature of Contractor.....

**GUIDFORM I**

**RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE 3 - THANH TRI SECTION**

**LIST OF CONTRACTOR'S SENIOR STAFF**

POSITION TO BE HELD	NAME	NATIONALITY	AGE	EDUCATION (1)	YEARS OF SERVICE IN COMPANY	YEARS OF EXPERIENCE IN BRIDGE & HIGHWAY CONSTRUCTION	OTHER YEARS OF EXPERIENCE IN THE INDUSTRY
1. General Superintendent (*or Project Manager)							
2. Deputy General Superintendent (*or Technical Manager)							
3. Bridge Engineer							
4. Assistant Bridge Engineer							
5. Highway Engineer							
6. Assistant Highway Engineer							
7. Materials Engineer							
8. Planning Engineer							
9. Measurement Engineer							
10. Geotechnical Engineer							
11. Others**							

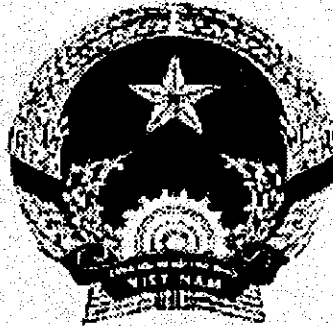
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**THE SOCIALIST REPUBLIC OF VIETNAM  
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**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

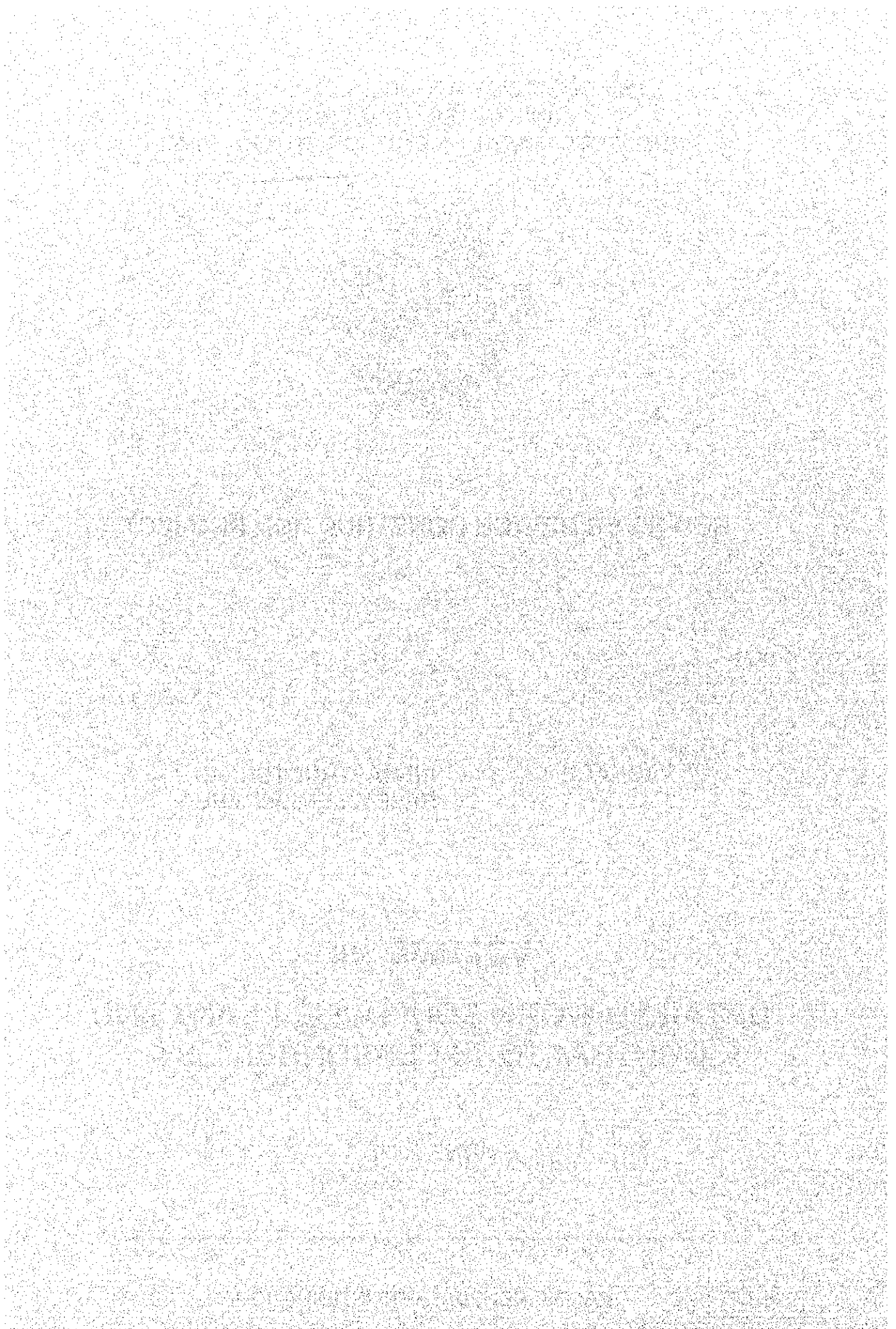
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RED RIVER BRIDGE CONSTRUCTION PROJECT  
 PACKAGE 4 - INFRASTRUCTURE IN RESETTLEMENT AREA

LIST OF CONSTRUCTION PLANT

(Proposed for use on this Contract)

QUANTITY	DESCRIPTION	MANUFACTURER AND MODEL	YEAR OF MANUFACTURE	SIZE-CAPACITY OR Kw	OWNED OR TO BE PURCHASED OR LEASED	CONDITION	PRESENT LOCATION

We, the undersigned, hereby declare that we understand that the above information forms part of the Bid, and that any mistake or omission in it would be a sufficient reason for the said Bid to be disqualified. We acknowledge the right of the Employer to visit the above declared sites and inspect any and all equipment so listed above.

Signature of Contractor.....

**RED RIVER BRIDGE CONSTRUCTION PROJECT**  
**PACKAGE 4 - INFRASTRUCTURE IN RESETTLEMENT AREA**  
**GUIDFORM I**

**LIST OF CONTRACTOR'S SENIOR STAFF**

POSITION TO BE HELD	NAME	NATIONALITY	AGE	EDUCATION (1)	YEARS OF SERVICE IN COMPANY	YEARS OF EXPERIENCE IN BRIDGE & HIGHWAY CONSTRUCTION	OTHER YEARS OF EXPERIENCE IN THE INDUSTRY
1. General Superintendent (*or Project Manager)							
2. Deputy General Superintendent (*or Technical Manager)							
3. Bridge Engineer							
4. Assistant Bridge Engineer							
5. Highway Engineer							
6. Assistant Highway Engineer							
7. Materials Engineer							
8. Planning Engineer							
9. Measurement Engineer							
10. Geotechnical Engineer							
11. Others**							

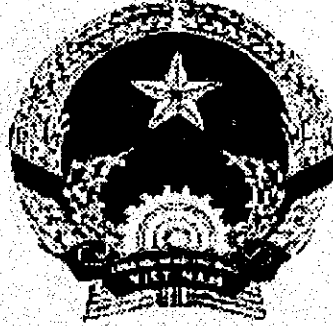
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Signature of Contractor.....

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



**RED RIVER BRIDGE CONSTRUCTION PROJECT**

**PACKAGE 1 : RED RIVER BRIDGE  
PACKAGE 2 : GIA LAM SECTION  
PACKAGE 3 ; THANH TRI SECTION  
PACKAGE 4 : INFRASTRUCTURE IN  
RESETTLEMENT AREA**

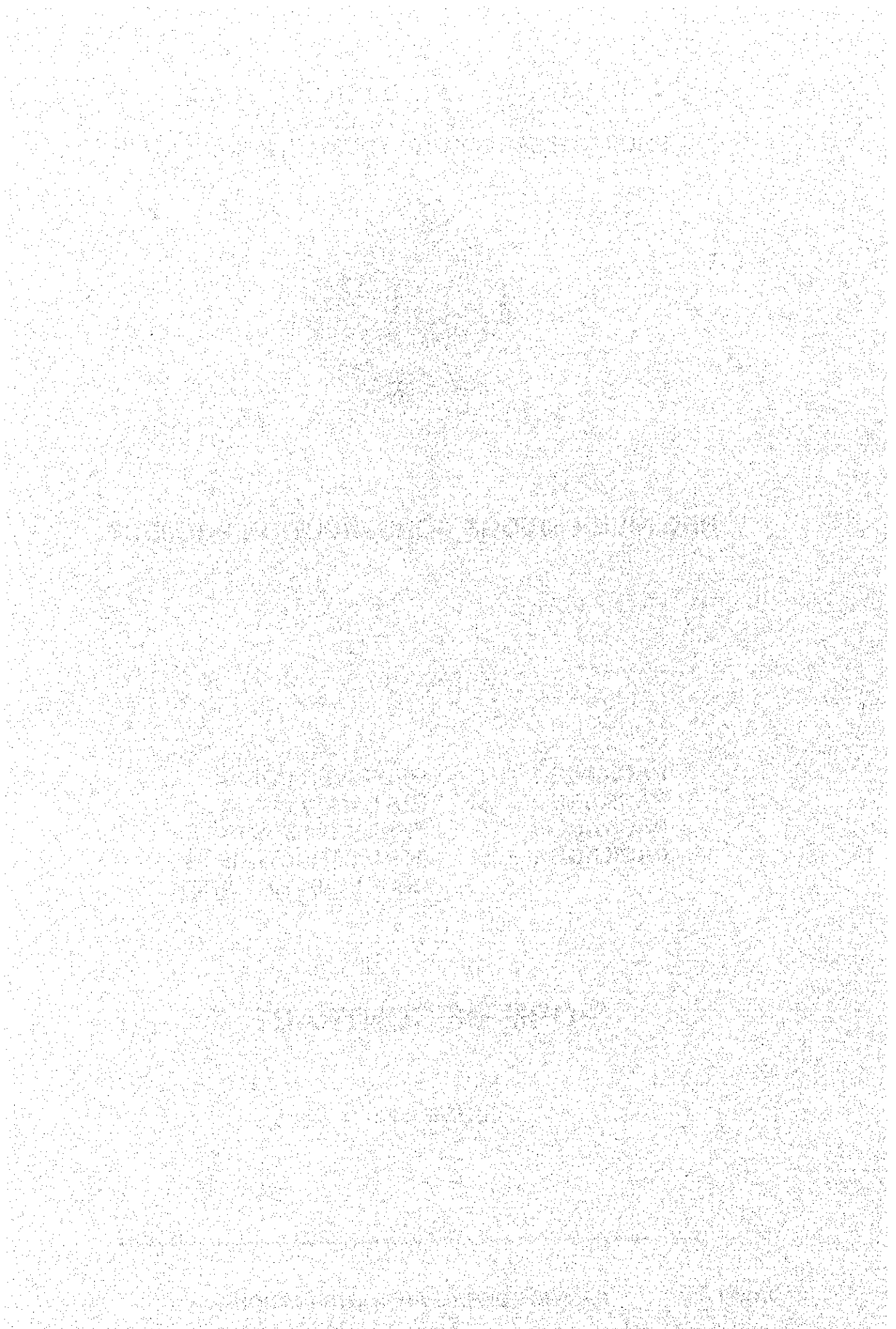
**FORM OF CONTRACT**

**JUNE 2000**

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**PACIFIC CONSULTANTS INTERNATIONAL**



## FORM OF CONTRACT

THIS CONTRACT made the .....day of.....200.....

BETWEEN the Ministry of Transport of the Socialist Republic of Vietnam through their authorized executing agency referred to as Projects Management Unit Thang Long (PMU Thang Long) (hereinafter called "the Employer") of the one part and

.....of  
.....  
.....

(hereinafter called " the Contractor") of the other part;

WHEREAS, the Employer is desirous that certain Works should be constructed and has accepted a Bid by the Contractor for the construction, completion and warranty of such Works;

NOW THIS AGREEMENT WITNESSETH as follows :

### F.01 Purpose of the Contract

The purpose of this Contract is the construction of the following works:

RED RIVER BRIDGE CONSTRUCTION PROJECT  
PACKAGE - -----

These works as well as any other works which may be ordered and executed under this Contract shall be undertaken in accordance with the Contract Document Listed in Clause F.02 hereinafter.

### F.02 Contract Documents

This contract includes the following documents :

1. Contract
2. General Conditions of Contract
3. Special Specifications
4. General Specifications
5. Bid and Bid Schedule
6. Drawings
7. Instructions to Bidders
8. Addendum
9. Bid documentation
  - Works Progress Schedule
  - Bid Schedule and Schedule of Rates and Prices
  - Detailed Price Analyses
  - List of Construction Plant

- List of Contractor's Staff
- Work Method Statements
- Certified copy of Partnership, Association or
- Affidavit Agreement for Joint-Operation

10. Letters of Agreement, Process Verbal and any other documents, which are signed by both parties and issued during the evaluation of Bids.

11. Notice of Award and Letter of Acceptance.

Except as otherwise provided in the General Conditions of Contract all documents above shall be construed to form one unit and each clause of any document shall be interpreted in compliance with all other clauses of all such documents.

F.03 Supervision of the Construction

Supervision of construction of the contracted Works shall be undertaken by the Engineer. The Contractor shall execute the work to the instructions and directions of the Engineer within the limits of the Contract Documents. The Engineer undertakes to prepare and deliver to the Contractor the Drawings required by the Contract Documents for the execution of the Contract before or during the progress of the Works.

F.04 Mutual Obligations

The Contractor hereby undertakes to execute, complete and maintain the Works in accordance with the provisions of the Contract, and the Employer undertakes in consideration of such execution, completion and maintenance, to pay the Contractor the Contract Sum at the times and in the manner prescribed by the Contract.

F.05 Contract Sum

The Contract Sum as computed on the basis of the unit prices, lump sums and the estimated quantities given in the Bid Schedule and Schedule of Rates and Prices comprises a foreign currency component of:

Yen ( in words ) .....

..... Yen (in figures).....

and a local currency component of :

VND ( in words ) .....

..... VND (in figures).....

The official selling rate of exchange as quoted by the Vietcom Bank 30 days prior to the Bid opening was ¥ 1 = VND .....

This Contract Sum is subject to change in accordance with the terms and conditions of the Contract Documents.



F.06(1) Payment of Foreign Currency Component

- (a) For the payment of the Foreign Currency Component, an irrevocable Letter of Credit shall be established in favour of the Contractor by Vietcom Bank through the Bank of Tokyo - Mitsubishi, Ltd. in accordance with the stipulations of the Loan Agreement No. ----- dated ----- concerning Yen Loan between the Japan Bank for International Cooperation (hereinafter called "the JBIC") and the Government of the Socialist Republic of Vietnam.
- (b) The payment of the Foreign Currency Component shall be made in Japanese Yen against a Statement of Performance issued by the Employer as well as the Notice of Issuance of Statement of Performance by Vietcom Bank based on the relevant monthly certificate issued by the Engineer under the irrevocable Letter of Credit stipulated in paragraph (a) of this clause.
- (c) The payment of the Foreign Currency Component under this agreement shall be not later than five years after the effective date of Loan Agreement, since the last disbursement of the said loan shall not be made thereafter by the JBIC unless otherwise agreed to by the JBIC.

F.06(2) Payment of Local Currency Component

Transfer Procedure for the Local Currency Component shall be according to the Loan Agreement.

F.07 Contract Period

- (a) The Contract Period shall be ..... (.....) consecutive calendar days commencing on the ..... day of ..... 200.... and shall consist of a ..... (.....) calendar day Construction Period terminating on the date of the Provisional Hand-Over and a ..... (.....) calendar day Warranty Period for the balance of the Contract Period.  
The Period of Warranty commences on the actual accepted date of the Provisional Hand-Over.
- (b) During the Warranty Period the Contractor shall undertake to remedy, at his own cost, any defect or failure or bad work which is discovered and which is the result of non-compliance with the Specifications; such remedial works shall be completed in a manner satisfactory to the Engineer, and in accordance with the Engineer's instruction as to time and safety.
- (c) If the Contractor should fail or is late or is negligent in executing the required remedial works within the times fixed by the Engineer, the Employer shall be entitled to remedy the defect or failure or bad work in the manner he deems fit without any right for the Contractor to object to the manner of execution or to the costs of the remedial work, and in such case the Employer shall deduct all of the costs he so incurs or is expected to incur from any retention amount, Performance Bond or other guarantees provided by the Contractor or from any other entitlements belonging to the Contractor.

F.08 Approval by JBIC

This Contract entered into between the Employer and the Contractor shall not become effective until approved by the JBIC.

IN WITNESS WHEREOF, the Government, hereunto subscribed by the Employer and the Contractor, have affixed their signatures and seals as of the date aforesaid.

CONTRACTOR.....

(Name of Contractor)

Name : .....

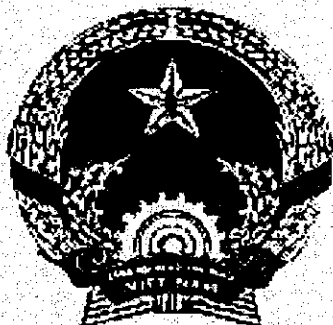
Title : Authorized Representative

THE GOVERNMENT OF THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT

\_\_\_\_\_  
Name : .....

Title : General Director  
Projects Management Unit Thang Long

THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG



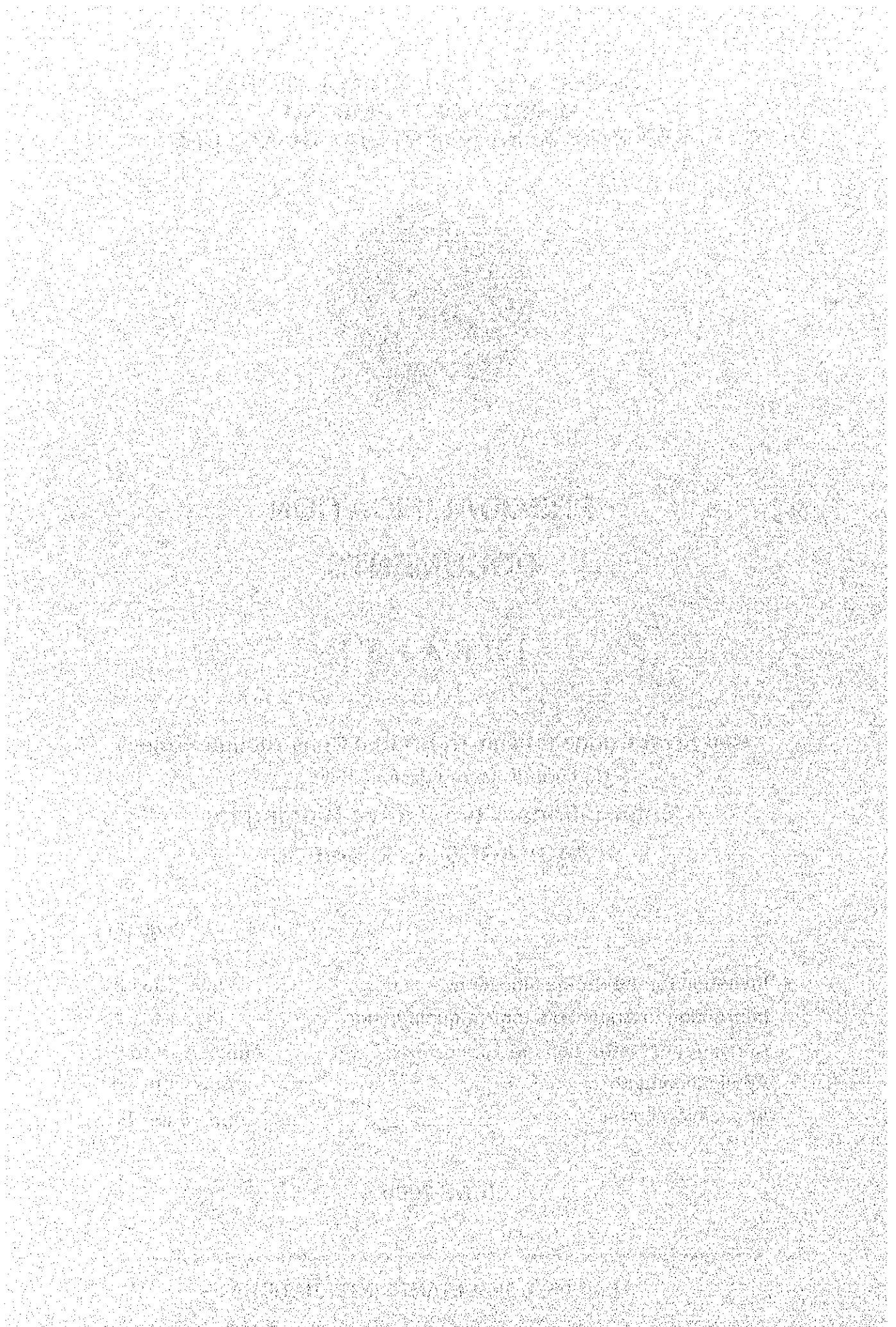
**PREQUALIFICATION  
DOCUMENTS**

**[ D R A F T ]**

**Red River Bridge (Thanh Tri Bridge) Construction Project  
Under JBIC Loan Agreement No. \_\_\_\_\_  
International Competitive Bidding for  
PACKAGES 1, 2 and 3.**

	<u>Page No</u>
<b>Invitation for the Pre-qualification</b>	<b>Inv. -1 to - 3</b>
<b>Instruction to Applicants for Pre-qualification</b>	<b>Ins.- 1 to - 9</b>
<b>Annex A ( to Instructions to Applicants )</b>	<b>Annex A - 1 to 6</b>
<b>Application Letter</b>	<b>App.- 1 to - 4</b>
<b>Application Forms</b>	<b>App.- 5 to - 18</b>

**JUNE 2000**



SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
**PROJECTS MANAGEMENT UNIT THANG LONG**  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam  
Tel: (84-4) – 8346664 Fax: (84-4) - 8341857

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## INVITATION FOR PREQUALIFICATION

**Red River Bridge (Thanh Tri Bridge) Construction Project**  
**Under JBIC Loan Agreement No. \_\_\_\_\_**  
**Packages 1, 2 and 3**

**Date:** \_\_\_\_\_

1. The Government of the Socialist Republic of Vietnam have received loan funding from the Japan Bank for International Cooperation, ( hereinafter referred to as “JBIC” ), towards the cost of the Red River Bridge (Thanh Tri Bridge) Construction Project. It is intended that a part of the proceeds of this loan will be used for eligible payments under the contracts for which this Invitation for Prequalification is issued. Disbursement of the ODA Loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the disbursement procedures and the “Guidelines for Procurement under the JBIC ODA Loans” No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any claim to the Loan proceeds.
2. JBIC requires that bidders and contractors as well as the Government of the Socialist Republic of Vietnam, under contracts funded with JBIC ODA Loans and other Japanese ODA, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, JBIC :
  - a) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
  - b) will recognize a Contractor as ineligible, for a period determined by JBIC, to be awarded a contract funded with JBIC ODA Loans if it at any time determines that the contractor has engaged in corrupt or fraudulent practices in competing for, or executing, another contract funded with JBIC ODA Loans or other Japanese ODA.
3. Projects Management Unit Thang Long under the Ministry of Transport, (hereinafter referred to as “Employer”) intends to prequalify Contractors for the works to be executed under the following three ( 3 ) contract packages.

Package 1 - Construction of PC bridges over the Red River for a total length of 3,084 m including a 680m length PC continuous box girder main bridge, together with procurement of maintenance / administrative equipment and the construction of workshop facilities.

Package 2 - Construction of expressway approach to the Red River Bridge on the Gia Lam (west) side over a distance of 3.5km. The works include the construction of one viaduct and three bridges with a total length of approximately 970m and three interchanges. The Project covers also the new construction of frontage road and borders.

Package 3 - Construction of expressway approach to the Red River Bridge on the Thanh Tri (east) side over a distance of 6.2 km including the construction of one viaduct and three bridges with a total length of approximately 770m and three interchanges. The Project covers also the new construction of frontage road and borders.

Applicants may apply for prequalification for any one or more of the above Packages. Bidding will be carried out for each separate Package and a Bidder can bid for only one of the above Packages.

4. It is expected that Invitations to Bid will be issued in \_\_\_\_\_ 2000.
5. Prequalification is open to firms and voluntarily formed joint ventures, all of whose members must be individually qualified, from all countries and areas and the contract shall be bid on an international competitive bidding (ICB) basis in accordance with the "Guidelines for Procurement under JBIC ODA Loans, October 1999".
6. Interested eligible applicants may obtain further information and inspect the Pre-qualification Documents at:

**PROJECTS MANAGEMENT UNIT THANG LONG**

Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam  
Tel: (84-4) – 8346664 Fax: (84-4) – 8341857

7. The documents are available during office hours for a non-refundable fee of VND \_\_\_\_\_ or US\$ \_\_\_\_\_. On written request, the Employer will promptly dispatch the documents by registered airmail or courier delivery, but under no circumstances will it be held responsible for late delivery or loss of the documents so mailed. Written requests for the documents must clearly state " *Request for Prequalification Documents for Red River Bridge (Thanh Tri Bridge) Construction Project Under JBIC Loan Agreement No. \_\_\_\_\_ Packages 1, 2 and 3* ".
8. The outline minimum requirements for qualification are as follows:
  - a) average annual turnover ( defined as billing for works in progress and completed ) over the last five years of  
Package 1 - US\$ 4,000 million equivalent.  
Package 2 - US\$ 35 million equivalent.

Package 3 - US\$ 40 million equivalent.

b) specific experience as follows:

Package 1 - Construction of a major civil engineering infrastructure project outside the contractor's home country with a contract value of US\$ 100 million or more; and Construction of highway and/or bridge project in the Socialist Republic of Vietnam within the last five years with a contract value of US\$ 25 million or more; and Construction of a major multi-span prestressed concrete bridge with a contract value of US\$60 million or more; and Construction of segmental continuous prestressed concrete box girder of span length over 100m.

Package 2 - Construction of a major civil engineering infrastructure project with a contract value of US\$ 20 million or more; and Fabrication of precast prestressed concrete girders with a span length of 30m or longer ( 100 numbers or more at one construction yard ) and erection of girders and construction of cast-insitu concrete slab; and Construction of a major road project requiring asphalt surfacing of more than 80,000 m2.

Package 3 - Construction of a major civil engineering infrastructure project with a contract value of US\$ 35 million or more; and Fabrication of precast prestressed concrete girders with a span length of 30m or longer ( 100 numbers or more at one construction yard ) and erection of girders and construction of cast-insitu concrete slab; Construction of a major road project requiring asphalt surfacing of more than 150,000 m2.

c) Where Contractors wish to prequalify for more than one package, the average annual turnover and specific experience should be increased accordingly. The prequalification documents which are available for inspection as per 7. above, contain further and full details of the minimum requirements for each Package. The prequalification documents also contain full details of the specific requirements for cases where applicants wish to pre-qualify for bidding on more than one of the packages.

d) Where Contractors wish to form Joint Venture with more than one or more companie(s), all members to do so must be individually qualified in terms of all condition mentioned in this Prequalification Documents especially for above 8 -a) b) c).

9. Submissions of Applications for Prequalification must be in sealed envelopes, which must be either delivered by hand or by registered mail, to:

**PROJECTS MANAGEMENT UNIT THANG LONG**  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam

- The Pre-qualification Documents must be submitted to PMU Thang Long not later than 4:00 p.m. on \_\_\_\_\_ 2000. Envelopes containing applications should be clearly marked with the following words:

*“Application to Prequalify for Red River Bridge (Thanh Tri Bridge) Construction Project Under JBIC Loan Agreement No. \_\_\_\_\_, Packages 1, 2 and 3”.*

10. The Employer reserves the right to accept or reject late applications.
11. Applicants will be advised, in due course, of the result of their application. Only firms and joint ventures prequalified under this procedure will be invited to bid.

\_\_\_\_\_  
TRAN TRUNG TRU  
General Director



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SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
**PROJECTS MANAGEMENT UNIT THANG LONG**  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi - Vietnam  
Tel: (84-4) – 8346664 Fax: (84-4) – 8341857

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## INSTRUCTIONS TO APPLICANTS FOR PRE-QUALIFICATION

**Red River Bridge (Thanh Tri Bridge) Construction Project**  
**Under JBIC Loan Agreement No. \_\_\_\_\_**  
**Packages 1, 2 and 3**

Date : \_\_\_\_\_ 2000

### 1. Scope of Bid

- 1.1 The Projects Management Unit Thang Long under the Ministry of Transport, (hereinafter referred to as "Employer") has, through the Government of the Socialist Republic of Vietnam, received an ODA loan from the Japan Bank for International Cooperation (hereinafter referred to as "JBIC") towards the cost of implementation of the Red River Bridge (Thanh Tri Bridge) Construction Project. It is intended to apply a part of the proceeds of this loan, for payments under the contracts for which this Invitation for Prequalification is issued. Disbursement of the ODA Loan by JBIC will be subject in all respects to the terms and conditions of the Loan Agreement including the disbursement procedures and the "Guidelines for Procurement under JBIC ODA Loans". No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any right to the loan proceeds.
- 1.2 JBIC requires that bidders and contractors as well as the Government of the Socialist Republic of Vietnam, under contracts funded with JBIC ODA Loans and other Japanese ODA, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, JBIC :
- a) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
  - b) recognize a contractor as ineligible, for a period determined by JBIC, to be awarded a contract funded with JBIC ODA Loans if it at any time determines that the contractor has engaged in corrupt or fraudulent practices in competing for, or executing, another contract funded with JBIC ODA Loans or other Japanese ODA.
- 1.3 The Employer intends to prequalify contractors for the following contracts under the project:

- Package 1 - Construction of PC bridges over the Red River for a total length of 3,084 m including a 680m length PC continuous box girder main bridge, together with procurement of maintenance / administrative equipment and the construction of workshop facilities.
- Package 2 - Construction of expressway approach to the red River Bridge on the Gia Lam (west) side over a distance of 3.5km. The works include the construction of one viaduct and three bridges with a total length of approximately 970m and three interchanges. The Project covers also the new construction of frontage road and borders.
- Package 3 - Construction of expressway approach to the red River Bridge on the Thanh Tri (east) side over a distance of 6.2 km including the construction of one viaduct and three bridges with a total length of approximately 770m and three interchanges. The Project covers also the new construction of frontage road and borders.

Further details of the works in each Package are given in Annex A. Applicants may apply for prequalification for any one or more of the above Packages and the application forms should be completed accordingly. Bidding will be for each separate Package and the Employer will not consider awarding more than one Package to the same Bidder.

- 1.4 General Information on the climate, hydrology, topography, access to the site and other relevant data is given in Annex A (attached). It is expected that Invitations to Bid will be issued in \_\_\_\_\_ 2000. The Contract will be a unit price re-measurement contract.

## 2. Submission of Applications

- 2.1 Applications for prequalification must be submitted in one original and one copy in sealed envelopes, which must be either delivered by hand or by registered mail, to :

PROJECTS MANAGEMENT UNIT THANG LONG (PMU THANG LONG)  
Dich Vong Ward, Cau Giay District, Hanoi- Vietnam

not later than 4.00 pm on \_\_\_\_\_ 2000. Envelopes containing applications should be clearly marked with the following words:

*"Applications to Pre-qualification for Red River Bridge (Thanh Tri Bridge) Construction Project, Under JBIC Loan Agreement No. \_\_\_\_\_"*.

- 2.2 The name and mailing address of the applicant shall be clearly marked on the envelope.
- 2.3 All information requested for prequalification shall be provided in the English language. Information in another language shall be accompanied by a translation of its pertinent parts into English. For the convenience of the Procurement Committee, the Applicants are requested to also submit the Application Letter and Forms fully translated into the Vietnamese language. The translated documents should be attached to the application. The English version of applications will govern and be used for interpreting the information.
- 2.4 Each sheet shall be duly signed by the applicant or a person or persons duly authorized to sign on behalf of the applicant. Such authorization shall be indicated by a written power-

of-attorney accompanying the application. All documents submitted by the applicants shall be treated as confidential and will not be returned.

- 2.5 Failure to provide information which is essential to evaluate the Applicant's qualifications or to provide timely clarification or substantiation of the information supplied may result in disqualification of the Applicant.

### 3. Eligible Bidders

Prequalification is open to firms and voluntarily formed joint ventures subject to 8-d) in Page Inv.-3 from all countries and areas and the contract shall be bid on an international competitive bidding (ICB) basis. In case the Tenderer wish to voluntarily form the Joint Venture or Joint Operation (herein after referred as J/V), all member contractors must be capable and individually eligible in term of all countries mentioned in this document. Therefore, qualification of each member shall be taken into account in determining the Applicant's compliance with the qualifying criteria for this prequalification.

### 4. Qualification Criteria

- 4.1 Prequalification will be based on meeting all the following minimum pass / fail criteria regarding the Applicant's general and particular experience, personnel and equipment capabilities, and financial position, as demonstrated by the Applicant's responses in the forms attached to the Letter of Application ( specific requirements for joint ventures are given under paras. 5.1 and 5.2 below ). The Employer reserves the right to waive minor deviations, if they do not materially affect the capability of an applicant to perform the Contract.
- 4.2 Subcontractors' experience and resources shall not be taken into account in determining the Applicant's compliance with the qualifying criteria for this prequalification, subject to law(s)/regulation applicable in Vietnam.
- 4.3 Experience

The Applicant shall meet the following minimum criteria :

- a) average annual turnover ( defined as billing for works in progress and completed ) over the last five years of :
- Package 1 - US \$ 4,000 million equivalent.
  - Package 2 - US\$ 35 million equivalent.
  - Package 3 - US\$ 40 million equivalent.
- Where Contractors wish to prequalify for more than one package, the average annual turnover should be increased accordingly
- b) successful experience as prime contractor and in the execution of at least five projects of a nature and complexity comparable to the proposed contract within the last five years, or be currently engaged in such activities ( for compliance, more than 50% of the relevant contract must have been successfully completed at the time of application )

- c) in addition to the above general experience, successful applicants must have had the following specific experience relative to each of the three contract packages:

**Package 1:**

- i) Construction of a major civil engineering infrastructure project outside the contractor's home country with a contract value of US\$ 100 million or more.
- ii) Construction of highway and/or bridge project in the Socialist Republic of Vietnam within the last five years with a contract value of US\$ 25 million or more.
- iii) Construction of a major multi-span prestressed concrete bridge with a contract value of US\$60 million or more.
- iv) Construction of segmental continuous prestressed concrete box girder of span length over 100m.
- v) Construction of bored cast-insitu concrete piles on a scale of large diameter ( 2.0m or larger ) and pile length ( 40m or longer ).

**Package 2:**

- i) Construction of a major civil engineering infrastructure project with a contract value of US\$ 20 million or more.
- ii) Fabrication of precast prestressed concrete girders with a span length of 30m or longer ( 100 numbers or more at one construction yard ), and erection of girders and construction of cast-insitu concrete slab.
- iii) Construction of a major road project requiring asphalt surfacing of more than 80,000 m<sup>2</sup>
- iv) Construction of a major road project requiring earth filling of more than 600,000 m<sup>3</sup>

**Package 3:**

- i) Construction of a major civil engineering infrastructure project with a contract value of US\$ 35 million or more.
- ii) Fabrication of precast prestressed concrete girders with a span length of 30m or longer ( 100 numbers or more at one construction yard ), and erection of girders and construction of cast-insitu concrete slab.
- iii) Construction of a major road project requiring asphalt surfacing of more than 150,000 m<sup>2</sup>
- iv) Construction of a major road project requiring earth filling of more than 1,000,000 m<sup>3</sup>

#### 4.4 Personnel Capabilities:

The Applicant must have suitably qualified personnel, to fill the following positions. The Applicant shall supply information on a prime candidate and an alternate for each position, both of whom should meet the minimum experience requirements specified below:

Position	Total experience (years)	Experience in similar post (years)	Experience in similar projects (years)
<b>Package 1:</b>			
Project Manager	20	10	7
Foundation/Piling Engineer	15	8	5
Concrete / Prestressing Engineer	15	8	5
Dredging/Earthworks Engineer	15	8	5
Material Engineer	10	5	3
<b>Package 2:</b>			
Project Manager	15	6	4
Highway Engineer	10	5	4
Concrete / Prestressing Engineer	10	5	4
Material Engineer	7	3	3
<b>Package 3:</b>			
Project Manager	18	8	5
Highway Engineer	12	7	4
Concrete / Prestressing Engineer	12	7	4
Material Engineer	8	4	3

#### 4.5 Equipment Capabilities

The Applicant shall own, or have assured access ( through hire, lease, purchase agreement, or other means ) to the following key items of equipment in full working order and must demonstrate that, based on known commitments, they will be available for use in the proposed contract. The Applicant may also list alternative equipment that it would propose for the contract, together with an explanation of the proposal.

##### Package 1:

No.	Item	Capacity	Required No. of Units
1	Concrete Batching Plant	90m <sup>3</sup> /hour	2
2	Concrete Batching Plant	40m <sup>3</sup> /hour	
3	Drilling equipment for 2000mm bored piles including reverse circulation pumps and mud tanks		
4	Drilling equipment for 1500mm bored piles including reverse circulation pumps and mud tanks		
5	Drilling equipment for 1000mm bored piles including reverse circulation pumps and mud tanks		
6	Formwork Travelers		
7	Asphalt Batching Plant	60T/h	
8	Crawler Crane	60T	
9	Crawler Crane	25T	
10	Concrete pump	130 HP, 100m <sup>3</sup> /h	
11	Post Tensioning Stressing Jacks	700 KN	

12	Post Tensioning Stressing Jacks	2,800 KN	
13	Asphalt Paver/Finisher	4 m	

**Package 2:**

No.	Item	Capacity	Required No. of unit
1	Concrete Batching Plant	40m <sup>3</sup> /hour	
2	Drilling equipment for 2000mm bored ples including reverse circulation pumps and mud tanks		
3	Drilling equipment for 1500mm bored ples including reverse circulation pumps and mud tanks		
4	Drilling equipment for 1000mm bored ples including reverse circulation pumps and mud tanks		
5	Formwork Travelers		
6	Asphalt Batching Plant	60T/h	
7	Crawler Crane	60T	
8	Crawler Crane	25T	
9	Concrete pump	130 HP, 1.2m <sup>3</sup> /h	
10	Post Tensioning Stressing Jacks	700 KN	
11	Post Tensioning Stressing Jacks	2,800 KN	
12	Asphalt Paver / Finisher	4 m	

**Package 3:**

No.	Item	Capacity	Required No. of unit
1	Concrete Batching Plant	40m <sup>3</sup> /hour	
2	Drilling equipment for 1500mm bored ples including reverse circulation pumps and mud tanks		
3	Drilling equipment for 1000mm bored ples including reverse circulation pumps and mud tanks		
4	Formwork Travelers		
5	Asphalt Batching Plant	60T/h	
6	Crawler Crane	60T	
7	Crawler Crane	25T	
8	Concrete pump	130 HP, 1.2m <sup>3</sup> /h	
9	Post Tensioning Stressing Jacks	700 KN	
10	Post Tensioning Stressing Jacks	2,800 KN	
11	Asphalt Paver / Finisher	4 m	

**4.6 Financial Position**

The Applicant should demonstrate that he has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means sufficient to meet the

construction cash flow estimated as

Package 1:	US\$ 13,000,000 ( or equivalent )
Package 2:	US\$ 5,000,000 ( or equivalent )
Package 3:	US\$ 8,000,000 ( or equivalent )
Package 1 and Package 2 :	US\$ 18,000,000 ( or equivalent )
Package 1 and Package 3:	US\$ 21,000,000 ( or equivalent )
Package 2 and 3 :	US\$ 13,000,000 ( or equivalent )
All 3 Packages :	US\$ 26,000,000 ( or equivalent )

The above assets are net of the Applicant's commitments for other contracts. If the Applicant feels necessary to do so, he may include with his application a bank reference letter from a First Class Bank to supplement his application. This letter should not take the form of a firm letter of commitment from the Bank, but should certify that the Bank believes that the Applicant has the financial capability to meet the financial obligations to perform the contract including the additional liquid assets as required above.

- 4.7 The audited balance sheets for the last five years should be submitted and must demonstrate the soundness of the Applicant's financial position, showing long-term profitability. Where necessary, the Employer will make enquiries with the Applicant's bankers.

4.8 **Litigation History**

The Applicant should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the application. Subsequent discovery of undisclosed litigation or arbitration shall lead to the disqualification of the Applicant.

**5. Joint Ventures**

- 5.1 Joint ventures must comply with the following requirements:

(a) Following are the minimum qualification requirements:

- (i) All member of the joint venture must satisfy collectively and individually all the qualifying criteria given in 4.3 a) b) and c). In addition, the lead partner alone shall meet at least the following specific criteria:  
**Package 1:** criteria i), ii) and iii) listed for Package 1 in para. 4.3 c)  
**Package 2:** criteria i), ii) and iii) listed for Package 2 in para. 4.3 c)  
**Package 3:** criteria i), ii) and iii) listed for Package 3 in para. 4.3 c)
- (ii) the joint venture shall nominate the staff to be proposed to meet the requirements of para 4.4 and these may be from any joint venture company,

which shall be properly explained in the proposal.

and

- (iv) the joint venture must satisfy collectively the criteria of paras. 4.5 and 4.6, for which purpose the relevant figures for each of the partners shall be added together to arrive at the joint ventures total capacity. Individual members must each satisfy the requirements of paras. 4.7 and 4.8 above.
- (b) The formation of a joint venture including sub-contractor after prequalification, and any change in a prequalified joint venture, will be subject to the written approval of the Consultant prior to the deadline for submission of bids. Such approval may be denied if (i) partners withdraw from a joint venture and the remaining partners do not meet the qualifying requirements; (ii) the new partners to a joint venture are not qualified, individually or as another joint venture; and (iii) in the opinion of the Employer, a substantial reduction in competition may result; and
- (c) any bid shall be signed so as to legally bind all partners, jointly and severally, and any bid shall be submitted with a copy of the joint venture agreement providing the joint and several liability with respect to the contract.

## 6. Conflict of Interest

The Applicant (including all members of a joint venture) shall disclose any current association or association in the past five years, with the consultant or any other entity that has prepared the design, specifications, and other prequalification and bidding documents for the Project. Any such association will be assessed to determine whether there is a conflict of interest, in which case the Applicant will be disqualified.

## 7. Updating of Prequalification Information

Bidders shall be required to update the financial information used for prequalification at the time of submitting their bids, to confirm their continued compliance with the qualification criteria and verification of the information provided. A bid shall be rejected if the Applicant's qualification thresholds are no longer met at the time of bidding.

## 8. General

- 8.1 Only firms and joint ventures that have been prequalified under this procedure will be invited to bid. A qualified firm or a member of a qualified joint venture may participate in only one bid for any one Contract. If a firm submits more than one bid, singly or in joint venture, all bids including that party will be rejected. This rule will not apply in case of bids which include specialist subcontractors who are used by more than one bidder.
- 8.2 Bidders will be required to provide bid security in the form of a banker's guarantee or other security acceptable to the Employer for amounts as follows:



Package 1: US\$ 10,000,000 ( or equivalent )  
Package 2: US\$ 800,000 ( or equivalent )  
Package 3: US\$ 1,500,000 ( or equivalent )

The successful bidder will be required to provide performance security. Examples of acceptable forms for bid and performance security will be supplied with the bidding documents.

8.3 The Employer reserves the right to:

- (a) amend the scope and value of the contracts to be bid, in which event the contracts will only be bid among those prequalified bidders who meet the requirements of the contracts as amended;
- (b) reject or accept any application; and
- (c) cancel the prequalification process and reject all applications.

The Employer shall neither be liable for any such actions nor be under any obligation to inform the Applicant of the grounds for them.

8.4 Applicants will be advised in writing by fax or telex, within 120 days of the date for submission of applications of the result of their application, and the names of the prequalified applicants, without the Employer assigning any reason for his decision.

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SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
**PROJECTS MANAGEMENT UNIT THANG LONG**  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam  
Tel: (84-4) – 8346664 Fax: (84-4) - 8341857

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Annex-A

**PROJECT DESCRIPTION****A. General Information :**

## 1. Topographic Conditions

The topography in the project area was surveyed by dividing the area into 3 sections: the Thanh Tri side, the Red River Bridge section and the Gia Lam side. The project area in the Thanh Tri side and the Gia Lam side are flat with a ground level of about +5.0m in the residential area and about +3.0 to +4.0m in the paddy field and fish pond. In Thanh Tri side, the ground level is about +4.0m. In Gia Lam side, the flood plain area is rather flat with a comparatively low ground elevation of less than +4.0m. The riverbed along the centerline has the deepest point at about -3.0m. The flood plain area is mainly used for the cultivation of corn.

## 2. Geology

The Project area is located in south-eastern part of Hanoi city which is located in the Red River Delta. Geologically, the Red River Delta is composed of Quaternary formations which consist of Alluvium (Holocene age) and Diluvium ( Pleistocene age).

The alluvial soils of the Red River Delta are bright red-brown in color, with medium clay content (20 to 25%) and an appropriate proportion of silt, about 50% in the form of grains 0.05 to 0.001 mm in size.

Alluvium deposits are mainly composed of top soil, cohesive soil and sandy soil. Diluvium deposits are mainly composed of cohesive soil, sandy soil and gravelly soil.

## 3. Hydrological condition (Red River)

The Red River originates in the Nguy Son mountain in China, but with a different name. The river then branches into several tributaries and flows through Laos and Vietnam. The main tributaries which flow through the north-west of Hanoi City are: the Da River, the Thao River, the Chay River, the Lo River and the Gam River. The Red River takes its name after the confluence of these tributaries at Viet Tri city. In the midstream, north of Hanoi City, the river is diverted to the west in the Day River and to the east in the Thai Binh River through the Duong River. The river then flows eastwards through Hanoi City to the sea at Ba Lat.

The overall drainage basin occupies area in Vietnam and also partly in Laos and China with a total drainage area of about 155,000 km<sup>2</sup>. The drainage area of the main tributaries in the upstream from Viet Tri city is approximately 143,700 km<sup>2</sup>.

Since 1998, the flow in the Da River has been regulated by the Hoa Binh reservoir. The portion of the regulated flow is reported to be more than 50% of the total flow in the Red River.

4. Climate

Annual average rainfall in Hanoi is about 1,700mm of 80-85% falls in the rainy season. The annual average number of rainy days is 140. Annual average temperature in Hanoi is 23.6°C with its minimum of 4°C and maximum 39.4°C; mean humidity is 82%.

5. Construction Materials

Natural materials such as soil, sand, stone and gravel are available along or not far from the road. These material reserves are high and easily exploited. Cement and steel are manufactured and supplied by the local factories. Bitumen has to be imported but it is easily provided by Vietnamese import - export companies.

## B. Specific Details for Each Package:

**Package 1: Red River Bridge:** Construction Period - 48 months.

Main elements of the construction will include:

a) Main Bridge

- Length = 680m (80m + 4@130m + 80m)
- Effective Width (between curbs) = 30.0 m.  
[ Inner Shoulder (0.25m) + Outer Carriageway (3.75m) + Inner Carriageway (3.75m) + Outer Shoulder (3.75m) + Space for Bicycle Users (3.5m) ] x 2 Directions = 30.0m
- Bridge Type = 6-Span Continuous Prestressed Concrete Box Girder by Cantilever Erection
- Bridge Area = 20,400m<sup>2</sup>

b) Dyke Bridge

- Length = 290m ( Thanh Tri side: 80m + 130m +80m ) and 290m ( Gia Lam side: 80m +130m +80m )
- Cross section components same as main bridge
- Bridge Type = 3-Span Continuous Prestressed Concrete Box Girder by Cantilever Erection
- Bridge Area = 17,400m<sup>2</sup>

c) Approach Bridge 1

- Length = 550m ( Thanh Tri side: 11@50m ) and 850m ( Gia Lam side: 17@50m )
- Cross section components same as main bridge
- Bridge Type = Continuous Prestressed Concrete Box Girder
- Bridge Area = 41,700m<sup>2</sup>

## d) Approach Bridge 2

- Length = 226m ( Thanh Tri side: 6@33m + 28m ) and 198m ( Gia Lam side: 6@33m )
- Cross section components same as main bridge
- Bridge Type = Simple Prestressed Concrete I-Girder
- Bridge Area = 13,020m<sup>2</sup>

## e) Major Quantities ( Approximate ) :

No.	Items	Unit	Quantity
1	Structure excavation	Cu.m	113,000
2	Structure excavation in the river	Cu.m	48,000
3	Bored piles 1,000mm Dia.	m	8,500
4	Bored piles 1,500mm Dia.	m	33,000
5	Bored piles 2,000mm Dia.	m	8,200
6	Blinding stone	Cu.m	3,300
7	Structural concrete class A1	Cu.m	44,000
8	Structural concrete class A2	Cu.m	36,000
9	Structural concrete class C1	Cu.m	7,000
10	Structural concrete class C4	Cu.m	124,000
11	Structural concrete class G	Cu.m	1,700
12	Reinforcing steel bars	Ton	24,000
13	P.C. tendons	Ton	3,500
14	P.C. I girder – Span 20m to 33m	each	190

## Explanation:

Concrete

- class A1 : PC Superstructure - cantilevering
- class A2 : P.C.I, P.C box
- class C1 : R.C. Slab, Hollow Slab
- class C4 : Substructure ( Pier, Abutment )
- class G : Lean Concrete

**Package 2: Gia Lam Section:** Construction Period - 42 months.

Main elements of the construction ( with approximate quantities ) will include:

- + Construction of 4,000 sq.m of PC box girder bridge, with cast-in-place concrete piling.
- + Construction of 23,300 sq.m of PC I-girder bridge, with cast-in-place concrete piling.

- + Construction of 1,200 sq.m of RC hollow slab bridge, with cast-in-place concrete piling.
- + Construction of 900,000 cu.m of borrow embankment.
- + Embankment foundation treatment of in soft ground area by 1.0m thickness sand mat and 2,550,000 m of preformed fibre vertical drain.
- + Construction of 1,400 lin.m of vehicular or pedestrian box culvert and large size pipe culvert to maintain existing drainage / irrigation network.
- + Construction of 18,500 l.m of road surface and roadside drainage by RC pipes and U-ditch.
- + Construction of 114,000 sq.m of asphalt concrete pavement including subbase course, base, asphalt treated base and asphalt concrete binder and surface courses.
- + Erosion control work such as sodding and slope protection by using mortared stone masonry wall or mortared stone surface protection.
- + Construction of highway supporting facilities such as guardrails, concrete curb, concrete sidewalk, road markings and signs and fence work.
- + Construction of road lighting and signals.

## Approximate Major Quantities for Structures :

No.	Items	Unit	Quantity
1	Structure excavation	Cu.m	21,000
2	Bored piles 1,000 mm Dia.	m	16,000
3	Bored piles 1,500 mm Dia.	m	3,500
4	Bored piles 2,000 mm Dia.	m	4,000
5	Blinding stone	Cu.m	1,000
6	Structural concrete class A2	Cu.m	3,300
7	Structural concrete class C1	Cu.m	7,600
8	Structural concrete class C4	Cu.m	18,000
9	Structural concrete class C5	Cu.m	900
10	Reinforcing steel bars	Ton	3,700
11	P.C. tendons	Ton	700
12	P.C. I-Girder - Span 25m to 35m	each	370

Explanation:

Concrete class A2 : P.C.I. and P.C. box

class C1 : R.C. Slab, Hollow Slab  
class C4 : Substructure ( Pier, Abutment )  
class C5 : Parapet

Approximate Major Quantities for Road Works: ( length = 2,500 m )

No.	Items	Unit	Quantity
1	Excavation	Cu.m	120,000
2	Borrow material	Cu.m	900,000
3	Sub-base course	Cu.m	56,000
4	Asphalt Treated Base course	Ton	88,000
5	Asphalt concrete binder course	Ton	11,000
6	Asphalt concrete surface course	Ton	13,000
7	Asphalt Cement	Ton	1,800

**Package 3: Thanh Tri Section:** Construction Period - 42 months.

Main elements of the construction ( with approximate quantities ) will include:

- + Construction of 2,300 sq.m of PC box girder bridge, with cast-in-place concrete piling.
- + Construction of 23,500 sq.m of PC I-girder bridge, with cast-in-place concrete piling.
- + Construction of 5,300 sq.m of RC hollow slab bridge, with cast-in-place concrete piling.
- + Construction of 1,500,000 cu.m of borrow embankment.
- + Embankment foundation treatment of soft ground area by 1.0m thickness sand mat and 1,780,000 m of 40cm diameter vertical sand drain.
- + Construction of 450 lin.m of vehicular or pedestrian box culvert and large size pipe culvert to maintain existing drainage / irrigation network.
- + Construction of 25,300 l.m of road surface and roadside drainage by RC pipes and U-ditch.
- + Construction of 183,000 sq.m of asphalt concrete pavement including subbase course, base, asphalt treated base and asphalt concrete binder and surface courses.
- + Erosion control work such as sodding and slope protection by using mortared stone masonry wall or mortared stone surface protection.
- + Construction of barrier type toll gate with control building.

- + Construction of highway supporting facilities such as guardrails, concrete curb, concrete sidewalk, road markings and signs and fence work.
- + Construction of road lighting and signals.

Approximate Major Quantities for Structures :

No.	Items	Unit	Quantity
1	Structure excavation	Cu.m	68,000
2	Bored piles 1,000mm Dia.	m	24,000
3	Bored piles 1,500mm Dia.	m	8,000
4	Blinding stone	Cu.m	2,400
5	Structural concrete class A2	Cu.m	1,800
6	Structural concrete class C1	Cu.m	8,700
7	Structural concrete class C4	Cu.m	33,000
8	Structural concrete class C5	Cu.m	2,500
9	Reinforcing steel bars	Ton	5,700
10	P.C. tendons	Ton	700
11	P.C. I-Girder - Span 28m to 35 m	each	400

Explanation:

Concrete class A2 : P.C.I. and P.C. box  
class C1 : R.C. Slab, Hollow Slab.  
class C4 : Substructure ( Pier, Abutment )  
class C5 : Parapet

Approximate Major Quantities for Road Works: ( length = 4,900 )

No.	Items	Unit	Quantity
1	Excavation	Cu.m	250,000
2	Borrow material	Cu.m	1,500,000
3	Sub-base course	Cu.m	120,000
4	Asphalt Treated Base course	Ton	66,000
5	Asphalt concrete binder course	Ton	22,000
6	Asphalt concrete surface course	Ton	33,000
7	Asphalt Cement	Ton	6,000



**LETTER OF APPLICATION**

*[Letterhead paper of the Applicant, or partner responsible for a joint venture, including full postal address, telephone, fax, cable and telex addresses]*

..... [date]

**To: Projects Management Unit Thang Long  
 Ministry of Transport  
 Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi, Vietnam**

Dear Sirs,

Being duly authorized to present and act on behalf of \_\_\_\_\_

(hereinafter referred to as the "Applicant"), and having reviewed and fully understood all prequalification information provided, the undersigned hereby apply to be pre-qualified by yourselves as a bidder for the following contracts under the Red River Bridge (Thanh Tri Bridge) Construction Project,

Package Combinations	Ranking Preference	Applicant's Name
Package 1only.		
Package 2 only.		
Package 3only.		
Package 1 & Package 2		
Package 1 & Package 3		
Package 2 & Package 3		
All Three Packages		

Each Package will be bid and let as a single independent entity. The above combinations have been prepared for the purposes of prequalification and are intended to ensure that Contractors are not allowed to bid for more work than they can successfully implement. There may also be some Applicants who will be interested in bidding for only one particular Package or combination of Packages. Applicants should insert their name opposite those Package Combinations for which they wish to be pre-qualified and at the same time should give a ranking to their order of preference. To avoid any misunderstanding Applicants should delete in ink any contract or combination of contracts for which they do **not** want to be considered for prequalification. The deletion should be initialled and dated.

2. Attached to this letter please find copies of original documents defining<sup>\*(1)</sup>
  - (a) the Applicant's legal status;
  - (b) his principal place of business; and

- (c) the place of incorporation (for applicants who are corporations); or the place of registration and the nationality of the owners (for applicants who are partnerships or individually owned firms).

*\*(1) For applications by joint ventures, all the information requested in the prequalification documents is to be provided for the joint venture, if it already exists, and for each party to the joint venture separately. The Lead Partner should be clearly identified. Each partner in the joint venture shall sign the letter. In order to demonstrate the capability of and also to determine the work demarcation/liability of the contract of the Joint Venture, necessary organization chart with supplement shall be attached hereto.*

3. Your Agency and its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents and information submitted in connection with this application, and to seek clarification, from our bankers and clients regarding any financial and technical aspects. This Letter of Application will also serve as authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves to verify statements and information provided in this application, such as the resources, experience, and competence of the Applicant.

4. Your Agency and its authorized representatives may contact the following persons for further information or clarification. <sup>\*(2)</sup>.

General and Managerial Inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Personnel Inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Technical inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Financial inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

*\*(2) Applications by joint ventures should provide, on a separate sheet equivalent information for each party to the application.*

5. This application is made in the full understanding that:
- (a) bids by prequalified applicants will be subject to verification of all information submitted for prequalification at the time of bidding ;
  - (b) your Agency reserves the right to :
    - amend the scope and value of any contracts bid under this project. In such event, bids will only be called from prequalified bidders who meet the revised requirements; and
    - reject or accept any application, cancel the prequalification process and reject all applications.
  - (c) your Agency shall not be liable for any such actions and shall be under no obligation to inform the Applicant of the grounds for them.

---

*Applicants, who are not joint ventures, should delete paragraphs 6 and 7 and initial the deletions.*

---

6. Appended to this application, we give details of the participation of each party, with supporting documents including capital contribution and profit/loss agreements, in the joint venture or association. We also specify the financial commitment in terms of the percentage of the value of the contract, and the responsibilities for execution of the contract.
7. We confirm that in the event that we bid, that bid as well as any resulting contract will be:
- (a) signed so as to legally bind all partners, jointly and severally; and
  - (c) submitted with a joint venture agreement providing the joint and several liability of all partners in the event the contract is awarded to us.

*\*(3) Original(s) of Power of Attorney, certified registration of each company and certificate to exist in each country etc shall be attached hereto in order to demonstrate each eligibility of the Tenderer and its members.*

8. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true and correct in every detail.

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
Applicant ( or leading partner  
of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Application Form (1)

Page..... of ..... Pages

**GENERAL INFORMATION**

All individual firms and each partner or a joint venture applying for prequalification are requested to complete the information in this form. Nationality information should be provided for all owners or applicants who are partnerships or individually owned firms.

Where the Applicant proposes to use named sub-contractors for critical components of the works, or for work contents in excess of ten per cent of the value of the whole works, the following information should also be supplied for those subcontractor(s), together with a brief description of their proposed input.

Name of Applicant: \_\_\_\_\_

Head Office Address: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

Place of Incorporation / Registration: \_\_\_\_\_

Year of Incorporation / Registration: \_\_\_\_\_

Nationality of Owners<sup>(1)</sup>:

Name	Nationality
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(1) To be completed by all owners of partnerships or individually-owned firms

**GENERAL EXPERIENCE RECORD**

Name of Applicant or Partner of a JV: \_\_\_\_\_

All individual firms and all partners of a joint venture should complete the information in this form. The information supplied should be the annual turnover of the Applicant (or each member of a joint venture), in terms of the amounts billed to clients for each year for work in progress or completed, converted to U.S. dollars at the rate of exchange at the end of the period reported.

Applicants should not enclose testimonials, certificates and publicity material with their applications; these will not be taken into account in the evaluation of qualifications.

Annual Turnover Data

Year	Turnover ( from Construction Works only )	US\$ Equivalent
19		
19		
19		
19		
19		

[Use a separate sheet for each partner of a joint venture.]

Application Form (2a)

Page..... of ..... Pages

**SUMMARY SHEET (JOINT VENTURES ONLY)**

**Names of all Partners of a Joint Venture:**

- 1. Lead Partner : \_\_\_\_\_
- 2. Partner : \_\_\_\_\_
- 3. Partner : \_\_\_\_\_
- 4. Partner : \_\_\_\_\_
- 5. Partner : \_\_\_\_\_
- 6. Partner : \_\_\_\_\_

Total value of annual construction turnover, in terms of work billed to clients, in millions of U.S. dollars equivalent, converted at the rate of exchange at the end of the period reported:

Partner	Year 19	Year 19	Year 19	Year 19	Year 19
1. Lead Partner :					
2. Partner					
3. Partner					
4. Partner					
5. Partner					
6. Partner					
<b>TOTALS :</b>					

**Joint Venture Agreement**

To: Projects Management Unit Thang Long  
Ministry of Transport  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi, Vietnam

The undersigned of this declaration of cooperation are by means of the attached Powers of Attorney <sup>(1)</sup> legally authorized to act with regard to the Red River Bridge ( Thanh Tri Bridge ) Construction Project and on behalf of their organisations.

They hereby declare:

1. that they will legalize a Joint Venture Agreement in case that a Contract for the Red River Bridge ( Thanh Tri Bridge ) Construction Project is awarded to their group;
2. that they have nominated \_\_\_\_\_ *[name of the lead partner]* as the Sponsor Firm of the group for the purpose of this Bid;
3. that they authorized Mr./Mrs. \_\_\_\_\_ *[name of the person who is authorized to act as the Representative on behalf of the Joint Venture]* to act as the Bidder's Representative in the name and on behalf of their group.
4. that all partner of the Joint Venture shall be liable jointly and severally for the execution of the Contract;
5. that this Joint Venture is an association freely constituted for the purpose of the execution of the Red River Bridge ( Thanh Tri Bridge ) Construction Project under this contract;
6. that if the employer accepts the Bid of this Joint Venture, it shall not be modified in its composition or constitution until the completion of Contract without the prior consent of the Employer;
7. that each partner's share of the Work, stated as percentage of the total contract amount, shall be as follows:

Name of Partner	Share of the Work ( as percentage of the contract amount ) and note of any Special Works to be carried out by the Partner.
1. Lead Partner	
2. Partner	
3. Partner	
4. Partner	
Total	100 %



Give names and position of the proposed Joint Venture Representatives, as well as organization's names and addresses:

1.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

2.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

3.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

4.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

5.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

[ \* ] Originals of the Power of Attorney to be attached to the Application .

**PARTICULAR EXPERIENCE RECORD**

Name of Applicant or Partner in a JV : \_\_\_\_\_

Using the following format, each Applicant or partner of joint venture is requested to demonstrate his performance during the last five (5) years on projects of a similar nature and complexity to the contract for which an application for prequalification is submitted.

1. Name of Project / Country: \_\_\_\_\_

2. Employer / Employer's Address: \_\_\_\_\_  
\_\_\_\_\_

3. If the project was carried out in a joint venture, Name of Joint Venture partners and Details

/ Share of own activities : \_\_\_\_\_  
\_\_\_\_\_

4. US\$ equivalent value of contract ( based on the currencies of the contract converted into US\$, at the rate of exchange at the date of completion, or for current contract at the time of award ):

5. Date of Commencement : \_\_\_\_\_ 6.Date of Completion: \_\_\_\_\_

7. Construction period : \_\_\_\_\_

8. Value of contract completed to date (if contract still in progress) : \_\_\_\_\_

9. Other relevant details of the project works : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[ use additional sheets as necessary ]

**Details of Contracts Displaying Specific Experience**

Name of Applicant or Partner of a JV : \_\_\_\_\_

[ Applicants should use the following format to demonstrate their ability to meet the requirements for specific experience as given in paragraph 4.3 c) of the Instructions to Applicants. The type of experience being demonstrated should be clearly identified in the following Form by using the same code and description under "Experience Type" as given in para. 4.3 c) - for example Package 1 iii) – Major Marine Works, etc. Full details of the project should have been given in Form 3 and therefore in this Form (3a) it is only necessary to Name the project again and report the relevant experience being claimed. ]

1. Experience Type : \_\_\_\_\_

2. Name of Project / Country: \_\_\_\_\_

3. Description of project works in comparison with the Experience requirements called for in 1.

above and detailed in 4.3 c). Compare project scale, production rates, etc.

\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

[ use additional sheets as necessary ]

**CURRENT CONTRACT COMMITMENTS / WORKS IN PROGRESS**

Name of Applicant (or partners of a joint venture) : \_\_\_\_\_

Applicants and all partners to an application should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or contracts approaching completion but for which an unqualified, full completion certificate has yet to be issued.

	Name of Contract	Value of Outstanding Work (Current US\$ Eq.)	Estimated Completion Date
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____

[ use additional sheets as necessary ]

Application Form (5)

Page..... of ..... Pages

**PERSONNEL CAPABILITIES**

**Name of Applicant :** .....

Applicants should provide the names of a prime candidate and an alternate qualified to meet the specified requirements stated for each position. The positions detailed should be the same as those given paragraph 4.4 of the Instructions to Bidders. Members of a joint venture should decide their best candidates from among the partners and propose only a Prime and one Alternative candidate for each position. Where Applicants wish to be pre-qualified for more than one of the Contract packages, they must propose different candidates for the posts in each Package. The data on their experience should be supplied in separate sheets (on Form 5a for each candidate).

**Position :** \_\_\_\_\_ [ *Package and Title of Position*]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ *Package and Title of Position*]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ *Package and Title of Position*]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ *Package and Title of Position*]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ *Package and Title of Position*]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ *Package and Title of Position*]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

[ use additional sheets as necessary ]

Application Form (5a)

Page..... of ..... Pages

CANDIDATE SUMMARY

Name of Applicant ( for prequalification ): \_\_\_\_\_

Contract Package and Position to be Filled : \_\_\_\_\_

Prime / Alternate Candidate [ Delete as appropriate ]

- 1. Candidate's Name: \_\_\_\_\_
- 2. Date of Birth: \_\_\_\_\_
- 3. Professional qualifications: \_\_\_\_\_
- 4. Employer's Name and Address: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

5. Contact Name ( Manager/ Personnel officer): \_\_\_\_\_

6. Candidate's Present Position: \_\_\_\_\_

7. Years with present employer: \_\_\_\_\_

8. Professional experience (Indicate particular technical and management experience relevant to the project, in reverse chronological order.)

Years	Company, Project, Position Held, and
From.....To	Relevant Technical and Management Experience

[ use additional sheets as necessary ]

**EQUIPMENT CAPABILITIES**

Name of Applicant (or Partner of a joint venture) : \_\_\_\_\_

The Applicant should provide adequate information to demonstrate clearly that it has the capability to meet the requirements for each and all items of Equipment listed in para. 4.5 of the "Instructions to Applicants". A separate form 6 shall be prepared for each item of equipment including alternative equipment proposed by the Applicant.

Item of equipment: \_\_\_\_\_

1. Manufacturer : \_\_\_\_\_ 2. Model and power rating: \_\_\_\_\_

3. Capacity: \_\_\_\_\_ 4. Year of manufacture: \_\_\_\_\_

5. Current Condition and Location: \_\_\_\_\_

7. Details of Current Commitments: \_\_\_\_\_

8. Indicate whether equipment is owned or to be hired, leased, manufactured especially, or through other means: \_\_\_\_\_

9. Owner: \_\_\_\_\_

*[ Omit the following information for equipment owned by the Applicant, including a Partner in a Joint Venture. ]*

10. Owners Address: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

12. Contact Person ( Name and Title ): \_\_\_\_\_

Details of hire / lease / manufacture agreements specific to the project for which the Applicant wishes to be prequalified: \_\_\_\_\_

**FINANCIAL CAPABILITY**

Name of Applicant or Partner of a Joint Venture: \_\_\_\_\_

Applicants, including each partner of a joint venture, should provide financial information to demonstrate that they meet requirements stated in the Instructions to Applicants. Each Applicant or partner of a JV must fill this form. If necessary, use separate sheets. A copy of audited balance sheets for the last five years should be attached. Firms owned by individuals and partnerships may submit their balance sheets certified by a registered accountant and supported by copies of tax returns, if audits are not required by the laws of their country of origin.

1. Name of Banker: \_\_\_\_\_
2. Banker's Address: \_\_\_\_\_  
 Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_
3. Contact Person ( Name and Title ): \_\_\_\_\_  
*[Provide the same information/or other bankers in a separate sheet.]*

Summary of Assets and Liabilities converted into US dollars ( at the rates of exchange current at end of each year ) for the last five years.

Financial Information in US\$ Equivalent		Actual Audited Results for the Previous Five ( 5 ) Years					Projected Results for the Next 2 Years	
		1.	2.	3.	4.	5.	6.	7.
Financial Years								
1.	Total Assets							
2.	Current Assets							
3.	Liquid Assets							
4.	Total Liabilities							
5.	Current Liabilities							
6.	Long Term Liabilities							
7.	Share Holder Equity							
8.	Ordinary Profits							
9.	Profits before Taxes							
10.	Profits after Taxes							



Page..... of ..... Pages

Proposed sources of financing to meet the cash flow demands of the Project, net of current commitments ( Instructions to Applicants, para 4.6):

(Note : The Applicant's current commitments shall be assessed as twice the maximum total of monthly cost for each on-going contract, or for which a letter of intent or acceptance has been received, assuming a straight line distribution of outstanding contract value over the outstanding contract period.)

<u>Sources of Financing</u>	<u>Amount ( US\$ Equivalent )</u>
_____	_____
_____	_____
_____	_____
_____	_____

Applicants may submit a bank reference letter from a reputable commercial bank to the effect that the bank certifies the financial capability of the applicants to meet their financial obligation to perform the appropriate contracts as given in para. 4.6. The bank may also confirm that they will consider to issue a specific line with proper amount of credit when and if the contract(s) are awarded to the Applicants.

Application Form (8)

Page..... of ..... Pages

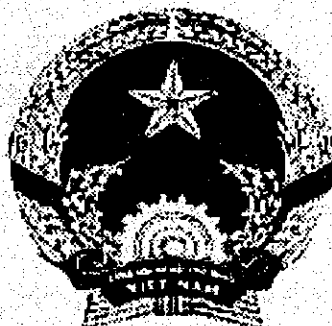
**LITIGATION HISTORY**

Name of Applicant or Partner in a JV : .....

Applicants, including each of the partners of a joint venture should provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution, as required in the "Instructions to Applicants". A separate sheet should be used for each partner of a joint venture.

Year	Name of Client; Cause of Litigation and Matter in Dispute.	Awarded FOR or AGAINST Applicant.	Disputed Amount ( Current Value in US\$ Equivalent )

**THE SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG**



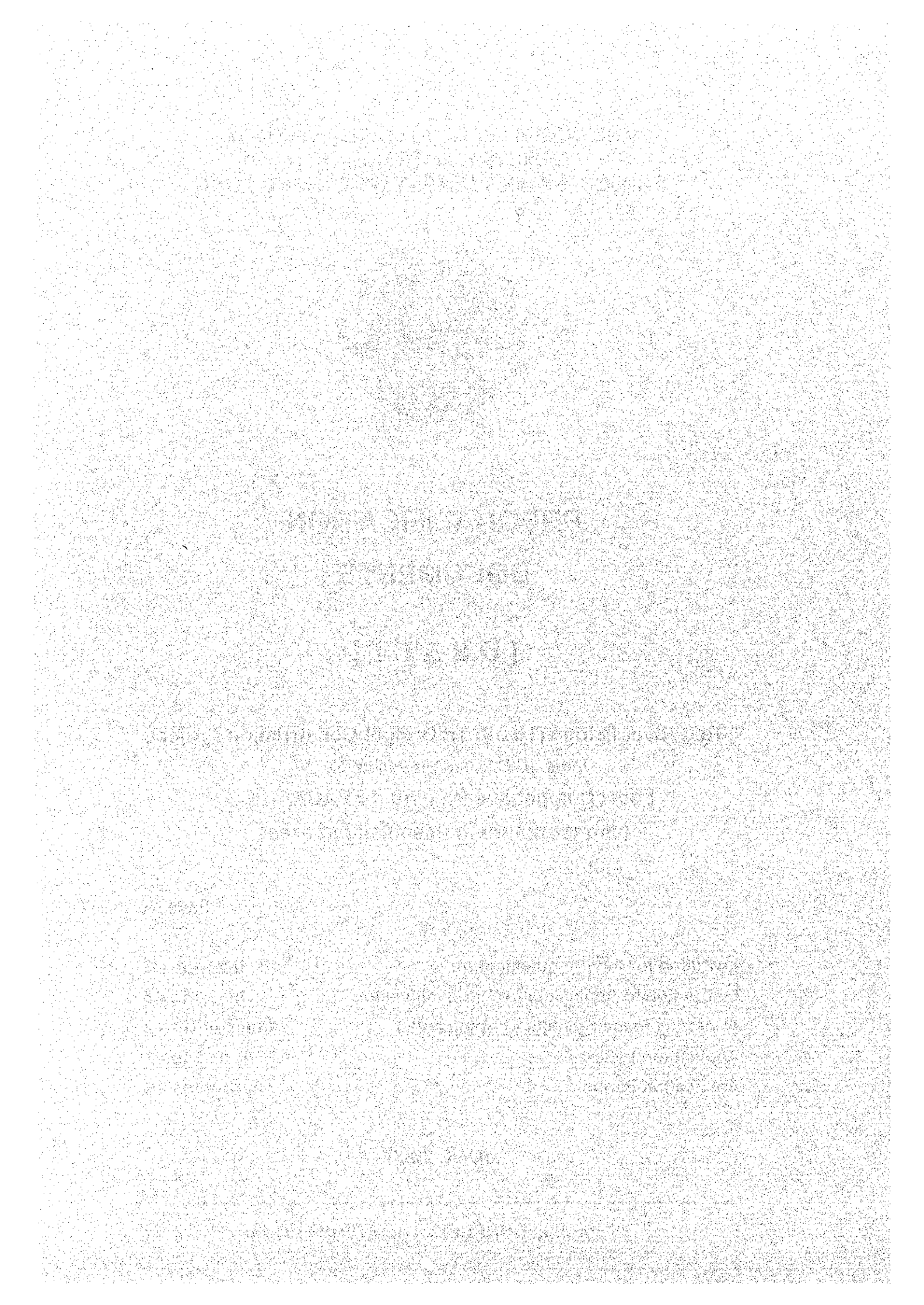
**PREQUALIFICATION  
DOCUMENTS**

**[ D R A F T ]**

**Red River Bridge (Thanh Tri Bridge) Construction Project  
Under JBIC Loan Agreement No. \_\_\_\_\_  
Local Competitive Bidding for PACKAGE 4.  
( Infrastructure in Resettlement Areas )**

	<u>Page No</u>
<b>Invitation for the Pre-qualification</b>	Inv. -1 to - 3
<b>Instruction to Applicants for Pre-qualification</b>	Ins.- 1 to - 6
<b>Annex A ( to Instructions to Applicants )</b>	Annex A - 1 to 2
<b>Application Letter</b>	App.- 1 to - 3
<b>Application Forms</b>	App.- 4 to - 16

**JUNE 2000**



SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
PROJECTS MANAGEMENT UNIT THANG LONG  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam  
Tel: (84-4) – 8346664 Fax: (84-4) - 8341857

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## INVITATION FOR PREQUALIFICATION

**Red River Bridge (Thanh Tri Bridge) Construction Project**  
**Under JBIC Loan Agreement No. \_\_\_\_\_**  
**Package 4 ( Infrastructure in Resettlement Areas )**

**Date:** \_\_\_\_\_

1. The Government of the Socialist Republic of Vietnam have received loan funding from the Japan Bank for International Cooperation, ( hereinafter referred to as “JBIC” ), towards the cost of the Red River Bridge (Thanh Tri Bridge) Construction Project. It is intended that a part of the proceeds of this loan will be used for eligible payments under the contract for which this Invitation for Prequalification is issued. Disbursement of the ODA Loan by JBIC will be subject, in all respects, to the terms and conditions of the Loan Agreement, including the disbursement procedures and the “Guidelines for Procurement under the JBIC ODA Loans” No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any claim to the Loan proceeds.
2. JBIC requires that bidders and contractors as well as the Government of the Socialist Republic of Vietnam, under contracts funded with JBIC ODA Loans and other Japanese ODA, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, JBIC :
  - a) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
  - b) will recognize a Contractor as ineligible, for a period determined by JBIC, to be awarded a contract funded with JBIC ODA Loans if it at any time determines that the contractor has engaged in corrupt or fraudulent practices in competing for, or executing, another contract funded with JBIC ODA Loans or other Japanese ODA.
3. Projects Management Unit Thang Long under the Ministry of Transport, (hereinafter referred to as “Employer”) intends to prequalify Contractors for the works to be executed under the following contract package :  
Package 4 - Construction of Infrastructure in Resettlement Area.

There are six resettlement sites and they are located at:

Thanh Tri district: Hoang Liet, Yen So, Tran Phu and Linh Nam communes, and  
Gia Lam district: Cu Khoi and Thach Ban communes.

The works in each area may include Earth Filling Work, Access Roads, Internal Roads, Electric Supply, Water Supply and Drainage Systems.

Applicants will be prequalified on the basis that the works will be awarded as one contract, but the Employer reserves the right to divide the work into a number of smaller contracts at the time of bidding.

4. It is expected that Invitations to Bid will be issued in \_\_\_\_\_ 2000.
5. The construction contract will be awarded on the basis of local competitive bidding ( LCB ) in accordance with the "Guidelines for Procurement under JBIC ODA Loans, October 1999". Bidding will be open to pre-qualified Vietnamese contractors and voluntarily formed joint ventures from among Vietnamese contractors
6. Interested eligible applicants may obtain further information and inspect the Pre-qualification Documents at:

**PROJECTS MANAGEMENT UNIT THANG LONG**

Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam

Tel: (84-4) – 8346664

Fax: (84-4) – 8341857

7. The documents are available during office hours for a non-refundable fee of VND \_\_\_\_\_. On written request, the Employer will promptly dispatch the documents by registered mail or courier delivery, but under no circumstances will it be held responsible for late delivery or loss of the documents so mailed. Written requests for the documents must clearly state "Request for Prequalification Documents for Red River Bridge ( Thanh Tri Bridge ) Construction Project Under JBIC Loan Agreement No. \_\_\_\_\_. Package 4. "
8. The outline minimum requirements for qualification are as follows:
  - a) average annual turnover as prime contractor ( defined as billing for works in progress and completed ) over the last five years of VND 150,000,000, and
  - b) specific experience as shown by the construction of at least three equivalent projects in the last five years.
9. Submissions of Applications for Prequalification must be in sealed envelopes, which must be either delivered by hand or by registered mail, to:

**PROJECTS MANAGEMENT UNIT THANG LONG**

Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam

The Pre-qualification Documents must be submitted to PMU Thang Long not later than 4.00 pm on \_\_\_\_\_ 2000. Envelopes containing applications should be clearly marked with the following words:

*“Application to Prequalify for Red River Bridge (Thanh Tri Bridge) Construction Project Under JBIC Loan Agreement No. \_\_\_\_\_. Package 4.*

10. The Employer reserves the right to accept or reject late applications.
11. Applicants will be advised, in due course, of the result of their application. Only firms and joint ventures prequalified under this procedure will be invited to bid.

TRAN TRUNG TRU  
General Director





SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
**PROJECTS MANAGEMENT UNIT THANG LONG**  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi - Vietnam  
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## INSTRUCTIONS TO APPLICANTS FOR PRE-QUALIFICATION

**Red River Bridge (Thanh Tri Bridge) Construction Project**  
**Under JBIC Loan Agreement No. \_\_\_\_\_**  
**Package 4 ( Infrastructure in Resettlement Areas )**

Date : \_\_\_\_\_ 2000

### 1. Scope of Bid

- 1.1 The Projects Management Unit Thang Long under the Ministry of Transport, (hereinafter referred to as “Employer”) has, through the Government of the Socialist Republic of Vietnam, received an ODA loan from the Japan Bank for International Cooperation (hereinafter referred to as “JBIC”) towards the cost of implementation of the Red River Bridge (Thanh Tri Bridge) Construction Project. It is intended to apply a part of the proceeds of this loan, for payments under the contract for which this Invitation for Prequalification is issued. Disbursement of the ODA Loan by JBIC will be subject in all respects to the terms and conditions of the Loan Agreement including the disbursement procedures and the “Guidelines for Procurement under JBIC ODA Loans”. No party other than the Government of the Socialist Republic of Vietnam shall derive any rights from the Loan Agreement or have any right to the loan proceeds.
- 1.2 JBIC requires that bidders and contractors as well as the Government of the Socialist Republic of Vietnam, under contracts funded with JBIC ODA Loans and other Japanese ODA, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, JBIC :
- a) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
  - b) recognize a contractor as ineligible, for a period determined by JBIC, to be awarded a contract funded with JBIC ODA Loans if it at any time determines that the contractor has engaged in corrupt or fraudulent practices in competing for, or executing, another contract funded with JBIC ODA Loans or other Japanese ODA.
- 1.3 The Employer intends to prequalify Contractors for the works to be executed under the following contract package :
- Package 4 - Construction of Infrastructure in Resettlement Area.
-

There are six resettlement sites and they are located at:

Thanh Tri district: Hoang Liet, Yen So, Tran Phu and Linh Nam communes, and

Gia Lam district: Cu Khoi and Thach Ban communes.

The works in each area may include Earth Filling Work, Access Roads, Internal Roads, Electric Supply, Water Supply and Drainage Systems.

Applicants will be prequalified on the basis that the works will be awarded as one contract, but the Employer reserves the right to divide the work into a number of smaller contracts at the time of bidding.

- 1.4 General Information on the climate, hydrology, topography, access to the site and other relevant data is given in Annex A (attached). It is expected that Invitations to Bid will be issued in \_\_\_\_\_ 2000. The Contract will be a unit price re-measurement contract.

## 2. Submission of Applications

- 2.1 Applications for prequalification must be submitted in one original and one copy in sealed envelopes, which must be either delivered by hand or by registered mail, to :

PROJECTS MANAGEMENT UNIT THANG LONG (PMU THANG LONG)  
Dich Vong Ward, Cau Giay District, Hanoi- Vietnam

not later than 4.00 pm on \_\_\_\_\_ 2000. "Envelopes containing applications should be clearly marked with the following words:

*"Applications to Pre-qualification for Red River Bridge (Thanh Tri Bridge) Construction Project, Under JBIC Loan Agreement No. \_\_\_\_ . Package 4 "*

- 2.2 The name and mailing address of the applicant shall be clearly marked on the envelope.
- 2.3 All information requested for prequalification shall be provided in the English language. Information in another language shall be accompanied by a translation of its pertinent parts into English. For the convenience of the Procurement Committee, the Applicants are requested to also submit the Application Letter and Forms fully translated into the Vietnamese language. The translated documents should be attached to the application. The English version of applications will govern and be used for interpreting the information.
- 2.4 Each sheet shall be duly signed by the applicant or a person or persons duly authorized to sign on behalf of the applicant. Such authorization shall be indicated by a written power-of-attorney accompanying the application. All documents submitted by the applicants shall be treated as confidential and will not be returned.
- 2.5 Failure to provide information which is essential to evaluate the Applicant's qualifications or to provide timely clarification or substantiation of the information supplied may result in disqualification of the Applicant.

**3. Eligible Bidders**

Prequalification is open to pre-qualified Vietnamese contractors and voluntarily formed joint ventures from among Vietnamese contractors. The contract shall be awarded on the basis of local competitive bidding ( LCB ) in accordance with the "Guidelines for Procurement under JBIC ODA Loans, October 1999".

**4. Qualification Criteria**

4.1 Prequalification will be based on meeting all the following minimum pass / fail criteria regarding the Applicant's general and particular experience, personnel and equipment capabilities, and financial position, as demonstrated by the Applicant's responses in the forms attached to the Letter of Application ( specific requirements for joint ventures are given under paras. 5.1 and 5.2 below ). The Employer reserves the right to waive minor deviations, if they do not materially affect the capability of an applicant to perform the Contract.

4.2 Subcontractors' experience and resources shall not be taken into account in determining the Applicant's compliance with the qualifying criteria for this prequalification.

**4.3 Experience**

The Applicant shall meet the following minimum criteria :

- a) average annual turnover as prime contractor ( defined as billing for works in progress and completed ) over the last five years of VND 150,000,000.
- b) successful experience as prime contractor and in the execution of at least three projects of a nature and complexity comparable to the proposed contract within the last five years, or be currently engaged in such activities ( for compliance, more than 50% of the relevant contract must have been successfully completed at the time of application )

**4.4 Personnel Capabilities:**

The Applicant must have suitably qualified personnel, to fill the following positions. The Applicant shall supply information on a prime candidate and an alternate for each position, both of whom should meet the minimum experience requirements specified below:

<u>Position</u>	<u>Total experience (years)</u>	<u>Experience in similar post (years)</u>	<u>Experience in similar work (years)</u>
Project Manager	12	10	7
Technical Managers	8	8	5
Site Supervisors	8	8	5
Utility Engineers	8	8	5

4.5 Equipment Capabilities

The Applicant shall own, or have assured access ( through hire, lease, purchase agreement, or other means ) to the following key items of equipment in full working order and must demonstrate that, based on known commitments, they will be available for use in the proposed contract. The Applicant may also list alternative equipment that it would propose for the contract, together with an explanation of the proposal.

No.	Item	Capacity	Required No. of unit
1	Concrete Batching Plant	10m <sup>3</sup> /hour	
2	Asphalt Batching Plant	60T/h	
3	Bulldozer	140 HP, 15T	
4	Backhoe	135 HP, 0.7m <sup>3</sup>	
5	Motor Grader	125HP, 2.5m	
6	Vibrating Roller	125 HP, 10T	
7	Tired Roller	20T	
8	Asphalt Paver/Finisher	4 m	
9	Cargo Truck	10-12T	

4.6 Financial Position

The Applicant should demonstrate that he has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means sufficient to meet the construction cash flow estimated as VND 15,000,000,000.

The above assets are net of the Applicant's commitments for other contracts. If the Applicant feels necessary to do so, he may include with his application a bank reference letter from a First Class Bank to supplement his application. This letter should not take the form of a firm letter of commitment from the Bank, but should certify that the Bank believes that the Applicant has the financial capability to meet the financial obligations to perform the contract including the additional liquid assets as required above.

- 4.7 The audited balance sheets for the last five years should be submitted and must demonstrate the soundness of the Applicant's financial position, showing long-term profitability. Where necessary, the Employer will make enquiries with the Applicant's bankers.

4.8 Litigation History

The Applicant should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the application. Subsequent discovery of undisclosed litigation or arbitration shall lead to the disqualification of the Applicant.

## 5. Joint Ventures

5.1 Joint ventures must comply with the following requirements:

(a) Following are the minimum qualification requirements:

- (i) The joint venture must satisfy collectively all the qualifying criteria given in 4.3.
- (ii) the lead partner shall meet not less than 65% of the qualifying criteria and the other partners, individually, 35% of the qualifying criteria given in para. 4.6 above. Where the lead partner satisfies 100% of the qualifying criteria given in para. 4.6 above, there is no qualifying requirement for the other partners.
- (iii) the joint venture shall nominate the staff to be proposed to meet the requirements of para 4.4 and these may be from any joint venture company.  
and
- (iv) the joint venture must satisfy collectively the criteria of paras. 4.5 and 4.6, for which purpose the relevant figures for each of the partners shall be added together to arrive at the joint ventures total capacity. Individual members must each satisfy the requirements of paras. 4.7 and 4.8 above.

(b) The formation of a joint venture after prequalification, and any change in a prequalified joint venture, will be subject to the written approval of the Employer prior to the deadline for submission of bids. Such approval may be denied if (i) partners withdraw from a joint venture and the remaining partners do not meet the qualifying requirements; (ii) the new partners to a joint venture are not qualified, individually or as another joint venture; and (iii) in the opinion of the Employer, a substantial reduction in competition may result; and

(c) any bid shall be signed so as to legally bind all partners, jointly and severally, and any bid shall be submitted with a copy of the joint venture agreement providing the joint and several liability with respect to the contract.

5.2 The prequalification of a joint venture does not necessarily prequalify any of its partners individually, or as a partner in any other joint venture or association. In case of dissolution of a joint venture, each one of the constituent firms may prequalify if they meet all the prequalification requirements, subject to the written approval of the Employer.

## 6. Conflict of Interest

The Applicant (including all members of a joint venture) shall disclose any current association or association in the past five years, with the consultant or any other entity that has prepared the design, specifications, and other prequalification and bidding documents for the Project. Any such association will be assessed to determine whether there is a conflict of interest, in which case the Applicant will be disqualified.

**7. Updating of Prequalification Information**

Bidders shall be required to update the financial information used for prequalification at the time of submitting their bids, to confirm their continued compliance with the qualification criteria and verification of the information provided. A bid shall be rejected if the Applicant's qualification thresholds are no longer met at the time of bidding.

**8. General**

8.1 Only firms and joint ventures that have been prequalified under this procedure will be invited to bid. A qualified firm or a member of a qualified joint venture may participate in only one bid for any one Contract. If a firm submits more than one bid, singly or in joint venture, all bids including that party will be rejected. This rule will not apply in case of bids which include specialist subcontractors who are used by more than one bidder.

8.2 Bidders will be required to provide bid security in the form of a banker's guarantee or other security acceptable to the Employer for amounts of VND 800,000,000. The successful bidder will be required to provide performance security. Examples of acceptable forms for bid and performance security will be supplied with the bidding documents.

8.3 The Employer reserves the right to:

- (a) amend the scope and value of the contracts to be bid, in which event the contracts will only be bid among those prequalified bidders who meet the requirements of the contracts as amended;
- (b) reject or accept any application; and
- (c) cancel the prequalification process and reject all applications.

The Employer shall neither be liable for any such actions nor be under any obligation to inform the Applicant of the grounds for them.

8.4 Applicants will be advised in writing by fax or telex, within 120 days of the date for submission of applications of the result of their application, and the names of the prequalified applicants, without the Employer assigning any reason for his decision.

\* \* \* \* \*

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SOCIALIST REPUBLIC OF VIETNAM  
MINISTRY OF TRANSPORT  
**PROJECTS MANAGEMENT UNIT THANG LONG**  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi-Vietnam  
Tel: (84-4) – 8346664 Fax: (84-4) - 8341857

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Annex-A

## PROJECT DESCRIPTION

### A. General Information :

1. Topographic Conditions

The topography in the project area was surveyed by dividing the area into 3 sections: the Thanh Tri side, the Red River Bridge section and the Gia Lam side. The project area in the Thanh Tri side and the Gia Lam side are flat with a ground level of about +5.0m in the residential area and about +3.0 to +4.0m in the paddy field and fish pond. In Thanh Tri side, the ground level is about +4.0m. In Gia Lam side, the flood plain area is rather flat with a comparatively low ground elevation of less than +4.0m. The riverbed along the centerline has the deepest point at about -3.0m. The flood plain area is mainly used for the cultivation of corn.

2. Geology

The Project area is located in south-eastern part of Hanoi city which is located in the Red River Delta. Geologically, the Red River Delta is composed of Quaternary formations which consist of Alluvium (Holocene age) and Diluvium ( Pleistocene age).

The alluvial soils of the Red River Delta are bright red-brown in color, with medium clay content (20 to 25%) and an appropriate proportion of silt, about 50% in the form of grains 0.05 to 0.001 mm in size. Alluvium deposits are mainly composed of top soil, cohesive soil and sandy soil. Diluvium deposits are mainly composed of cohesive soil, sandy soil and gravelly soil.

3. Hydrological condition (Red River)

The Red River originates in the Nguy Son mountain in China, but with a different name. The river then branches into several tributaries and flows through Laos and Vietnam. The main tributaries which flow through the north-west of Hanoi City are: the Da River, the Thao River, the Chay River, the Lo River and the Gam River. The Red River takes its name after the confluence of these tributaries at Viet Tri city. In the midstream, north of Hanoi City, the river is diverted to the west in the Day River and to the east in the Thai Binh River through the Duong River. The river then flows eastwards through Hanoi City to the sea at Ba Lat. The overall drainage basin occupies area in Vietnam and also partly in Laos and China with a total drainage area of about 155,000 km<sup>2</sup>. The drainage area of the main tributaries in the upstream from Viet Tri city is approximately 143,700 km<sup>2</sup>. Since 1998, the flow in the Da River has been regulated by the Hoa Binh reservoir. The portion of the regulated flow is reported to be more than 50% of the total flow in the Red River.

## 4. Climate

Annual average rainfall in Hanoi is about 1,700mm of 80-85% falls in the rainy season. The annual average number of rainy days is 140. Annual average temperature in Hanoi is 23.6°C with its minimum of 4°C and maximum 39.4°C; mean humidity is 82%.

## 5. Construction Materials

Natural materials such as soil, sand, stone and gravel are available along or not far from the road. These material reserves are high and easily exploited. Cement and steel are manufactured and supplied by the local factories. Bitumen has to be imported but it is easily provided by Vietnamese import - export companies.

**B. Specific Details for the Package:**

**Package 4: Infrastructure in Resettlement Areas.** Construction Period - 18 months.

Location	X1	X2	X3	X4	X5	X6	Total
Area of Each Site m <sup>2</sup>	39,000	33,000	17,000	8,000	10,000	13,000	120,000

Approximate quantities of the major pay items:

Item	Item	Unit	Quantity
1. Earthwork	Site Clearing	sq.m	230,000
	Embankment ( Borrow Material )	cu.m	560,000
2. Pavement	Asphalt Concrete Pavement	sq.m	60,000
	Concrete slab paving	sq.m	16,000
3. Drainage	RC Pipe, D = 125 cm	l.m	100
	RC Pipe, D = 75 cm	l.m	2,000
	Concrete U-Ditch, Type U-3	l.m	6,000
	Catch Basin, Type R2	each	140
4. Miscellaneous	Stone Masonry	cu.m	6,400
	Concrete Curb, Type A	l.m	3,000
5. Utilities	Power Receiving System	unit	6
	Lighting, Power Line / Cable	LS	( Various )
	Water Supply	LS	( Various )



LETTER OF APPLICATION

*[Letterhead paper of the Applicant, or partner responsible for a joint venture, including full postal address, telephone, fax, cable and telex addresses]*

..... [date]

**To: Projects Management Unit Thang Long  
Ministry of Transport  
Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi, Vietnam**

Dear Sirs,

Being duly authorized to present and act on behalf of \_\_\_\_\_

(hereinafter referred to as the "Applicant"), and having reviewed and fully understood all prequalification information provided, the undersigned hereby apply to be pre-qualified by yourselves as a bidder for the following contract under the Red River Bridge (Thanh Tri Bridge) Construction Project,

**Package 4 : Infrastructure in Resettlement Areas**

2. Attached to this letter please find copies of original documents defining<sup>\*(1)</sup>
- (a) the Applicant's legal status;
  - (b) his principal place of business; and
  - (c) the place of incorporation (for applicants who are corporations); or the place of registration and the nationality of the owners (for applicants who are partnerships or individually owned firms).

*\*(1) For applications by joint ventures, all the information requested in the prequalification documents is to be provided for the joint venture, if it already exists, and for each party to the joint venture separately. The Lead Partner should be clearly identified. Each partner in the joint venture shall sign the letter.*

3. Your Agency and its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents and information submitted in connection with this application, and to seek clarification, from our bankers and clients regarding any financial and technical aspects. This Letter of Application will also serve as authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves to verify statements and information provided in this application, such as the resources, experience, and competence of the Applicant.

4. Your Agency and its authorized representatives may contact the following persons for further information or clarification.\*<sup>(2)</sup>

General and Managerial Inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Personnel Inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Technical inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Financial inquiries:

Contact 1: \_\_\_\_\_ Tel No. : \_\_\_\_\_

Contact 2: \_\_\_\_\_ Tel No. : \_\_\_\_\_

*\*(2) Applications by joint ventures should provide, on a separate sheet equivalent information for each party to the application.*

5. This application is made in the full understanding that:

- (a) bids by prequalified applicants will be subject to verification of all information submitted for prequalification at the time of bidding ;
- (b) your Agency reserves the right to :
  - amend the scope and value of any contracts bid under this project. In such event, bids will only be called from prequalified bidders who meet the revised requirements; and
  - reject or accept any application, cancel the prequalification process and reject all applications.
- (c) your Agency shall not be liable for any such actions and shall be under no obligation to inform the Applicant of the grounds for them.

---

*Applicants, who are not joint ventures, should delete paragraphs 6 and 7 and initial the deletions.*

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6. Appended to this application, we give details of the participation of each party, with supporting documents including capital contribution and profit/loss agreements, in the joint venture or association. We also specify the financial commitment in terms of the percentage of the value of the contract, and the responsibilities for execution of the contract.
  
7. We confirm that in the event that we bid, that bid as well as any resulting contract will be:
  - (a) signed so as to legally bind all partners, jointly and severally; and
  
  - (d) submitted with a joint venture agreement providing the joint and several liability of all partners in the event the contract is awarded to us.
  
8. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true and correct in every detail.

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
Applicant ( or leading partner  
of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Signed: \_\_\_\_\_ Name : \_\_\_\_\_

For and on behalf of : \_\_\_\_\_  
( partner of a joint venture)

Application Form (1)

Page ..... of ..... Pages

**GENERAL INFORMATION**

All individual firms and each partner or a joint venture applying for prequalification are requested to complete the information in this form. Nationality information should be provided for all owners or applicants who are partnerships or individually owned firms.

Where the Applicant proposes to use named sub-contractors for critical components of the works, or for work contents in excess of ten per cent of the value of the whole works, the following information should also be supplied for those subcontractor(s), together with a brief description of their proposed input.

Name of Applicant: \_\_\_\_\_

Head Office Address: \_\_\_\_\_  
\_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

Place of Incorporation / Registration: \_\_\_\_\_

Year of Incorporation / Registration: \_\_\_\_\_

Nationality of Owners<sup>(1)</sup>:

Name

Nationality

<u>Name</u>	<u>Nationality</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(1) To be completed by all owners of partnerships or individually-owned firms

Application Form (2)

Page..... of..... Pages

**GENERAL EXPERIENCE RECORD**

Name of Applicant or Partner of a JV: \_\_\_\_\_

All individual firms and all partners of a joint venture should complete the information in this form. The information supplied should be the annual turnover of the Applicant (or each member of a joint venture), in terms of the Vietnamese Dong amounts billed to clients for each year for work in progress or completed.

Applicants should not enclose testimonials, certificates and publicity material with their applications; these will not be taken into account in the evaluation of qualifications.

## Annual Turnover Data

Year	Turnover in VND ( from Construction Works only )
19	
19	
19	
19	
19	

[Use a separate sheet for each partner of a joint venture.]

Application Form (2a)

Page..... of..... Pages

**SUMMARY SHEET (JOINT VENTURES ONLY)**

**Names of all Partners of a Joint Venture:**

- 1. Lead Partner : \_\_\_\_\_
- 2. Partner : \_\_\_\_\_
- 3. Partner : \_\_\_\_\_
- 4. Partner : \_\_\_\_\_
- 5. Partner : \_\_\_\_\_
- 6. Partner : \_\_\_\_\_

Total value of annual construction turnover, in terms of work billed to clients in Vietnamese Dong.

Partner	Year 19	Year 19	Year 19	Year 19	Year 19
1. Lead Partner :					
2. Partner					
3. Partner					
4. Partner					
5. Partner					
6. Partner					
TOTALS :					

### Joint Venture Agreement

To: Projects Management Unit Thang Long  
 Ministry of Transport  
 Thon Trung, Dich Vong Ward, Cau Giay District, Hanoi, Vietnam

The undersigned of this declaration of cooperation are by means of the attached Powers of Attorney <sup>[\*]</sup> legally authorized to act with regard to the Red River Bridge ( Thanh Tri Bridge ) Construction Project and on behalf of their organisations.

They hereby declare:

1. that they will legalize a Joint Venture Agreement in case that a Contract for the Red River Bridge ( Thanh Tri Bridge ) Construction Project ( Package 4 ) is awarded to their group;
2. that they have nominated \_\_\_\_\_ [*name of the lead partner*] as the Sponsor Firm of the group for the purpose of this Bid;
3. that they authorized Mr./Mrs. \_\_\_\_\_ [*name of the person who is authorized to act as the Representative on behalf of the Joint Venture*] to act as the Bidder's Representative in the name and on behalf of their group.
4. that all partner of the Joint Venture shall be liable jointly and severally for the execution of the Contract;
5. that this Joint Venture is an association freely constituted for the purpose of the execution of the Red River Bridge ( Thanh Tri Bridge ) Construction Project under this contract;
6. that if the employer accepts the Bid of this Joint Venture, it shall not be modified in its composition or constitution until the completion of Contract without the prior consent of the Employer;
7. that each partner's share of the Work, stated as percentage of the total contract amount, shall be as follows:

Name of Partner	Share of the Work ( as percentage of the contract amount ) and note of any Special Works to be carried out by the Partner.
1. Lead Partner	
2. Partner	
3. Partner	
4. Partner	
Total	100 %

Give names and position of the proposed Joint Venture Representatives, as well as organization's names and addresses:

1.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

2.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

3.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

4.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

5.	Name:	Signature:
	Position:	Date:
	Representative of: (Organization's Name)	

[ \* ] Originals of the Power of Attorney to be attached to the Application .



**PARTICULAR EXPERIENCE RECORD**

Name of Applicant or Partner in a JV : \_\_\_\_\_

Using the following format, each Applicant or partner of joint venture is requested to demonstrate his performance during the last five (5) years on projects of a similar nature and complexity to the contract for which an application for prequalification is submitted.

1. Name of Project / Country: \_\_\_\_\_

2. Employer / Employer's Address: \_\_\_\_\_

3. If the project was carried out in a joint venture, Name of Joint Venture partners and Details / Share of own activities : \_\_\_\_\_

4. Vietnamese Dong value of the contract : \_\_\_\_\_

5. Date of Commencement : \_\_\_\_\_ 6.Date of Completion: \_\_\_\_\_

7. Construction period : \_\_\_\_\_

8. Value of contract completed to date (if contract still in progress) : \_\_\_\_\_

9. Other relevant details of the project works : \_\_\_\_\_

[ use additional sheets as necessary ]

**CURRENT CONTRACT COMMITMENTS / WORKS IN PROGRESS**

Name of Applicant (or partners of a joint venture) : \_\_\_\_\_

Applicants and all partners to an application should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or contracts approaching completion but for which an unqualified, full completion certificate has yet to be issued.

	Name of Contract	Value of Outstanding Work ( VND )	Estimated Completion Date
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
9.	_____	_____	_____
10.	_____	_____	_____
11.	_____	_____	_____

[ use additional sheets as necessary ]

Application Form (5)

Page ..... of ..... Pages

**PERSONNEL CAPABILITIES**

**Name of Applicant :** .....

Applicants should provide the names of a prime candidate and an alternate qualified to meet the specified requirements stated for each position. The positions detailed should be the same as those given paragraph 4.4 of the Instructions to Bidders. Members of a joint venture should decide their best candidates from among the partners and propose only a Prime and one Alternative candidate for each position. Where Applicants wish to be pre-qualified for more than one of the Contract packages, they must propose different candidates for the posts in each Package. The data on their experience should be supplied in separate sheets (on Form 5a for each candidate).

**Position :** \_\_\_\_\_ [ Insert Title of Position]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ Insert Title of Position]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ Insert Title of Position]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ Insert Title of Position]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

**Position :** \_\_\_\_\_ [ Insert Title of Position]

Prime Candidate's Name : \_\_\_\_\_

Alternate Candidate Name : \_\_\_\_\_

[ use additional sheets if necessary ]

Application Form (5a)

Page ..... of ..... Pages

CANDIDATE SUMMARY

Name of Applicant ( for prequalification ): \_\_\_\_\_

Contract Package and Position to be Filled : \_\_\_\_\_

Prime / Alternate Candidate [ Delete as appropriate ]

1. Candidate's Name: \_\_\_\_\_

2. Date of Birth: \_\_\_\_\_

3. Professional qualifications: \_\_\_\_\_

4. Employer's Name and Address: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

5. Contact Name ( Manager/ Personnel officer): \_\_\_\_\_

6. Candidate's Present Position: \_\_\_\_\_

7. Years with present employer: \_\_\_\_\_

8. Professional experience (Indicate particular technical and management experience relevant to the project, in reverse chronological order.)

Years From.....To	Company, Project, Position Held, and Relevant Technical and Management Experience

[ use additional sheets as necessary ]

**EQUIPMENT CAPABILITIES**

Name of Applicant (or Partner of a joint venture) : \_\_\_\_\_

The Applicant should provide adequate information to demonstrate clearly that it has the capability to meet the requirements for each and all items of Equipment listed in para. 4.5 of the "Instructions to Applicants". A separate form 6 shall be prepared for each item of equipment including alternative equipment proposed by the Applicant.

Item of equipment: \_\_\_\_\_

- 1. Manufacturer : \_\_\_\_\_ 2. Model and power rating: \_\_\_\_\_
- 3. Capacity: \_\_\_\_\_ 4. Year of manufacture: \_\_\_\_\_
- 5. Current Condition and Location: \_\_\_\_\_
- 7. Details of Current Commitments: \_\_\_\_\_
- 8. Indicate whether equipment is owned or to be hired, leased, manufactured especially, or through other means: \_\_\_\_\_
- 9. Owner: \_\_\_\_\_

*[ Omit the following information for equipment owned by the Applicant, including a Partner in a Joint Venture. ]*

- 10. Owners Address: \_\_\_\_\_
- Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_
- 12. Contact Person ( Name and Title ): \_\_\_\_\_

Details of hire / lease / manufacture agreements specific to the project for which the Applicant wishes to be prequalified: \_\_\_\_\_

**FINANCIAL CAPABILITY**

Name of Applicant or Partner of a Joint Venture: \_\_\_\_\_

Applicants, including each partner of a joint venture, should provide financial information to demonstrate that they meet requirements stated in the Instructions to Applicants. Each Applicant or partner of a JV must fill this form. If necessary, use separate sheets. A copy of audited balance sheets for the last five years should be attached. Firms owned by individuals and partnerships may submit their balance sheets certified by a registered accountant and supported by copies of tax returns, if audits are not required by the laws of their country of origin.

1. Name of Banker: \_\_\_\_\_

2. Banker's Address: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

3. Contact Person ( Name and Title ): \_\_\_\_\_

*[Provide the same information/or other bankers in a separate sheet.]*

Summary of Assets and Liabilities ( in Vietnamese Dong ) for the last five years.

Financial Information in VND		Actual Audited Results for the Previous Five ( 5 ) Years					Projected Results for the Next 2 Years	
		1.	2.	3.	4.	5.	6.	7.
Financial Years								
1.	Total Assets							
2.	Current Assets							
3.	Liquid Assets							
4.	Total Liabilities							
5.	Current Liabilities							
6.	Long Term Liabilities							
7.	Share Holder Equity							
8.	Ordinary Profits							
9.	Profits before Taxes							
10.	Profits after Taxes							

Proposed sources of financing to meet the cash flow demands of the Project, net of current commitments ( Instructions to Applicants, para 4.6):

(Note : The Applicant's current commitments shall be assessed as twice the maximum total of monthly cost for each on-going contract, or for which a letter of intent or acceptance has been received, assuming a straight line distribution of outstanding contract value over the outstanding contract period.)

Sources of Financing

Amount

<u>Sources of Financing</u>	<u>Amount</u>

Applicants may submit a bank reference letter from a reputable commercial bank to the effect that the bank certifies the financial capability of the applicants to meet their financial obligation to perform the appropriate contracts as given in para. 4.6. The bank may also confirm that they will consider to issue a specific line of credit when and if the contract(s) are awarded to the Applicants.

Application Form (8)

Page ..... of ..... Pages

**LITIGATION HISTORY**

Name of Applicant or Partner in a JV : .....

Applicants, including each of the partners of a joint venture should provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution, as required in the "Instructions to Applicants". A separate sheet should be used for each partner of a joint venture.

Year	Name of Client; Cause of Litigation and Matter in Dispute.	Awarded FOR or AGAINST Applicant.	Disputed Amount (in VND )









JICA