



Bagamati Province Government
Ministry of Water Supply, Energy and Irrigation
Water Resources and Irrigation Development Division Office (WRIDD)
Hetauda, Makwanpur

Invitation for Bids

Date of Publication: 3rd June 2025

Project No. and Title:

Contract No. and Title: ISIP/WRIDD/Makwanpur/081-82/NCB-01: Construction of Chauraha Dhol Khola Ratomate Irrigation Project, Manahari - 05, Makwanpur

Deadline for Submission of Bids: 3rd July 2025

1. The Water Resources Irrigation Development Division Office, Makwanpur ("the Employer") invites sealed bids from eligible Bidders for the construction and completion of Construction of Chauraha Dhol Khola Ratomate Irrigation Project, Manahari - 05, Makwanpur ("the Works").
2. Open competitive bidding will be conducted in accordance with KFAED's Single Stage: Two-Envelope (1S2E) procedure and is open to all Bidders from eligible countries as described in the Bidding Document.
3. Only eligible Bidders with the following key qualifications defined in the bidding document may participate in this bidding:
 - a) Average Annual Construction Turnover (as per section 3 of Bidding Document): NPR 17.45 million.
 - b) Financial Resources (as per section 3 of Bidding Document): NPR 2.19 million.
 - c) Contracts of Similar Size and Nature (as per section 3 of Bidding Document): NPR 10.47 million (including VAT).
 - d) Bid security (as per section 2 of Bidding Document): NPR. 0.27 million.
 - e) Bid Validity Period for this bid: 90 days
4. To obtain further information and inspect the bidding documents, Bidders should contact:

Division Chief
WRIDD, Makwanpur, Bagamati Province
Telephone: 977 057-522377
E-mail: hetaudairrigation0@gmail.com
OR Visit PPMO's e-GP system www.bolpatra.gov.np/egp
5. To purchase the bidding documents in English, eligible Bidders should
 - write to address above requesting the bidding documents for : ISIP/WRIDD/Makwanpur/081-82/NCB-01: Construction of Chauraha Dhol Khola Ratomate Irrigation Project, Manahari - 05, Makwanpur
 - pay a non-refundable fee of NPR. 3,000 (Three thousand) in the form of Bank Voucher deposited in the Rastriya Banijya Bank Ltd, Makwanpur Branch in Revenue Account No.: 1000100200010000 in favor of Water Resources and Irrigation Development Division, Makwanpur, Office Code: 3130132013, Revenue Heading No.: 14229 by 3rd July 2025, 12:00 Noon.

Or,



- download the bidding documents from e-GP portal of Public Procurement Monitoring Office (PPMO): <https://bolpatra.gov.np/egp>. or collect electronic copies from the office mentioned in para. 5.
 - pay the fee as specified above, and upload an electronic copy of the bank deposit/voucher/cash receipt/wire transfer when submitting the bid via the e-GP portal.
6. Interested Bidders shall submit electronic bids through PPMO's e-GP System <https://bolpatra.gov.np/egp> on or before the deadline **3rd July 2025**, 12.00 hours, NST together with a Bid Security as described in the Bidding Document, and upload an electronic copy of the bid security when submitting the Bid. Paper submission of Bid is not permitted. Only electronically submitted bids will be considered for evaluation.

Bids will be opened immediately after the deadline for bid submission in the presence of Bidders' representatives who choose to attend.



Bagmati Province Government
Ministry of Water Supply, Energy and Irrigation
Water Resources and Irrigation Development Division (WRIDD)
Makwanpur

Procurement of Works
Single-Stage: Two-Envelope Bidding Procedure

Bidding Document
for
Procurement of

**Construction of Chauraha Dhol Khola Ratomate Irrigation
Project,
Manahari-05, Makwanpur**

Issued on: 3rd June 2025

Invitation for Bids No.: NCB-01

OCB No: ISIP/WRIDD/Makwanpur/081-82/NCB-01

Employer: WRIDD, Makwanpur

Country: Nepal

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Section 1 - Instructions to Bidders

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Section 1 - Instructions to Bidders

A. General

1. **Scope of Bid**
 - 1.1 In connection with the Invitation for Bids (IFB) indicated in the Bid Data Sheet (BDS), the Employer, as indicated in the BDS, issues this Bidding Document for the procurement of the Works as specified in Section 6 (Employer's Requirements). The name, identification, and number of contracts of this bidding are provided in the BDS.
 - 1.2 Throughout this Bidding Document,
 - (a) the term "in writing" means communicated in written form and delivered against receipt;
 - (b) except where the context requires otherwise, words indicating the singular also include the plural and words indicating the plural also include the singular; and
 - (c) "day" means calendar day.
2. **Source of Funds**
 - 2.1 The Borrower or Recipient (hereinafter called "Borrower") indicated in the BDS has applied for or received financing (hereinafter called "funds") from the Kuwait Fund For Arab Economic Development (hereinafter called "KFAED") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
 - 2.2 Payments by KFAED will be made only at the request of the Borrower and upon approval by KFAED in accordance with the terms and conditions of the Financing Agreement between the Borrower and KFAED (hereinafter called "Financing Agreement"), and will be subject in all respects to the terms and conditions of that Financing Agreement. No party other than the Borrower shall derive any rights from the Financing Agreement or have any claim to the funds.
3. **Fraud and Corruption**
 - 3.1 KFAED's Anticorruption Policy requires Borrowers (including beneficiaries of KFAED-financed activity), as well as Bidders, Suppliers, and Contractors under KFAED-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, KFAED
 - (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
 - (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
 - (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any

- party or the property of the party to influence improperly the actions of a party;
- (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
 - (v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an KFAED investigation; (b) making false statements to investigators in order to materially impede an KFAED investigation; (c) failing to comply with requests to provide information, documents or records in connection with an Office of Anticorruption and Integrity (OAI) investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or (e) materially impeding KFAED's contractual rights of audit or access to information; and
 - (vi) "integrity violation" is any act which violates KFAED's Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of KFAED sanctions, retaliation against whistleblowers or witnesses, and other violations of KFAED's Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
 - (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of KFAED financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to KFAED to remedy the situation;
 - (d) will impose remedial actions on a firm or an individual, at any time, in accordance with KFAED's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate¹ in KFAED-financed, administered, or supported activities or to benefit from an KFAED-financed, administered, or supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other

¹ Whether as a Contractor, Nominated Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document). A Nominated Subcontractor is one that either has been: (i) included by the Bidder in its prequalification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the bidder's prequalification application or the bid; or (ii) appointed by the Employer.

integrity violations; and

- (e) will have the right to require that a provision be included in bidding documents and in contracts financed by KFAED, requiring Bidders, suppliers, and contractors to permit KFAED or its representative to inspect their accounts and records and other documents relating to the bid submission and contract performance and to have them audited by auditors appointed by KFAED.

3.2 Furthermore, Bidders shall be aware of the provisions of GCC 28.3 and 73.2 (i).

4. Eligible Bidders

4.1 A Bidder may be a natural person, private entity, or government-owned enterprise subject to ITB 4.5 – or any combination of them with a formal intent to enter into an agreement or under an existing agreement in the form of a Joint Venture. In the case of a Joint Venture:

- (a) all partners shall be jointly and severally liable; and
- (b) the Joint Venture shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the Joint Venture during the bidding process and, in the event the Joint Venture is awarded the Contract, during contract execution.

4.2 A Bidder, and all parties constituting the Bidder, shall have the nationality of an eligible country, in accordance with Section 5 (Eligible Countries). A Bidder shall be deemed to have the nationality of a country if the Bidder is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

4.3 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to be in a conflict of interest with one or more parties in this bidding process if any of, including but not limited to, the following apply:

- (a) they have controlling shareholders in common; or
- (b) they receive or have received any direct or indirect subsidy from any of them; or
- (c) they have the same legal representative for purposes of this bid; or
- (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to material information about or improperly influence the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) a Bidder participates in more than one bid in this bidding process, either individually or as a partner in a joint venture, except for alternative offers permitted under ITB 13 of the Bidding Document. This will result in the disqualification of all Bids in which it is involved. However, subject to any finding of a conflict of interest in terms of 4.3 (a) - (d) above, this does not limit the participation of a

Bidder as a Subcontractor in another Bid or of a firm as a Subcontractor in more than one Bid; or

- (f) a Bidder or any affiliated entity, participated as a Consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or
- (g) a Bidder was affiliated with a firm or entity that has been hired (or is proposed to be hired) by the Employer or Borrower as Engineer for the contract.

4.4 A firm shall not be eligible to participate in any procurement activities under an KFAED-financed, administered, or supported project while under temporary suspension or debarment by KFAED pursuant to its Anticorruption Policy (see ITB 3), whether such debarment was directly imposed by KFAED, or enforced by KFAED pursuant to the Agreement for Mutual Enforcement of Debarment Decisions. A bid from a temporary suspended or debarred firm will be rejected.

4.5 Government-owned enterprises in the Employer's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under commercial law, and (iii) are not a dependent agency of the Employer.

4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.

4.7 Firms shall be excluded if by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country.

4.8 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.

5. Eligible Materials, Equipment and Services

5.1 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as defined in ITB 4.2 above and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment, and services.

5.2 For purposes of ITB 5.1 above, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

B. Contents of Bidding Document

6. Sections of

6.1 The Bidding Document consist of Parts I, II, and III, which include all the sections indicated below, and should be read in conjunction with

Bidding Document

any addenda issued in accordance with ITB 8.

PART I Bidding Procedures

- Section 1 - Instructions to Bidders (ITB)
- Section 2 - Bid Data Sheet (BDS)
- Section 3 - Evaluation and Qualification Criteria (EQC)
- Section 4 - Bidding Forms (BDF)
- Section 5 - Eligible Countries (ELC)

PART II Requirements

- Section 6 –Employer's Requirements (ERQ)

PART III Conditions of Contract and Contract Forms

- Section 7 - General Conditions of Contract (GCC)
- Section 8 - Particular Conditions of Contract (PCC)
- Section 9 - Contract Forms (COF)

- 6.2 The Invitation for Bids (IFB) issued by the Employer is not part of the Bidding Document.
- 6.3 The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the IFB.
- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.

7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting

- 7.1 A prospective Bidder requiring any clarification on the Bidding Document shall contact the Employer in writing at the Employer's address indicated in the BDS or raise his inquiries during the pre-bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of bids, within a period given in the BDS. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 22.2.
- 7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself, on its own risk and responsibility, all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and

expenses incurred as a result of the inspection.

- 7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than 1 week before the meeting.
- 7.6 Minutes of the pre-bid meeting, including the text of the questions raised, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
- 7.7 Nonattendance at the pre-bid meeting will not be a cause for disqualification of a Bidder.

8. Amendment of Bidding Document

- 8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Document by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 22.2.

C. Preparation of Bids

9. Cost of Bidding

- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

10. Language of Bid

- 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language specified in the BDS. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11. Documents Comprising the Bid

- 11.1 The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Bid containing the documents listed in ITB 11.2 and the other the Price Bid containing the documents listed in ITB 11.3, both envelopes enclosed together in an outer single envelope.

11.2 The Technical Bid shall comprise the following:

- (a) Letter of Technical Bid;
- (b) Bid Security or Bid-Securing Declaration, in accordance with ITB 19;
- (c) alternative Bids, at Bidder's option and if permissible, in accordance with ITB 13;
- (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
- (e) documentary evidence in accordance with ITB 17, establishing the Bidder's qualifications to perform the contract;
- (f) Technical Proposal in accordance with ITB 16;
- (g) Any other document required in the BDS.

11.3 The Price Bid shall comprise the following:

- (a) Letter of Price Bid;
- (b) completed Price Schedules, in accordance with ITB 12 and ITB 14, or as stipulated in the BDS;
- (c) alternative price Bids, at Bidder's option and if permissible, in accordance with ITB 13;
- (d) Any other document required in the BDS.

11.4 In addition to the requirements under ITB 11.2, Bids submitted by a Joint Venture shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful Bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement.

12. Letters of Bid and Schedules

12.1 The Letters of Technical Bid and Price Bid, and the Schedules, and all documents listed under Clause 11, shall be prepared using the relevant forms furnished in Section 4 (Bidding Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested and as required in the BDS.

13. Alternative Bids

13.1 Unless otherwise indicated in the BDS, alternative Bids shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included in the BDS, as will the method of evaluating different times for completion.

13.3 When specified in the BDS pursuant to ITB 13.1, and subject to ITB 13.4 below, Bidders wishing to offer technical alternatives to the requirements of the Bidding Document must first price the Employer's design as described in the Bidding Document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical

requirements shall be considered by the Employer.

- 13.4 When specified in the BDS, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified in the BDS and described in Section 6 (Employer's Requirements). The method for their evaluation will be stipulated in Section 3 (Evaluation and Qualification Criteria).

14. Bid Prices and Discounts

- 14.1 The prices and discounts quoted by the Bidder in the Letter of Price Bid and in the Schedules shall conform to the requirements specified below.
- 14.2 The Bidder shall submit a bid for the whole of the works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section 4 (Bidding Forms). In case of admeasurement contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.
- 14.3 The price to be quoted in the Letter of Price Bid shall be the total price of the Bid, excluding any discounts offered. Absence of the total bid price in the Letter of Price Bid may result in the rejection of the Bid.
- 14.4 The Bidder shall quote any discounts and the methodology for their application in the Letter of Price Bid, in accordance with ITB 12.1.
- 14.5 Unless otherwise provided in the BDS and the Conditions of Contract, the prices quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, the Bidder shall furnish the indexes and weightings for the price adjustment formulas in the Table(s) of Adjustment Data in Section 4 (Bidding Forms) and the Employer may require the Bidder to justify its proposed indexes and weightings.
- 14.6 If so indicated in ITB 1.1, bids are being invited for individual contracts or for any combination of contracts (packages). Bidders wishing to offer any price reduction for the award of more than one Contract shall specify in their bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Price reductions or discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all contracts are submitted and opened at the same time.
- 14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

15. Currencies of Bid and Payment

- 15.1 The currency (ies) of the Bid and payment shall be as specified in the BDS.

- 15.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements, and to substantiate that the amounts included in the prices shown in the appropriate form(s) of Section 4, in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.
- 16. Documents Comprising the Technical Proposal**
- 16.1 The Bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule, and any other information as stipulated in Section 4 (Bidding Forms), in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work requirements and the completion time.
- 17. Documents Establishing the Qualifications of the Bidder**
- 17.1 To establish its qualifications to perform the Contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding information sheets included in Section 4 (Bidding Forms).
- 17.2 Domestic Bidders, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility in accordance with ITB 35.
- 18. Period of Validity of Bids**
- 18.1 Bids shall remain valid for the period specified in the BDS after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as nonresponsive.
- 18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 19, it shall also be extended 28 days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its Bid.
- 19. Bid Security/Bid-Securing Declaration**
- 19.1 Unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, in original form, either a Bid-Securing Declaration or a bid security as specified in the BDS. In the case of a bid security, the amount and currency shall be as specified in the BDS.
- 19.2 If a Bid-Securing Declaration is required pursuant to ITB 19.1, it shall use the form included in Section 4 (Bidding Forms). The Employer will declare a Bidder ineligible to be awarded a Contract for a specified period of time, as indicated in the BDS, if the Bid-Securing Declaration is executed.
- 19.3 If a bid security is specified pursuant to ITB 19.1, the bid security shall be, at the Bidder's option, in any of the following forms:
- (a) an unconditional bank guarantee,
 - (b) an irrevocable letter of credit, or
 - (c) a cashier's or certified check,
- all from a reputable bank from an eligible country as described in Section 5 (Eligible Countries). In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included

in Section 4 (Bidding Forms) or another form acceptable to the Employer. The form must include the complete name of the Bidder. The bid security shall be valid for 28 days beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 18.2.

- 19.4 Unless otherwise specified in the BDS, any Bid not accompanied by a substantially compliant bid security or Bid-Securing Declaration, if one is required in accordance with ITB 19.1, shall be rejected by the Employer as nonresponsive.
- 19.5 If a bid security is specified pursuant to ITB 19.1, the bid security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's furnishing of the performance security pursuant to ITB 42.
- 19.6 If a bid security is specified pursuant to ITB 19.1, the bid security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required performance security.
- 19.7 The bid security may be forfeited or the Bid-Securing Declaration executed
 - (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid, except as provided in ITB 18.2; or
 - (b) if the successful Bidder fails to
 - (i) sign the Contract in accordance with ITB 41;
 - (ii) furnish a performance security in accordance with ITB 42;
 - (iii) accept arithmetical corrections in accordance with ITB 33; or
 - (iv) furnish a domestic preference security, if applicable, in accordance with ITB 42.
- 19.8 The bid security or the Bid-Securing Declaration of a Joint Venture shall be in the name of the Joint Venture that submits the Bid. If the Joint Venture has not been legally constituted at the time of bidding, the bid security or the Bid-Securing Declaration shall be in the names of all future partners as named in the letter of intent mentioned in ITB 4.1.

20. Format and Signing of Bid

- 20.1 The Bidder shall prepare one original set of the Technical Bid and one original of the Price Bid comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - PRICE BID." Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE." In the event of any discrepancy between the original and the copies, the original shall prevail.
- 20.2 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the Bid.

The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid, except for unamended printed literature, shall be signed or initialed by the person signing the bid. If a Bidder submits a deficient authorization, the Bid shall not be rejected in the first instance. The Employer shall request the Bidder to submit an acceptable authorization within the number of days as specified in the BDS. Failure to provide an acceptable authorization within the prescribed period of receiving such a request shall cause the rejection of the Bid.

- 20.3 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Submission and Opening of Bids

21. Sealing and Marking of Bids

21.1 Bidders may submit their Bids as specified in the BDS. Procedure for submission, sealing and marking as follows:

(a) Bidders submitting Bids by mail or by hand shall enclose the original of the Technical Bid, the original of the Price Bid, and each copy of the Technical Bid and each copy of the Price Bid, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL - TECHNICAL BID," "ORIGINAL - PRICE BID," and "COPY NO... - TECHNICAL BID," and "COPY NO.... - PRICE BID." These envelopes, the first containing the originals and the others containing copies, shall then be enclosed in one single envelope per set. If permitted in accordance with ITB 13, alternative Bids shall be similarly sealed, marked and included in the sets. The rest of the procedure shall be in accordance with ITB 21.2 and ITB 21.3.

(b) Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified in the BDS.

21.2 The inner and outer envelopes shall

- (a) bear the name and address of the Bidder;
- (b) be addressed to the Employer as provided in BDS 22.1; and
- (c) bear the specific identification of this bidding process indicated in the BDS 1.1.

21.3 The outer envelopes and the inner envelopes containing the Technical Bid shall bear a warning not to open before the time and date for the opening of Technical Bid, in accordance with ITB 25.1.

21.4 The inner envelopes containing the Price Bid shall bear a warning not to open until advised by the Employer in accordance with ITB 25.7.

21.5 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

- 22. Deadline for Submission of Bids**
- 22.1 Bids must be received by the Employer at the address and no later than the date and time indicated in the BDS.
- 22.2 The Employer may, at its discretion, extend the deadline for the submission of Bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 23. Late Bids**
- 23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.
- 24. Withdrawal, Substitution, and Modification of Bids**
- 24.1 A Bidder may withdraw, substitute, or modify its Bid – Technical or Price – after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 20.2, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be
- (a) prepared and submitted in accordance with ITB 20 and ITB 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION;” and
- (b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 22.
- 24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.
- 24.3 No Bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of Bids and the expiration of the period of bid validity specified by the Bidder on the Letters of Technical Bid and Price Bid or any extension thereof.
- 25. Bid Opening**
- 25.1 The Employer shall open the Technical Bids in public at the address, on the date, and time specified in the BDS in the presence of Bidders’ designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 21.1, shall be as specified in the BDS. The Price Bids will remain unopened and will be held in custody of the Employer until the specified time of their opening. If the Technical Bid and Price Bid are submitted together in one envelope, the Employer may reject the entire Bid. Alternatively, the Price Bid may be immediately resealed for later evaluation.
- 25.2 First, envelopes marked “WITHDRAWAL” shall be opened and read out and the envelope with the corresponding Bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening.

- 25.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Technical Bid and/or Substitution Price Bid shall be exchanged for the corresponding envelopes being substituted, which are to be returned to the Bidder unopened. Only the Substitution Technical Bid, if any, shall be opened, read out, and recorded. Substitution Price Bid will remain unopened in accordance with ITB 25.1. No envelope shall be substituted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.
- 25.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Bid and/or Price Bid shall be modified unless the corresponding modification notice contains a valid authorization to request the modification and is read out and recorded at the opening of Technical Bids. Only the Technical Bids, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Price Bids, both Original and Modification, will remain unopened in accordance with ITB 25.1.
- 25.5 All other envelopes holding the Technical Bids shall be opened one at a time, and the following read out and recorded:
- (a) the name of the Bidder;
 - (b) whether there is a modification or substitution;
 - (c) the presence of a bid security or a Bid-Securing Declaration, if required; and
 - (d) any other details as the Employer may consider appropriate.
- Only Technical Bids and alternative Technical Bids read out and recorded at bid opening shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Technical Bid are to be initialed by at least three representatives of the Employer attending the bid opening. No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with ITB 23.1.
- 25.6 The Employer shall prepare a record of the opening of Technical Bids that shall include, as a minimum, the name of the Bidder and whether there is a withdrawal, substitution, or modification; alternative proposals; and the presence or absence of a bid security or a Bid-Securing Declaration, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.
- 25.7 At the end of the evaluation of the Technical Bids, the Employer will invite bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids. The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice for the opening of Price Bids.

- 25.8 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Document and return their Price Bids unopened.
- 25.9 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids, in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.
- 25.10 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:
- (a) the name of the Bidder;
 - (b) whether there is a modification or substitution;
 - (c) the Bid Prices, including any discounts and alternative offers; and
 - (d) any other details as the Employer may consider appropriate.
- Only Price Bids, discounts, and alternative offers read out and recorded during the opening of Price Bids shall be considered for evaluation. Unless otherwise specified in the BDS, all pages of the Letter of Price Bid and Schedules are to be initialed by at least three representatives of the Employer attending the bid opening. No Bid shall be rejected at the opening of Price Bids.
- 25.11 The Employer shall prepare a record of the opening of Price Bids that shall include, as a minimum, the name of the Bidder, the Bid Price (per lot if applicable), any discounts, and alternative offers. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders who submitted Bids on time, and posted online when electronic bidding is permitted.

E. Evaluation and Comparison of Bids

26. Confidentiality

- 26.1 Information relating to the examination, evaluation, comparison, and post qualification of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to all Bidders.
- 26.2 Any attempt by a Bidder to influence the Employer in the evaluation of the Bids or Contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB 26.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it may do so in writing.

27. Clarification of Bids

- 27.1 To assist in the examination, evaluation, and comparison of the Technical and Price Bids, the Employer may, at its discretion, ask any

Bidder for a clarification of its Bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the substance of the Technical Bid or prices in the Price Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Price Bids, in accordance with ITB 33.

27.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.

28. Deviations, Reservations, and Omissions

28.1 During the evaluation of bids, the following definitions apply:

- (a) "Deviation" is a departure from the requirements specified in the Bidding Document;
- (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document; and
- (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Document.

29. Examination of Technical Bids

29.1 The Employer shall examine the Technical Bid to confirm that all documents and technical documentation requested in ITB 11.2 have been provided, and to determine the completeness of each document submitted.

29.2 The Employer shall confirm that the following documents and information have been provided in the Technical Bid. If any of these documents or information is missing, the offer shall be rejected.

- (a) Letter of Technical Bid;
- (b) written confirmation of authorization to commit the Bidder;
- (c) Bid Security or Bid-Securing Declaration, if applicable; and
- (d) Technical Proposal in accordance with ITB 16.

30. Responsiveness of Technical Bid

30.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB11.

30.2 A substantially responsive Technical Bid is one that meets the requirements of the Bidding Document without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that,

- (a) if accepted, would:
 - (i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or
 - (ii) limit in any substantial way, inconsistent with the Bidding Document, the Employer's rights or the Bidder's obligations under the proposed Contract; or
- (b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

- 30.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, Technical Proposal, in particular, to confirm that all requirements of Section 6 (Employer's Requirements) have been met without any material deviation, reservation, or omission.
- 30.4 If a Bid is not substantially responsive to the requirements of the Bidding Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
- 31. Nonmaterial Nonconformities**
- 31.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid that do not constitute a material deviation, reservation, or omission.
- 31.2 Provided that a Technical Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the Price Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 31.3 Provided that a Technical Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section 3 (Evaluation and Qualification Criteria).
- 32. Qualification of the Bidder**
- 32.1 The Employer shall determine to its satisfaction during the evaluation of Technical Bids whether Bidders meet the qualifying criteria specified in Section 3 (Evaluation and Qualification Criteria).
- 32.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17.1.
- 32.3 An affirmative determination shall be a prerequisite for the opening and evaluation of a Bidder's Price Bid. A negative determination shall result into the disqualification of the Bid, in which event the Employer shall return the unopened Price Bid to the Bidder.
- 33. Correction of Arithmetical Errors**
- 33.1 during the evaluation of Price Bids, the Employer shall correct arithmetical errors on the following basis:
- (a) Only for unit price contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected.
- (b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total

shall be corrected.

(c) If there is a discrepancy between the bid price in the Summary of Bill of Quantities and the bid amount in item (c) of the Letter of Price Bid, the bid price in the Summary of Bill of Quantities will prevail and the bid amount in item (c) of the Letter of Price Bid will be corrected.

(d) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a), (b) and (c) above.

33.2 If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its Bid shall be disqualified and its bid security may be forfeited or its Bid-Securing Declaration executed.

34. Conversion to Single Currency

34.1 For evaluation and comparison purposes, the currency (ies) of the Bid shall be converted into a single currency as specified in the BDS.

35. Margin of Preference

35.1 Unless otherwise specified in the BDS, a margin of preference shall not apply.

36. Evaluation of Price Bids

36.1 The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

36.2 To evaluate the Price Bid, the Employer shall consider the following:

- (a) the bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities for admeasurement contracts, or Schedule of Prices for lump sum contracts, but including Day work items, where priced competitively;
- (b) price adjustment for correction of arithmetic errors in accordance with ITB 33.1;
- (c) price adjustment due to discounts offered in accordance with ITB 14.4;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 34;
- (e) adjustment for nonconformities in accordance with ITB 31.3; and
- (f) Application of all the evaluation factors indicated in Section 3 (Evaluation and Qualification Criteria).

36.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.

36.4 If this Bidding Document allows Bidders to quote separate prices for different contracts, and to award multiple contracts to a single Bidder, the methodology to determine the lowest evaluated price of the contract combinations, including any discounts offered in the Letter of Price Bid, is specified in Section 3 (Evaluation and Qualification

Criteria).

36.5 If the Bid for an admeasurement contract, which results in the lowest Evaluated Bid Price, is seriously unbalanced, front loaded or substantially below updated estimates in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

37. Comparison of Bids

37.1 The Employer shall compare all substantially responsive Bids to determine the lowest evaluated Bid, in accordance with ITB 36.2.

38. Employer's Right to Accept Any Bid, and to Reject Any or All Bids

38.1 The Employer reserves the right to accept or reject any Bid, and to annul the bidding process and reject all Bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

F. Award of Contract

39. Award Criteria

39.1 The Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated Bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.

40. Notification of Award

40.1 Prior to the expiration of the period of bid validity, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted.

40.2 At the same time, the Employer shall also notify all other Bidders of the results of the bidding. The Employer will publish in an English language newspaper or well-known freely accessible website the results identifying the bid and lot numbers and the following information: (i) name of each Bidder who submitted a Bid; (ii) bid prices as read out at bid opening; (iii) name and evaluated prices of each Bid that was evaluated; (iv) name of bidders whose bids were rejected and the reasons for their rejection; and (v) name of the winning Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded. After publication of the award, unsuccessful Bidders may request in writing to the Employer for a debriefing seeking explanations on the grounds on which their Bids were not selected. The Employer shall promptly respond in writing to any unsuccessful Bidder who, after publication of contract award, requests a debriefing.

40.3 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

41. Signing of Contract

41.1 Promptly after notification, the Employer shall send the successful Bidder the Contract Agreement.

41.2 Within 28 days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.

42. Performance Security

42.1 Within 28 days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security in accordance with the Conditions of Contract, subject to ITB 36.5, using for that purpose the Performance Security Form included in Section 9 (Contract Forms), or another form acceptable to the Employer.

42.2 Failure of the successful Bidder to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the bid security or execution of the Bid-Securing Declaration. In that event the Employer may award the Contract to the next lowest evaluated Bidder whose offer is substantially responsive and is determined by the Employer to be qualified to perform the Contract satisfactorily.

42.3 The above provision shall also apply to the furnishing of a domestic preference security, if so required.



Section 2 - Bid Data Sheet

A. General

ITB 1.1	The number of the Invitation for Bids (IFB) is : NCB-01
ITB 1.1	The Employer is: Water Resources and Irrigation Development Division Office (WRIDD), Makwanpur, Bagamati Province
ITB 1.1	The name of the bidding process is: Single Stage – Two Envelope The identification number of the bidding process is: ISIP/WRIDD/Makwanpur/081-82/NCB-01 The number and identification of lots comprising this bidding process is: None
ITB 2.1	The Borrower is: Nepal
ITB 2.1	The name of the Project is: ISIP

B. Contents of Bidding Documents

ITB 7.1	For clarification purposes only, the Employer's address is: Attention: Division Chief WRIDD- Makwanpur Street address: Hetauda-5, Makwanpur Country: Nepal Telephone: +977 057 522377 Fax: E-mail address: hetaudairrigation0@gmail.com Requests for clarification should be received by the Employer no later than: 7 days before the last date of submission of bid
ITB 7.4	A Pre-Bid meeting Shall take place at the following Date, Time and Place. Date: June 18 2025 Time: 13:00 hours, NST Place: Meeting Hall, WRIDD- Makwanpur A site visit conducted by the Employer shall not be organized.

C. Preparation of Bids

ITB 10.1	The language of the Bid is: English
ITB 11.2 (g)	The Bidder shall submit with its Technical Bid the following additional documents: None
ITB 11.3 (b)	In accordance with ITB 12 and ITB 14, the following schedules shall be submitted with the bid, including the priced Bill of Quantities for admeasurement contracts and Activity Schedule for lump sum contracts: None
ITB 11.3 (d)	The Bidder shall submit with its Price Bid the following additional documents: None
ITB 12.1	The units and rates in figures entered into the Bill of Quantities and Day work Schedule should be typewritten or if written by hand, must be in print form. Bill of Quantities and Day work Schedule not presented accordingly may be considered nonresponsive.
ITB 13.1	Alternative bids shall not be permitted.
ITB 13.2	Alternative times for completion shall not be permitted.
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: Not Applicable
ITB 14.5	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.
ITB 15.1	The prices shall be quoted by the bidder and shall be paid in: Nepalese Rupees (NPR)
ITB 18.1	The bid validity period shall be 90 days.
ITB 19.1	The Bidder shall furnish a bid security in the amount of NRs. 0.27 million The Bidder shall upload scanned copy of bid security at the time of electronic submission of the bid. If a bidder does not submit scanned copy of bid security at the time of bid submission, its bid shall be rejected by the Employer as nonresponsive
ITB 19.2	The ineligibility period will be: Not Applicable.
ITB 19.4	Any bid not accompanied by an irrevocable and callable bid security shall be rejected by the Employer as nonresponsive. However, if a bidder submits a bid security that deviates in form, amount and/or period of validity, the Employer shall request the Bidder to submit a compliant bid security within 7 days of receiving such a request. Failure to provide a compliant bid security within the prescribed



	period of receiving such a request shall cause the rejection of the Bid.
ITB 20.1	In addition to the original Bid, the number of copies is: NA
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: An organizational document, board resolution or its equivalent, or power of attorney specifying the representative's authority to sign the Bid on behalf of the Bidder. If the Bidder is an intended or an existing joint venture, the power of attorney should be signed by all partners and specify the authority of the named representative of the joint venture to sign on behalf of the intended or existing joint venture. If the joint venture has not yet been formed, also include evidence from all proposed joint venture partners of their intent to enter into a joint venture in the event of a contract award.
ITB 20.2	The Bidder shall submit an acceptable authorization within 7 days.

D. Submission and Opening of Bids

ITB 21.1	Bidders shall submit their Bids electronically. Paper submission of Bid is not permitted. Only electronically submitted bids will be considered for evaluation.														
ITB 21.1 (a)	NA														
ITB 21.1 (b)	Electronic bidding submission procedure shall be: i. The bidder is required to register in the e-GP system https://www.bolpatra.gov.np/egp following the procedure specified in e-GP guideline. ii. Interested bidders may either purchase the bidding document from the Employer's office as specified in the Invitation for Bid (IFB) or bidders may download the IFB and bidding document from e-GP system. iii. The registered bidders need to maintain their profile data required during preparation of bids. iv. In order to submit their bids the cost of the bidding document can be deposited as specified in IFB. In addition, electronic scanned copy (.pdf format) of the bank deposit voucher/cash receipt should also be submitted along with the technical bid. <table><tr><td>Name of Bank</td><td>Name of Office</td><td>Revenue Account No.</td><td>Office Code</td><td>Revenue Heading No.</td></tr><tr><td>Rastriya Banijya Bank Ltd.</td><td>Water Resources and Irrigation Development Division, Makwanpur</td><td>1000100200010000</td><td>3130132013</td><td>14229</td></tr></table> v. The bidder can prepare their technical and price bids using data and documents maintained in bidder's profile and forms/format provided in bidding document by Employer. The bidder may submit bids as a single entity or as a joint					Name of Bank	Name of Office	Revenue Account No.	Office Code	Revenue Heading No.	Rastriya Banijya Bank Ltd.	Water Resources and Irrigation Development Division, Makwanpur	1000100200010000	3130132013	14229
Name of Bank	Name of Office	Revenue Account No.	Office Code	Revenue Heading No.											
Rastriya Banijya Bank Ltd.	Water Resources and Irrigation Development Division, Makwanpur	1000100200010000	3130132013	14229											

- venture. The bidder submitting bid in joint venture shall have to upload joint venture agreement along with partner(s) Bolpatra ID provided during bidder's registration.
- vi. Bidders (all partners in case of JV) should update their profile data and documents required during preparation and submission of their technical bids.
- vii. In case of bid submission in JV, the consent of the partners shall be obtained through the confirmation link sent to the registered email address and the partners shall have to acknowledge their confirmation.

The required forms and documents shall be part of technical bids.

No.	Document	Requirement	Remarks
1.	Letter of Technical Bid	Mandatory	PDF
2.	Bid Security/Bank Guarantee	Mandatory	PDF
3.	Company registration Certificate	Mandatory	PDF
4.	VAT registration Certificate	Mandatory (for domestic bidders only)	PDF
5.	Business Registration Certificate	Mandatory	PDF
6.	Tax Clearance Certificate/Tax return submission evidence/evidence of time extension	Mandatory (for domestic bidders only)	PDF
7.	Power of Attorney of Bid signatory	Mandatory	PDF
8.	Bank Voucher for cost of bid document	Mandatory	PDF
9.	Joint venture agreement	Mandatory in case of JV Bids Only	PDF
10.	Qualification Documents	Mandatory	Using profile data(financial details, contract details etc.) and Technical Proposal
11.	Additional documents] specified in ITB 11.2 (h)	Mandatory (If any)	PDF

The required forms and documents shall be part of price bids.

No.	Document	Requirement	Remarks
1.	Letter of Price Bid	Mandatory	PDF
2.	Completed Bill of Quantities (BoQ)	Mandatory	Online Forms
3.	Price Adjustment Table	Mandatory (If applicable)	Online Forms



		4. Additional Documents specified in ITB 11.3 (d)	Mandatory (If any)	PDF
		<u>Note:</u> a) The documents specified as “Mandatory” should be included in e-submission and non-submission of the documents shall be considered as non-responsive bid. b) Bidders (all partners in case of JV) should verify/update their profile documents as appropriate for the specific bid before submitting their bid electronically. viii. After providing all the details and documents, two separate bid response documents i.e technical bids and price bids will be generated from the system. Bidders are advised to download and verify the response documents prior to bid submission. ix. For verifying the authentic user, the system will send one time password (OTP) in the registered e-mail address of the bidder. System will validate the OTP and allow bidder to submit their bid. x. Electronically submitted bids can be modified and/or withdrawn through system. The bidder may modify their bids multiple times online within bid submission date and time specified in e-GP system. Once a Bid is withdrawn, bidder won't be able to submit another bid response for the same bid. xi. The Bidder / Bid shall meet the following requirements and conditions for e-submission of bids; aa) The e-submitted bids must be readable through PDF reader. bb) The facility for submission of bid electronically through e-submission is to promote transparency, non-discrimination, equality of access, and open competition in the bidding process. The Bidders are fully responsible to use the e- submission facility properly in e-GP system as per specified procedures and in no case the Employer shall be held liable for Bidder's inability to use this facility. cc) When a bidder submits electronic bid through the PPMO e-GP portal, it is assumed that the bidder has prepared the bid by studying and examining the complete set of the Bidding documents including specifications, drawings and conditions of contract.		
ITB 22.1		For <u>bid submission purposes</u> only, the Employer's address is: https://www.bolpatra.gov.np/eqp Attention: Division Chief Street address: Hetauda-5, Makwanpur		

	The deadline for bid submission is: Date: July 3, 2025 Time: 12:00 hours, NST i. The standard time for e-submission is Nepal Standard Time as set out in the server of PPMO ii. The e-procurement system will not accept any submission of bid after the deadline of submission of bid specified above.
ITB 24.1	For electronically submitted bids, the bids may be withdrawn, substituted or modified electronically only and shall be done no later than the deadline prescribed for submission of bids, in accordance with ITB 22. Paper submission will not be valid.
ITB 24.2	For electronically submitted bids which are requested to be withdrawn, bids will not be returned to the Bidders.
ITB 25.1	The opening of the Technical Bid shall take place at: Street address Date: July 3, 2025 Time: 13:00 hours, NST
ITB 25.1	Electronic bid opening procedure shall be as follows: For electronically submitted bids in accordance with ITB 21.1 (b), the specific bid opening procedure shall be: i. The employer may download the technical bids only on the technical bid opening date and time and thereafter. Simultaneous login of two members of the opening committee is required for bid opening. ii. The Employer shall conduct the opening of technical bid at the address on the same date and time as specified in bidding document in the presence of Bidders' representatives who choose to attend iii. The e-GP does not allow to open the bids marked by "WITHDRAWAL". iv. Electronic Bids shall be opened one by one and read out as per ITB 25. The e-submitted technical bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files shall be considered incomplete.
ITB 25.5	The Letter of Technical Bid shall be initialed by at least three representatives of the Employer attending the Bid opening.
ITB 25.8	For electronically submitted bids, the Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially nonresponsive to the requirements of the Bidding Document and will leave their Price Bids unopened in the system.
ITB 25.9	For electronically submitted bids in accordance with ITB 21.1(b), the specific price bid opening procedures shall be: i. The e-GP system will send the email notification for price bids opening to all bidder(s) who have submitted substantially responsive

	technical bids and are qualified for opening of price bids. ii. The Employer shall conduct the opening of Price Bids in the presence of Bidders' representatives who choose to attend at the address, on the date, and time specified by the Employer. Simultaneous login of two members of the opening committee is required for price bid opening. iii. The Employer shall download the e-submitted Price Bid files. The e-procurement system allows the Employer to download the e-submitted price bid files (report) only after price bid opening date and time after login simultaneously by at least two members of the Bid opening committee. iv. Electronic Bids shall be opened one by one and read out. The e-submitted price bids must be readable through open standards interfaces. Unreadable and or partially submitted bid files shall be considered incomplete.
ITB 25.10	The Letter of Price Bid and Schedules shall be initialed by at least three representatives of the Employer attending the Bid opening.

E. Evaluation and Comparison of Bids

ITB 34.1	The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: Not Applicable
ITB 35.1	A margin of preference shall not apply.

Section 3 - Evaluation and Qualification Criteria

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1. Evaluation

In addition to the criteria listed in ITB 36.2 (a) – (e), other relevant factors are as follows:

1.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section 6 (Employer's Requirements).

Non-compliance with equipment and personnel requirements described in Section 6 (Employer's Requirements) shall not normally be a ground for bid rejection, and such noncompliance will be subject to clarification during bid evaluation and rectification prior to contract award.

1.2 Completion Time

An alternative Completion Time, if permitted under ITB 13.2, will be evaluated as follows:

1.3 Technical Alternatives

Technical alternatives, if permitted under ITB 13.4, will be evaluated as follows:

1.4 Quantifiable Nonconformities and Omissions

Subject to ITB 14.2 and ITB 36.2, the evaluated cost of quantifiable nonconformities including omissions, is determined as follows:

Pursuant to ITB 31.3, the cost of all quantifiable nonmaterial nonconformities shall be evaluated, including omissions in Day work where competitively priced but excluding omission of prices in the Bill of Quantities. The Employer will make its own assessment of the cost of any nonmaterial nonconformities and omissions for the purpose of ensuring fair comparison of bids.

1.5 Margin of Preference : Not Applicable

1.6 Multiple Contracts : Not Applicable

2. Qualification

It is the legal entity or entities comprising the Bidder, and not the Bidder's parent companies, subsidiaries, or affiliates, that must satisfy the qualification criteria described below.

2.1 Eligibility

Criteria	Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture		Submission Requirements
		All Partners Combined	Each Partner	

2.1.1 Nationality

Nationality in accordance with ITB Subclause 4.2.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI -1; ELI -2 with attachments
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2.1.2 Conflict of Interest

No conflicts of interest in accordance with ITB Subclause 4.3.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
--	-----------------------	-----------------------	-----------------------	----------------	-------------------------

2.1.3 Eligibility

Not having been declared ineligible by Donor Agent or respective, as described in ITB Subclause 4.4.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
--	-----------------------	-----------------------	-----------------------	----------------	-------------------------

2.1.4 Government-Owned Enterprise

Bidder required to meet conditions of ITB Subclause 4.5.	must meet requirement	must meet requirement	must meet requirement	not applicable	Forms ELI -1, ELI - 2 with attachments
--	-----------------------	-----------------------	-----------------------	----------------	--

2.1.5 United Nations Eligibility

Not having been excluded by an act of compliance with a UN Security Council resolution in accordance with ITB Subclause 4.7.	must meet requirement	must meet requirement	must meet requirement	not applicable	Letter of Technical Bid
--	-----------------------	-----------------------	-----------------------	----------------	-------------------------

2.2 Pending Litigation

Pending litigation and arbitration criterion shall not apply

2.3 Financial Situation

2.3.1 Historical Financial Performance

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Submission of audited financial statements or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last Five (5) years to demonstrate the current soundness of the Bidder's financial position. As a minimum, the Bidder's net worth for the last year, calculated as the difference between total assets and total liabilities should be positive.	must meet requirement	not applicable	must meet requirement	not applicable	Form FIN - 1 with attachments

2.3.2 Average Annual Construction Turnover

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Minimum average annual construction turnover of NRs 17.45 million ,calculated as total certified payments received for contracts in progress or completed, of the Best Three (3) years, within the last Five (5) years.	must meet requirement	must meet requirement	must meet Forty Percent (40%) of the requirement	must meet Fifty Percent (50%) of the requirement	Form FIN - 2

Note: Nepal Rastra Bank consumer price index will be applied to calculate the present value of Annual Construction Turnover

2.3.3 Financial Resources

If the bid evaluation process and the decision for the award of the Contract takes more than one (1) year from the date of bid submission, Bidders shall be asked to resubmit their current contract commitments and latest information on financial resources supported by latest audited accounts/audited financial statements, or if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, and the Bidders' financial capacity shall be reassessed on this basis.

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
The Bidder must demonstrate that it has the financial resources to meet					
(a) its current contract commitments, as defined in FIN-4 (Total Financial Requirements for Current Contract Commitments), plus	must meet requirement	not applicable	must meet requirement for its own contractual commitments	not applicable	Form FIN - 4
(b) the requirements for the Subject Contract of NRs 2.19 million	must meet requirement	must meet requirement	must meet Forty Percent (40%) of the Requirement (A)	must meet Fifty Percent (50%) of the Requirement (B)	Form FIN – 3 and Form FIN - 4

2.4 Construction Experience

2.4.1 Contracts of Similar Size and Nature

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
Participation in at least one contract that has been successfully or substantially completed within the last Five (5) years and that is similar to the proposed works, where the value of the Bidder's participation exceeds NRs. 10.47 million .The similarity of the Bidder's participation shall be based on the physical size, nature of works, complexity, methods, technology or other characteristics as described in Section 6 (Employer's Requirements). Similar nature of works are: Construction of Irrigation system, canals and associated structures like super passage, Aqueduct, Drop Structures etc and other hydraulic structures.	must meet requirement	not applicable	One successfully or substantially completed contract of similar nature where such partner's value of participation exceeds NRs 4.19 million	must meet requirement	Form EXP -1

Note: Nepal Rastra Bank consumer price index will be applied to calculate the present value of Annual Construction Turnover

2.4.2 Construction Experience in Key Activities: NA

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Letter of Technical Bid

Date:

NCB No.: **ISIP/WRIDD/Makwanpur/081-82/NCB-01**

Invitation for Bid No.: NCB-01

To: Water Resources and Irrigation Development Division (WRIDD) Office, Makwanpur

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8.
- (b) We offer to execute in conformity with the Bidding Documents the following Works: _____

- (c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of **90 days** from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (d) Our firm, including any Subcontractors or Suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB 4.2.
- (e) We, including any Subcontractors or Suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3.
- (f) We are not participating, as a Bidder in more than one Bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers submitted in accordance with ITB 13.
- (g) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible by Kuwait Fund / KFAED, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council.
- (h) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB4.5].¹

¹ Use one of the two options as appropriate.

- (i) We agree to permit **Kuwait Fund / KFAED/ ISIP** or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by **Kuwait Fund / KFAED/ ISIP**.
- (j) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section 6 (Employer's Requirements) and our technical proposal, or as otherwise agreed with the Employer.

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

Letter of Price Bid

Date:

ICB/NCB No.: **ISIP/WRIDD/Makwanpur/081-82/NCB-01**

Invitation for Bid No.: NCB-01

To: Water Resources and Irrigation Development Division (WRIDD) Office, Makwanpur

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) 8.
- (b) We offer to execute in conformity with the Bidding Documents the following Works: _____

- (c) The total price of our Bid, excluding any discounts offered in item (d) below is-----
-----or, when left blank, is the Bid price indicated in the summary of Bill of Quantities (BOQ)¹
- (d) The discounts offered and the methodology for their application are as follows:

- (e) Our Bid shall be valid for a period of 90 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (f) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents.
- (g) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract: ²

Name of Recipient	Address	Reason	Amount
.....			
.....			

¹ The failure to specify the Total Price of the Bid in (c) above or the Bid Price in the summary of Bill of Quantities (BOQ) shall be ground for declaring the Bid nonresponsive.

² If none has been paid or is to be paid, indicate "None".

- (h) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.
- (i) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (j) We agree to permit KFAED or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by KFAED.

Name

In the capacity of

Signed

Duly authorized to sign the Bid for and on behalf of

Date

Bid Security

Bank Guarantee

Bank's name, and address of issuing branch or office¹

Beneficiary: *Name and address of employer*

Date:

Bid Security No.:

We have been informed that *name of the bidder* (hereinafter called "the Bidder") has submitted to you its bid dated (hereinafter called "the Bid") for the execution of *name of contract* under Invitation for Bids No. ("the IFB").

Furthermore, we understand that, according to your conditions, bids must be supported by a bid guarantee.

At the request of the Bidder, we *name of bank* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *amount in figures* (..... *amount in words*) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Bidder is in breach of its obligation(s) under the bid conditions, because the Bidder

- (a) has withdrawn its Bid during the period of bid validity specified by the Bidder in the Letter of Technical Bid and Letter of Price Bid; or
- (b) does not accept the correction of errors in accordance with the Instructions to Bidders (hereinafter "the ITB"); or
- (c) having been notified of the acceptance of its Bid by the Employer during the period of bid validity, (i) fails or refuses to execute the Contract Agreement, or (ii) fails or refuses to furnish the Performance Security, in accordance with the ITB, or (iii) fails or refuses to furnish the domestic preference security, if required.

This guarantee will expire (a) if the Bidder is the successful Bidder, upon our receipt of copies of the Contract Agreement signed by the Bidder and the Performance Security issued to you upon the instruction of the Bidder; and (b) if the Bidder is not the successful Bidder, upon the earlier of (i) our receipt of a copy your notification to the Bidder of the name of the successful Bidder, or (ii) 28 days after the expiration of the Bidder's bid.

Consequently, any demand for payment under this guarantee must be received by us at the office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.²

.....*Bank's seal and authorized signature(s)*

-- Note --

¹ All italicized text is for use in preparing this form and shall be deleted from the final document.

² Or 758 as applicable.

In case of a joint venture, the bid security must be in the name of all partners to the joint venture that submits the bid.

Technical Proposal

Personnel

Form PER – 1: Proposed Personnel

Bidder should provide the details of the proposed personnel and their experience record in the relevant Information Forms below for each candidate:

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name
etc.	Title of position*
	Name

-- Note --

**As listed in Section 6 (Employer's Requirements).*

Form PER – 2: Resume of Proposed Personnel

The Bidder shall provide all the information requested below. Use one form for each position.

Position		
Personnel information	Name	Date of birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager / personnel officer)
	Fax	E-mail
	Job title	Years with present employer

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company / Project / Position / Relevant Technical and Management Experience

Equipment

Form EQU: Equipment

The Bidder shall provide adequate information and details to demonstrate clearly that it has the capability to meet the equipment requirements indicated in Section 6 (Employer's Requirements), using the Forms below. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of Equipment		
Equipment Information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current Status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	

Omit the following information for equipment owned by the Bidder.

Owner	Name of owner	
	Address of owner	
	Telephone	Contact name and title
	Fax	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the project	

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Bidders Qualification

To establish its qualifications to perform the contract in accordance with Section 3 (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

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Form ELI - 1: Bidder's Information Sheet

Form ELI - 2: Joint Venture Information Sheet

Form LIT – 1: Pending Litigation and Arbitration

Form FIN - 1: Historical Financial Performance

Form FIN - 2: Average Annual Construction Turnover

Form FIN – 3: Availability of Financial Resources

Form FIN- 4: Financial Resources Requirement

Form FIN - 5: Compliance Check of Financial Resources (Criterion 2.3.3 of Section 3)

Form EXP – 1: Contracts of Similar Size and Nature

Form EXP - 2: Construction Experience in Key Activities

Schedules

Schedule of Payment Currencies

Table(s) of Adjustment Data

Form ELI - 1: Bidder's Information Sheet

Bidder's Information	
Bidder's legal name	
In case of Joint Venture, legal name of each partner	
Bidder's country of constitution	
Bidder's year of constitution	
Bidder's legal address in country of constitution	
Bidder's authorized representative (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following documents. ☐ 1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2. ☐ 2. Authorization to represent the firm or Joint Venture named above, in accordance with ITB 20.2. ☐ 3. In case of Joint Venture, letter of intent to form Joint Venture or Joint Venture agreement, in accordance with ITB 4.1. ☐ 4. In case of a government-owned enterprise, any additional documents not covered under 1 above required to comply with ITB 4.5.	

Form ELI - 2: Joint Venture Information Sheet

Each member of the Joint Venture and Specialist Subcontractor must fill out this form separately.

Joint Venture / Specialist Subcontractor Information	
Bidder's legal name	
Joint Venture Partner's or Specialist Subcontractor's legal name	
Joint Venture Partner's or Specialist Subcontractor's country of constitution	
Joint Venture Partner's or Specialist Subcontractor's year of constitution	
Joint Venture Partner's or Specialist Subcontractor's legal address in country of constitution	
Joint Venture Partner's or Specialist Subcontractor's authorized representative information (name, address, telephone numbers, fax numbers, e-mail address)	
Attached are copies of the following documents. ☐ 1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITB 4.1 and ITB 4.2. ☐ 2. Authorization to represent the firm named above, in accordance with ITB 20.2. ☐ 3. In the case of government-owned enterprise, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB 4.5.	

Specialist Subcontractor is a specialist enterprise engaged for highly specialized processes that cannot be provided by the main Contractor.

Form LIT – 1: Pending Litigation and Arbitration: Not Applicable

Each Bidder must fill out this form if so required under Criterion 2.2 of Section 3 (Evaluation and Qualification Criteria) to describe any pending litigation or arbitration formally commenced against it.

In case of joint ventures, each Joint Venture Partner must fill out this form separately, and provide the Joint Venture Partner name below:

Joint Venture Partner: _____

Pending Litigation and Arbitration			
Choose one of the following: ☐ No pending litigation and arbitration. ☐ Below is a description of all pending litigation and arbitration involving the Bidder (or each Joint Venture member if Bidder is a Joint Venture).			
Year	Matter in Dispute	Value of Pending Claim in NRs.	Value of Pending Claim as a Percentage of Net Worth

- Note -

This form shall only be included if Criterion 2.2 of Section 3 (Evaluation and Qualification Criteria) is applicable.

Form FIN - 1: Historical Financial Performance

Each Bidder must fill out this form.

In case of joint ventures, each Joint Venture Partner must fill out this form separately, and provide the Joint Venture Partner name below:

Joint Venture Partner: _____

Financial Data for Previous ____ Years [US\$ Equivalent]		
Year 1:	Year 2:	Year ____:

Information from Balance Sheet

Total Assets (TA)			
Total Liabilities (TL)			
Net Worth = TA – TL			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital = CA - CL			

Most Recent Working Capital		To be obtained for most recent year and carried forward to FIN-3 Line 1; in case of Joint Ventures, to the corresponding Joint Venture Partner's FIN-3.
-----------------------------	--	---

Information from Income Statement

Total Revenues			
Profits Before Taxes			
Profits After Taxes			

- ☐ Attached are copies of financial statements (balance sheets including all related notes, and income statements) for the last _Five (5)____ years, as indicated above, complying with the following conditions.
- Unless otherwise required by Section 3 of the Bidding Document, all such documents reflect the financial situation of legal entity or entities comprising the Bidder and not the Bidder's parent companies, subsidiaries, or affiliates.
 - Historical financial statements must be audited by a certified accountant.
 - Historical financial statements must be complete, including all notes to the financial statements.
 - Historical financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

Form FIN - 2: Average Annual Construction Turnover

Each Bidder must fill out this form.

The information supplied should be the Annual Turnover of the Bidder 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 US Dollars at the specified exchange rate.

In case of joint ventures, each Joint Venture Partner must fill out this form separately, and provide the Joint Venture Partner name below:

Joint Venture Partner: _____

Annual Turnover Data for the Last ____ Years (Construction only)			
Year	Amount Currency	Exchange Rate	US\$ Equivalent
Average Annual Construction Turnover			

Form FIN – 3: Availability of Financial Resources

Bidder must demonstrate sufficient financial resources, usually comprising of Working Capital supplemented by credit line statements or overdraft facilities and others to meet the Bidder's financial requirements for

- (a) its current contract commitments, and
- (b) the subject contract.

In case of joint ventures, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner name below:

Joint Venture Partner: _____

Financial Resources		
No.	Source of financing	Amount (NRs.)
1	Working Capital (to be taken from FIN-1)	
2	Credit Line ^a	
3	Other Financial Resources	
	Total Available Financial Resources	

^a To be substantiated by a letter from the bank issuing the line of credit.

Form FIN- 4: Financial Resources Requirement

Bidders (or each Joint Venture partner) 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 for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

In case of joint ventures, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner name below:

Joint Venture Partner: _____

Current Contract Commitments						
No.	Name of Contract	Employer's Contact (Address, Tel, Fax)	Contract Completion Date	Outstanding Contract Value (X)	Remaining Contract Period in months (Y)	Monthly Financial Resources Requirement (X / Y)
1						
2						
3						
4						
Total Monthly Financial Requirements for Current Contract Commitments						NRS.

Form FIN - 5: Compliance Check of Financial Resources (Criterion 2.3.3 of Section 3)
Form FIN-5A: For Single Entities

For Single Entities:	Total Available Financial Resources from FIN-3 (C)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN-4 (D)	Available Financial Resources net of CCC (C-D)	$\geq$	Requirement ^a
_____	_____	_____	_____	$\geq$	100% of Requirement from Section 3 - 2.3.3(b)
(Name of Bidder)					

Form FIN-5B: For Joint Ventures

For Joint Ventures:	Total Available Financial Resources from FIN-3 (C)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN-4 (D)	Available Financial Resources net of CCC (C-D)	$\geq$	Requirement ^a
One Partner:					
_____	_____	_____	_____	$\geq$	B(%) of Requirement
(Name of Partner)					
Each (Other) Partner:					
_____	_____	_____	_____	$\geq$	A(%) of Requirement
(Name of Partner 1)					
_____	_____	_____	_____	$\geq$	A(%) of Requirement
(Name of Partner 2)					
_____	_____	_____	_____	$\geq$	A(%) of Requirement
(Name of Partner 3)					
All partners combined			$\Sigma (C-D)^b =$	$\geq$	100% of Requirement from Section 3 - 2.3.3(b)

Form FIN - 5 is made available for use by the bidder as a self-assessment tool, and by the employer as evaluation work sheet, to determine compliance with financial resources.

^a Requirement for the subject contract is defined in Criterion 2.3.3(b) of Section 3. Value A is the required percentage of the subject contract, which each partner must meet; and value B is the required percentage of the subject contract, which one partner must meet. A and B values are defined in Criterion 2.3.3 of Section 3 (Evaluation and Qualification Criteria).

^b $\Sigma (C - D)$ = sum of available financial resources net of current contract commitments (CCC) for all partners.

Form EXP – 1: Contracts of Similar Size and Nature

Fill up one (1) form per contract.

Contract of Similar Size and Nature		
Contract No of	Contract Identification	
Award Date		Completion Date
Total Contract Amount	US\$	
If partner in a Joint Venture or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's Name Address Telephone/Fax Number E-mail		
Description of the similarity in accordance with Criterion 2.4.1 of Section 3		
Construction of Irrigation system, canals and associated structures like super passage, Aqueduct, Drop Structures etc and other hydraulic structures.		

Form EXP - 2: Construction Experience in Key Activities:

Fill up one (1) form per contract.

Contract with Similar Key Activities		
Contract No of	Contract Identification	
Award Date		Completion Date
Total Contract Amount	US\$	
If partner in a Joint Venture or subcontractor, specify participation of total contract amount	Percent of Total	Amount
Employer's Name Address Telephone Number Fax Number E-mail		
Description of the key activities in accordance with Criterion 2.4.2 of Section 3		

Schedules

Schedule of Payment Currencies Not Applicable

Forinsert name of Section of the Works.....

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. In such a case, the Employer should prepare separate tables for each Section of the Works.

	A	B	C	D
Name of Payment Currency	Amount of Currency	Rate of Exchange to Local Currency	Local Currency Equivalent $C = A \times B$	Percentage of Net Bid Price (NBP) $\frac{100 \times C}{NBP}$
Local Currency		1.00		
Foreign Currency #1				
Foreign Currency #2				
Foreign Currency #3				
Net Bid Price				100.00
Provisional Sums Expressed in Local Currency		1.00		
BID PRICE				

-- Note --

The rates of exchange shall be the selling rates 28 days prior to the deadline for submission of bids published by the source specified in BDS 15.

Table(s) of Adjustment Data: Not Applicable

Table A - Local Currency

Index Code	Index Description	Source of Index *	Base Value and Date	Bidder's Local Currency Amount	Bidder's Proposed Weighting (coefficient)
	Nonadjustable	—	—	—	a: (by Employer) b: _____ c: _____ d: _____ e: _____
Total					1.00

Table B - Foreign Currency: Not Applicable

Name of Currency:

If the Bidder wishes to quote in more than one foreign currency, but in no case more than three, this table should be repeated for each foreign currency.

Index Code	Index Description	Source of Index	Base Value and Date	Bidder's Currency in Type/Amount	Equivalent in FC1	Bidder's Proposed Weighting (coefficient)
	Nonadjustable	—	—	—		a: (by Employer) b: _____ c: _____ d: _____ e: _____
Total						1.00

-- Note --

"Base Date" means the date 28 days prior to the deadline for submission of bids.

Tables of Adjustment Data shall only be included if prices are to be quoted as adjustable prices in accordance with ITB 14.5.

Bill of Quantities

[Admeasurement Contract]

[Attached with Financial Bid]

Bagmati Province Government
Ministry of Water Supply, Energy & Irrigation
Water Resources and Irrigation Development Division Office
Hetauda, Makwanpur

Bill of Quantity (BOQ)

Name of Project : Chauraha Dhol Khola Ratomate Irrigation Project

Contract ID: ISIP/WRIDD/Makwanpur/081-82/NCB-01

Name of Work : Construction of Side Intake, Canal & Canal Structures

Location : Manahari Rural Municipality-05, Makawanpur

S.N.	Description of work	Unit	Quantity	Rate		Amount	Remark
				In Figure	In word		
A	Civil construction works						
1	Earthwork in excavation of hard clay and soil mixed with moorum stone with disposal all complete as per instruction.	m3	284.57				
2	Earthwork in backfilling all complete as per instruction.	m3	2.18				
3	Stone Soling works in foundation and levelling all complete as per instruction.	m3	2.51				
4	Concreting of foundation, vertical faces, wall etc. in ratio of 1:2:4 (M15) including supplying of materials and haulage etc. all complete as per instruction.	m3	301.13				
5	P.C.C (1:3:6) works Concreting of foundation, vertical faces, wall etc. in ratio of 1:3:6 (M10) including supplying of materials and haulage etc. all complete as per instruction.	m3	55.82				
6	Wooden form work incl. supply & selection of material fixing , nailing according to drawing, placing seperators dismantaling forms and hauling upto 30m	m2	3791.89				

	distance all complete as per instruction.						
7	RRM in 1:4 works all complete as per instruction.	m3	4.14				
8	Cutting , Bending, placing in position as shown in the Drawing & binding of Reinforcement Bars for RCC works incl. haulage etc. all complete as per instruction.	kg	15879.17				
9	Supply and Weaving gabion box of medium coated 10 gauge SWG wire having rectangle mesh size of 10 cm x 10 cm with two way knots incl. transportation of wire, cutting, netting etc all complete as per instruction.	m2	383.39				
10	Supply and filling stones in gabion boxes all complete as per instruction.	m3	82.12				
11	Supply & Laying Geo.textile all complete as per instruction	m2	23.00				
12	Supply and installation of Trash Rack Works all complete as per instruction.	Job	1.00				
13	Supply and Installation of Irrigation Gate all complete as per instruction.	Job	2.00				
	Sub Total (A), NRs.						
B	General Items						
1	Insurance against work, plant and material	PS	1	17100.00		17,100.00	
2	Insurance against damage to equipment	PS	1	17100.00		17,100.00	
3	Insurance against loss and damage to property	PS	1	17100.00		17,100.00	
4	Insurance against personal injury and death	PS	1	17100.00		17,100.00	
5	Commision of	PS	1	5700.00			

Section 4 - Bidding Forms

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	Performance Bond					5,700.00	
6	Preparation of as built drawing	PS	1	5700.00		5,700.00	
7	Environmental Protection works	PS	1	114000.00		114,000.00	
	Sub Total (B), NRs						
	Total (A+B)						
	VAT @13% of A						
	Grand Total, NRs						

Section 5 - Eligible Countries

1.	AFG	Afghanistan	35.	FSM	Micronesia, Federal States of
2.	ARM	Armenia	36.	MON	Mongolia
3.	AUS	Australia	37.	MYA	Myanmar
4.	AUT	Austria	38.	NAU	Nauru, Republic of
5.	AZE	Azerbaijan	39.	NEP	Nepal
6.	BAN	Bangladesh	40.	NET	Netherlands
7.	BEL	Belgium	41.	NZL	New Zealand
8.	BHU	Bhutan	42.	NOR	Norway
9.	BRU	Brunei Darussalam	43.	PAK	Pakistan
10.	CAM	Cambodia	44.	PAL	Palau
11.	CAN	Canada	45.	PNG	Papua New Guinea
12.	PRC	China, People's Republic of	46.	PHI	Philippines
13.	COO	Cook Islands	47.	POR	Portugal
14.	DEN	Denmark	48.	SAM	Samoa
15.	FIJ	Fiji Islands, Republic of	49.	SIN	Singapore
16.	FIN	Finland	51.	SOL	Solomon Islands
17.	FRA	France	51.	SPA	Spain
18.	GEO	Georgia	52.	SRI	Sri Lanka
19.	GER	Germany	53.	SWE	Sweden
20.	HKG	Hong Kong, China	55.	SWI	Switzerland
21.	IND	India	55.	TAJ	Tajikistan
22.	INO	Indonesia	56.	TAP	Taipei, China
23.	IRE	Ireland	57.	THA	Thailand
24.	ITA	Italy	58.	TIM	Timor-Leste, Democratic Republic of
25.	JPN	Japan	58.	TON	Tonga
26.	KAZ	Kazakhstan	60.	TUR	Turkey
27.	KIR	Kiribati	61.	TKM	Turkmenistan
28.	KOR	Korea	62.	TUV	Tuvalu
29.	KGZ	Kyrgyz	63.	UKG	United Kingdom
30.	LAO	Lao People's Democratic Republic	64.	USA	United States of America
31.	LUX	Luxembourg	65.	UZB	Uzbekistan
32.	MAL	Malaysia	66.	VAN	Vanuatu
33.	MLD	Maldives	67.	VIE	Viet Nam
34.	RMI	Marshall Islands			

Section 6 –Employer’s Requirements

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Specifications

Section 6 - Work's Requirements

This Section contains the Technical Specifications, Detailed Design and Drawings, Subproject Implementation Plan, and Environmental Management Plan that describe the Works to be procured.

Technical Specifications

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SECTION 1 SUMMARY OF WORK

1.1 Project Description

- A. The works of this contract are described in the Drawings and Bill of Quantities of the Bid Documents.
- B. The accessibility of the Work Site is described in the Bid Documents.
- C. All the materials shall be supplied by the Contractor at his own cost, the approval of which will have to be obtained from the Employer.
- D. The project implementation will be carried with the assistance of WUA's construction committee. However all the instruction to the Contractor will be given through the Project Manager appointed by the Employer.

1.2 Rainfall and Climate

Climatic conditions in the Project area are dominated by monsoons. Average annual rainfall varies from 5mm to 720 mm. Over 80% of the total annual rainfall is concentrated from May to September. Mean temperatures vary depending on altitude and mean monthly temperatures range from 10-21 degree Celsius in January to 24-32 degree Celsius in July & April. Relative humidity ranges from 49% in April to 86% in September.

1.3 Drawings

- A. The location, extent, types and arrangement of the required construction and improvements are shown and noted on the Drawings accompanying this specification, which Drawings are hereby made a part of the Specification and this Contract.
- B. The Drawings accompanying the Specification, along with the quantities given in the Bill of Quantities are for tendering purpose and for obtaining comparable tenders. The Drawings accompanying the Specification indicate the scope and character of the Works to be performed. They are not fully detailed and are not released for construction purpose.

1.4 Standards and Supplementary Specifications

- A. All workmanship, materials, and components throughout shall where applicable, and unless otherwise stated in the Contract Documents, comply either:
 - 1. With the relevant ISO, British or Indian Standard Code of Practice current on the date fixed for receipt of tenders, or
 - 2. With other Standards or Codes of Practice proposed by the Contractor at the time of tendering provided that these standards or Codes of Practice are equivalent or superior to the relevant ISO, British or Indian Standard or Code of Practice.
- B. The acceptance of a tender based upon a Standard or Code of Practice proposed by the Contractor shall only signify the Employer's Representative's general approval to the use of such Standard or Code of Practice, and shall not make the Employer's Representative liable to accept a Standard of workmanship subsequently found to be inferior to the corresponding ISO, British, or Indian Standard or Code of Practice.
- C. Where the relevant standard provides for the furnishing of a certificate to the Employer or Employer's Representative at their request, stating that the materials supplied comply in all respects with the standard, the Contractor shall obtain the

certificate and forward it to the Employer's Representative. If no standard is indicated, then the relevant ISO, British, or Indian Standard, if any, shall apply.

- D. Wherever reference is made within these documents to certain standard specifications the reference shall unless otherwise specifically stated be construed to mean the standards, with all subsequent amendments, change or additions as thereafter adopted and published that are in effect on the date of issue of the Tender Documents.

1.5 Quality Control

The Contractor shall submit and agree with the Project Manager a Quality Assurance Plan (QAP) prior to commencement of Works at site. The quality assurance plan shall clearly set out working procedures, workmanship, testing and process control the Contractor will adopt in carrying out the Works so that the material and works shall comply with the requirements of the Contract and the Technical Specifications. Only after receiving approval of QAP from the Project Manager shall the Contractor proceed with the Works at site.

The Project Manager will be assisted in monitoring the quality of work by the Water Users Association Construction Sub-committee. However, instructions to the Contractor shall only be given by the Project Manager, based on the information provided by the WUA.

In addition, the National Vigilance Centre may conduct technical audits on the work done to ensure all works are carried out in accordance with the Contract and Specifications.

SECTION 2 CONSTRUCTION FACILITIES

2.1 Transportation Facilities

The Contractor shall investigate the availability of transportation facilities and shall make all arrangements necessary for the delivery of materials to be used on the work. The Contractor shall make his own investigations on the condition of available public roads, access rights of way, and of restrictions, bridge load limits and other limitations affecting transportation and ingress.

2.2 Sanitation

The Contractor shall maintain the Site and all working areas in a sanitary condition and in all matters of health and sanitation shall comply with the requirements of the local medical office or other competent authority.

2.3 Potable Water Supply

The Contractor shall install, operate and maintain an adequate supply of fresh potable water to all staff quarters, labour camps, offices, workshops and other sheds and places of work on the Site. The supply shall be continuously available at all the Contractor's housing sites. Potable water shall mean water free of harmful impurities.

2.4 Safety Measures and Public Convenience

- A. The Contractor shall provide for the protection of all persons and property at all times. The Contractor shall comply with a manual acceptable to the Employer's Representative, to the extent that such provisions do not conflict with the applicable laws. The Contractor shall take all necessary measures to protect the work and prevent accidents during the construction. He shall provide and maintain sufficient night lights, barricades, guards, temporary sidewalks, temporary bridges, danger signals, watchmen and necessary appliances and safeguards to properly safeguard life and property. He shall also protect all excavations, equipment and materials so that the public will not be endangered.
- B. The Contractor shall so conduct his operations as to offer the least possible obstruction and inconvenience to traffic, and he shall have under construction no greater amount of work than he can handle properly with due regard for the rights of the public. Where existing streets or footpaths are not available as detours, the Contractor shall make suitable temporary detours as necessary, as directed by the Employer's Representative.
- C. The Contractor shall be responsible for all damage or injury which may be caused on any property by trespass by the Contractor or his employees in the course of their employment, whether the said trespass by the Contractor or his employees in the course of their employment, was committed with or without the consent or knowledge of the Contractor.

2.5 Temporary Fencing

If and where required the Contractor shall erect, maintain, and remove suitable and approved temporary fencing to enclose such areas of the works and all areas of land occupied by the Contractor within the site as may be necessary. Where any temporary fencing has to be erected alongside a public road, footpath, etc. it shall be of the type required by and shall be erected to the satisfaction of the authority concerned.

2.6 Notice Board

The Contractor shall erect a notice board of a size of not less than 1.0 m by 2.5 m at each work Site. The notice boards shall be painted and the inscription shall be approved by the Employer's Representative. The board is to be erected at a suitable place upon the commencement of the works.

2.7 Progress Photographs

The Contractor shall take progress photographs of key measurement events throughout the Contract period. The monthly statements of the estimated value of the work executed shall be accompanied by photographs of the key measurement events with measuring tapes or poles to indicate scale. The final statement should be accompanied by progress photographs of all completed main structures and works.

2.8 Costs

The costs of providing construction facilities shall be included in the prices tendered for the various items of the Bill of Quantities for which the construction facilities are required, and no separate payment will be made therefore.

SECTION 3 CONTROL OF WATER

3.1 General

- A. The Contractor shall be responsible for the control of water met within the excavations due to ground water, springs, seepage, rain or other causes. He shall take all measures and necessary precautions to control water seepage into excavations by suitable diversions and by bailing out or by pumping, if necessary, to keep the excavations dry during excavation, concrete construction, and embankment or backfill placement and compaction.
- B. The Contractor shall submit to the Employer's Representative for approval, details of such measures as he proposes to adopt for the control of water from any source. Notwithstanding any approval by the Employer's Representative of the Contractor's arrangements for the exclusion of water, the Contractor shall be responsible for the sufficiency thereof and for keeping the works safe at all times particularly during any floods, and for making good at his own expense any damage to the works including any that may be attributable to floods.
- C. Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of the movement of water through any fresh concrete. No pumping shall be permitted during the placing of concrete or for any period of at least 24 hours thereafter unless it is done from a suitable pump separated from the concrete work by a watertight wall or other similar means.
- D. At the discretion of the Contractor, cement grouting or other approved methods may be used to prevent or reduce seepage and to protect the excavation area.

3.2 Works to be Kept Clear of Water

The Contractor shall keep the works well drained until the Employer's Representative certifies that the whole of the works is substantially complete and shall ensure far as is practicable all work is carried out in the dry. Temporary works such as temporary dams, water courses and other works of all kinds including pumping and well-point de-watering that may be necessary to exclude water from the works while construction is in progress shall not be removed without the approval of the Employer's Representative. The Contractor is to take all necessary precautions to avoid floatation of any partially completed structure.

3.3 Discharge of Water into Existing Streams

The Contractor shall make provision for the discharge or disposal from the works and temporary works of all water and waste products howsoever arising, and the methods of disposal shall be to the satisfaction of the Employer's Representative and of any Authority or person having an interest in any pond or watercourse over or in which water and waste products may be so discharged. Care shall be taken so that discharge of drained water will not cause damage to the works, crops or any other property, the requirements of this clause shall not limit any of the Contractor's obligations or liabilities, particularly as to Clause 22 of the Conditions of Contract.

3.4 Costs

Costs incurred by the Contractor in complying with the requirements of this Section shall be deemed to be included in the prices tendered for the various items of the Bill of Quantities for which the control of the water is required and no separate payment will be made thereof.

SECTION 4 STORAGE OF MATERIALS

4.1 General

- A. 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 as approved by the Employer's Representative. Stored materials shall be located so as to facilitate prompt inspection. Private property shall not be used for storage purposes without the written permission of the owner and payment to him if necessary.
- B. The stockpile site shall be prepared by clearing and levelling as approved by the Employer's Representative.
- C. Aggregate storage piles shall be built up and removed in layers not exceeding 1 m. The height of such stockpiles shall be limited to 5.0 m. The centre of the storage areas shall be raised and sloped to the sides, as required to provide proper drainage of excess moisture. The material shall be stored in such a manner as to prevent segregation and to ensure proper gradation and moisture content.
- D. Immediately upon receipt at site of work, cement shall be stored in a dry weather tight, properly ventilated structure with adequate prevention of absorption of moisture. The Contractor's method of handling and storing of cement shall be to the approval of the Employer's Representative.

Not more than 13 bags of cement shall be permitted to be piled up and this number shall be limited to 7 bags when the storage is expected to be longer than 2 months. The bags of cement shall be piled up or stored so as to permit easy access for identification, inspection and testing.

4.2 Costs

The costs of providing for storage for materials shall be included in the prices tendered for the various items of the Bill of Quantities for which storage of materials is required, and no separate payment will be made thereof.

SECTION 5 EQUIPMENT PERFORMANCE, STANDARDISATION AND TESTING

5.1 Equipment Performance

Where performance of equipment is specified or accepted at the time of tender, failure of the equipment to perform at the specified level will be the responsibility of the Contractor. The Employer reserves the right not to accept such equipment and to withhold retention money and to make claims on the performance bond in the event of failure of equipment to meet the specified performance.

5.2 Standardization

To the maximum extent possible, equipment to be supplied and installed by the Contractor under this contract is to be standardized both as to type and to supplier.

5.3 Operational and Field Testing

After all construction is completed and before acceptance, the Contractor shall perform field tests in the presence of Engineer's representative and WUA Construction Committee members. Where called for, the Contractor shall demonstrate to the Employer's Representative the operation of the facilities for proper sequence of operation of the system and satisfactory performance of the individual components. Any improper operation of the system or any improper, neglected or faulty construction shall be repaired or corrected to the satisfaction of the Employer's Representative and WUA Construction Committee members. The Contractor shall make such changes, adjustments or replacement as may be required to make the same comply with the Specification, or shall replace any defective parts or materials.

SECTION 6 MEASUREMENT AND PAYMENT

6.1 Preliminary Note

- A. The items as set out in the Bill of Quantities are understood to be full compensation for:
- the preparation of Working Drawings for the Civil Engineering works and conforming to the requirements for the equipment and drawings as set out in the Specification, Conditions of Contract, Information and Instructions, Drawings, Schedules and Appendices Submitted with the Tender Documents;
 - all material, parts and labour cost as well as the cost of supervision, quality inspection and testing and all other costs for the supply of the equipment and materials;
 - all handling, packing and shipping charges, rail, road and all other transport costs, including harbour dues, dock handling charges, insurance during transit, customs outside Nepal (if any) and all other charges on the equipment and material from any place outside Nepal until it is delivered on site;
 - all cost of labour, supervising, erection of plant and temporary works, materials and other things of whatever nature required for storing, moving into final position, setting out, handling and erecting, final painting and protection, quality inspection and testing;
 - all duties and obligations as set out in the Conditions of Contract, the Specification, Information and Instruction, Drawings, Schedules and Appendices.
- B. Measurement methods specified in the individual Sections of the Specification shall govern if they differ from methods specified in this Section.
- C. The Employer's Representative will compute all quantities and will take measurements as required for such computations.

6.2 Measurement of Quantity

- A. Measurement Standards: All work to be paid for at a contract price per unit of measurement will be measured by the Employer's Representative in accordance with Metric Standard Measures. A ton shall consist of 1,000 kilograms.
- B. Measurement of Quantities:
1. Steel shapes, castings, miscellaneous metal, metal fabrications, and similar items to be paid for by weights for the type and quantity of material actually furnished and used.
 2. The Employer's Representative may be present to witness the weighing and to check and compile the daily record of such scale weights; however, in any case, the Employer's Representative will require that the Contractor furnish weigh slips and daily summary weigh sheets. In such cases, furnish a duplicate weigh slip or a load slip to each vehicle weighed and deliver the slip to the Employer's Representative at the point of delivery of the material.

C. Measurement by Volume:

1. Measurement by volume will be by the cubic dimension listed or indicated in the Bill of Quantities. Method of volume measurement will be as determined or directed by the Employer's Representative.
2. When material is to be measured and paid for on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Contractor in writing and accepted by the Employer's Representative in writing, the materials will be weighed in accordance with the requirements specified for weight measurement. Such weights will be converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Employer's Representative and shall be agreed to by the Contractor before such method of measurement of payment quantities will be accepted.

D. Measurement by Area: Measurement by area will be by the square dimension listed or indicated in the Bill of Quantities. Method of square measurement will be as determined or directed by the Employer's Representative.

E. Linear Measurement: Linear measurement will be by the linear dimension listed or indicated in the Bill of Quantities. Method of linear measurement will be as determined or directed by the Employer's Representative. Generally, items components, or work to be measured will be measured at the centreline of the item in place.

F. Lump-Sum Measurement:

1. Lump-sum measurement will be for the entire item, unit of work, structure, or combination thereof, as listed or indicated in the Bill of Quantities.
2. If the Contractor requested progress payments for lump-sum items or amounts in the Bill of Quantities, such progress payments will be made in accordance with a well-balanced, detailed program of payment apportioning, prepared by the Contractor and submitted to the Employer's Representative for approval.
3. Such program for each applicable lump-sum item shall show estimated quantities and unit prices as allocated by the Contractor to the different features of the work and major subdivisions thereof it shall also show the amounts allocated by the Contractor for:
 - (1) Costs of the various materials to be furnished,
 - (2) Direct labour costs and derivative charge,
 - (3) Other itemized costs,
 - (4) Overhead,
 - (5) Insurance, and
 - (6) Profit, the Summation of extensions of quantities and unit prices and related costs total, in each case, the exact amount to be paid under the lump-sum Contract Price for the item.
4. Such programs will be used for computing progress payments as provided herein, but will not be used to determine the amount of the final payment for the work of this Contract.

6.3 Field Measurement for Payment

- A. The Employer's Representative will compute for payment purposes all quantities of Work performed by the Contractor, of materials and equipment delivered to the site.
- B. The Contractor shall assist the Employer's Representative in the taking of measurements by providing all equipment and workers, as required to measure quantities in accordance with the provisions for measurement specified herein.
- C. All measurement services required, of the Contractor, as specified shall be performed under the direction and supervision of the Employer's Representative.
- D. The Contractor shall take photographs of key stages during the construction of main structures/canals and submit these with his progress payment requests.

6.4 Rejected Materials

Quantities of material waste or disposed of in a manner not called for under the Contract, rejected loads of material, including material rejected after it has been placed by reasons of the failure of the Contractor to conform to the 'Provisions of the Contract; material not unloaded from the transporting vehicle; material placed outside the lines indicated on the Contract Drawings or established by the Employer's Representative; or material remaining on hand after completion of the Work, will not be paid for, and such quantities shall not be included in the final total quantities. No compensation will be permitted for loading, hauling and disposing of rejected material.

Separate measurement or payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included with the related item of work in the Bill of Quantities, or incidental to the Project.

SECTION 7 MOBILIZATION AND DEMOBILIZATION

7.1 General

- A. Within a period of specified days from the Employer's order to commence the work, the Contractor shall submit a mobilization programme to the Employer's Representative for approval.
- B. The mobilization work prescribed shall consist of all work involved in the establishment by the Contractor of his construction camps as required for the execution of the Work, and includes all accommodations, offices, and workshops (suitably equipped), sheds, stores, temporary roads, or paths, services and maintenance facilities required by him for his personnel, plant, equipment, and materials. This work also includes all movement of personnel, plant and objects to and from the site. It includes all assistance, which is required to enable the Employer's Representative and his staff to carry out the checking and testing of the works expeditiously.
- C. The establishment of camps and plant on site shall comply with all the provisions of the conditions of contract.
- D. Except in areas where no alternative access is practicable, as determined by the Employer's Representative, no construction traffic will be permitted on the canal inspection roads.
- E. The demobilization work shall consist of all work involved in the removal of the construction camps and other facilities mentioned in paragraph B above, removal from the site of personnel, plant and other objects brought by the Contractor and leaving the camp and working sites clear and free from any obstructions on the completion of the work as required under Clause 22 of the Conditions of Contract.
- F. All temporary buildings erected by the Contractor shall be removed from the site by the Contractor at the completion of the Contract. The area in which such buildings were sited shall be cleaned up and all foundations, plumbing and other fixtures shall be removed and the site restored to its original condition before the buildings were erected.
- G. At the completion of the Contract, except as may be permitted by the Employer's Representative, all temporary roads and tracks made by the Contractor shall be levelled to the satisfaction of the Employer's Representative. Due care shall be exercised to ensure that the obliteration of such roads and tracks will not lead to soil erosion.

7.2 Payment

- A. If required by the Contractor pursuant to Clause 48 of the Conditions of Contract, the Employer will make an advance payment for mobilization as a loan against future earnings in accordance with the terms of said Clause 48.

Within a period of thirty (30) days from the date of the Employer's order to commence, the Contractor shall submit to the Employer's Representative a payment schedule in such form as to allocated the total lump-sum amounts tendered for the items Construction and Maintenance of Temporary Access Roads; Compensation payment (Rental) for Temporary Access Roads; Construction, Maintenance and Removal of Contractor's Staff Quarters and Labour Camps, and Construction,

maintenance and Removal of Contractor's Temporary offices, Stores and Workshops in the Bill of Quantities to the major divisions of the work to be performed. The payment schedule shall show the proportionate part of the total lump-sum amounts allocated thereto. The above allocation of the lump-sum amount shall be subject to the approval of the Employer's Representative. Monthly statements for progress payment shall include the amount allocated to each major division of work for each month as approved by the Employer's Representative. No quantity measurement will be made of the work under the said items and the payments therefore will be based on the completion of the work specified herein.

- B. The amounts tendered for the various items specified in A above shall be full compensation for the work specified herein including the work of site preparation, which shall consist of all the clearing and grubbing for temporary works outside the limit of permanent works as required by the Contractor to establish camps and other temporary work areas and all costs of maintenance and operation of camps, offices, workshops, ware houses, sheds, storage yards and also maintenance of Contractor provided in the work areas.
- C. All other costs relating to work specified in this section but not covered in the Bill of Quantities Items Specified herein shall be deemed to be covered in the prices tendered for related items in the Bill of Quantities, or shall be considered incidental to the Works.

SECTION 8 SITE INVESTIGATION

8.1 General

If at any time during the execution of the Works the Employer's Representative shall require the Contractor to make bore-holes or to carry out exploratory excavation, such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provisions of Clause 10 of the Conditions of Contract unless a provisional sum in respect of such anticipated work shall have been included in the Bill of Quantities.

SECTION 9 CLEARING AND GRUBBING

9.1 General Description

This Specification Section covers clearing, grubbing, and removing of vegetation and other objectionable materials from the site and the right-of-way.

9.2 Clearing of the Site: General

- A. Within limits established by the Employer's Representative, the Contractor shall uproot and remove all trees, shrubs, bushes and other vegetation standing above the ground surface. Trees designated by the Employer's Representative to remain shall be protected.
- B. On the instructions of the Employer's Representative, the Contractor shall demolish and remove all timber buildings, fences and similar structures within the same areas.
- C. Where directed by the Employer's Representative, usable materials and equipment should be salvaged and handed over to the representative of the Employer. All other material cleared shall be disposed of by burning on site, as prescribed below, or by removal to waste lands beyond the site boundaries. The location of such disposal areas shall be subject to approval by the Employer's Representative before use.

9.3 Clearing the Right of Way

- A. All areas which require clearing for purpose of earthworks and construction including right of way, borrow areas, stock pile sites and elsewhere as directed by the Employer's Representative shall be cleared of trees, brush, roots, rubbish and other objectionable matter and such materials shall be removed from the site of the work or otherwise disposed of as approved by the Employer's Representative. On the approval of the Employer's Representative fences, walls, buildings and ruins shall be removed from the same areas.
- B. All materials to be burnt shall be piled neatly and when in a suitable condition shall be burnt completely. Piling for burning shall be done in such a manner and in such locations as to cause the least fire risks. The Contractor shall take special precautions to prevent fire from spreading.
- C. In general, only such trees that would interfere with the construction required under these specifications shall be removed, and trees along the right-of-way shall be left in place to the greatest extent practicable. The Contractor shall dispose of all material cleared as prescribed above.
- D. During the Contractor's operations the removal of certain trees and shrubs outside the right of way may be required, in which case the Contractor may remove such trees and shrubs after obtaining prior approval of the Employer's Representative. All trees and shrubs designated to remain in place shall be protected from damage. Any damage to the Works and public or private property caused by the Contractor's operations in clearing and grubbing shall be repaired or replaced by the Contractor at his cost.

9.4 Measurement and Payment

When indicated as an item in the Bill of Quantities, clearing and grubbing will be measured for payment in terms of area from toe to toe of the canal alignment and the area covered by borrow pit. No payment shall be made for any clearance made by the Contractor for making access to the canal alignment outside the right of way or to the borrow pit. Where the Bill of Quantities for a schedule does not include an item for clearing and grubbing, no separate payment will be made for such work and all costs therefore shall be included in the unit rates tendered for the various type of excavation.

In general, borrow material will be taken from agricultural land in the vicinity of canal embankments as indicated in the Bill of Quantities utilising shallow, levelled and drained borrow pits to be returned for agricultural use after excavation. The completion of works in a single stretch of canal system will generally require that a single dry season crop compensation will require to be paid to occupiers of the borrow area. The crop compensation shall be measured for payment in terms of area from toe to toe of the canal alignment and the areas covered by borrow pits. No payment shall be made for any clearance made by the Contractor for making access to the canal alignment outside the right of way or to the borrow pit. Prior to the commencement of the works, the Contractor shall conduct survey measurement detailing the list of the occupiers of the borrow area and the right of way of the canal alignment and their individual areas for approval by the Employer's Representative. The rate and the sum for crop compensation given in the Bill of Quantities are provisional only. The rates for compensation shall be determined by the Employer's Representative in consultation with the local district authority. Upon approval of the list of occupiers and rates, the Contractors shall make payment for crop compensation to the occupiers and the evidence of such payment shall be submitted to the employer. An advance payment to the Contractor may be made for crop compensation. The payment for crop compensation to the Contractors shall be made only to extent of actual amount paid to the occupiers. The Contractor's rate for excavation from borrow areas shall include for the survey, measurement and administration of such compensation.

Payment for clearing grubbing and for the crop compensation shall be made for the following works:

- (a) In case of Command area Development works, area covered by excavation in the canal to carry out works as per Section 12 and area covered by embankment construction of Type A and B as per Section 13.
- (b) In case of Branch and Distributary Canals, area covered by excavation in the canal to carry out works as per Section 12 and area covered by embankment construction of Type A and B as per Section 13. No payment shall be made for carrying out Type C, D and E of embankment construction.
- (c) In case of Service Roads Construction no payment shall be made for excavation and all types of embankment construction.

SECTION 10 DEMOLITION OF EXISTING STRUCTURES

10.1 General Description

- A. This Specification Section covers the partial and complete demolition of existing structures constructed of concrete, brick, stone etc.

10.2 Demolition

- A. Existing structures shall be demolished as directed by the Employer's Representative. Where the structure interferes with the new construction, it shall be demolished completely. Where such structures are to be incorporated into the Works, such structures shall be partially demolished as specified below.
- B. Materials resulting from demolition which are suitable for reuse shall be considered as the property of the Employer and shall be salvaged. Sound brick and stone shall be neatly stockpiled at locations as directed by the Employer's Representative. Rubble resulting from demolition of concrete shall be stockpiled when directed by the Employer's Representative, for use in backfill, embankment, or for other purposes.
- C. Partial demolition of existing structures which are to be incorporated into the Works shall consist of the removal of all unsound portions of the structures, and other portions as directed by the Employer's Representative, as necessary to incorporate the remaining, sound portions into the Works. Care shall be taken to preserve the portions designated to remain in sound condition. Concrete structures shall be cut with a suitable saw to a depth of 40 mm before the cut-off portion is demolished, all unsound concrete which spalls when struck with a hammer shall be removed. All bricks and stones that are loose, and all bricks and stones set in unsound mortar shall be removed.

10.3 Measurement and Payment

Separate measurement for payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included with the related item of work in the Bill of Quantities or incidental to the Project. Accidental demolition of parts of structures designated to remain shall be repaired by the Contractor at his own expense.

SECTION 11 STRIPPING

11.1 General Description

This Specification Section covers stripping of topsoil and other unsuitable material, and the stockpiling or disposal thereof.

11.2 Stripping

- A. Stripping shall consist of the removal of all organic and unsuitable materials such as sod, topsoil and roots from embankment foundation, from areas where the excavated material is to be further used in embankments, from the base of all roads, from approved borrow areas within the right of way, and from all other areas as may be directed by the Employer's Representative.
- B. Materials from stripping which are suitable for topsoil shall be selected during stripping operations and stockpiled for further use if so directed by the Employer's Representative. Material not suitable for topsoil or other further use shall be disposed of in spoil banks according to the Employer's Representative's instructions.

11.3 Measurement and Payment

- A. Where indicated as an item in the Bill of Quantities stripping will be measured for payment by the square meter for the applicable schedule and shall include a depth of 0.20 m below original ground surface. Quantities for payment will be computed by direct measurement of areas stripped, and will include only the locations directed by the Employer's Representative. No measurement for payment will be made of over excavation and no allowance will be made for bulking or compaction or for work done outside the outer bank slopes. Payment will be made at the unit rates per square meter tendered therefore in the Bill of Quantities.
- B. Where the Bill of Quantities for a schedule does not include an item for stripping the top 0.20 m depth of excavation shall be measured for payment as excavation.

SECTION 12 EXCAVATION FOR IRRIGATION CANALS AND STRUCTURES

12.1 General Description

- A. This Specification Section covers excavation required for the construction and rehabilitation of irrigation canals, associated structures such as abutments, flumes, piers, and retaining walls and ancillary work such as drainage pipes.
- B. Excavation shall consist of excavation, removal and satisfactory disposal of all materials necessary for the construction of permanent works in accordance with the requirements of the Specification to the lines, grades and cross-sections shown on the Drawings or as otherwise directed by the Employer's Representative. This work shall include the hauling and stacking, or hauling to sites of embankment also the disposal of unsuitable materials in specified manner, de-watering and pumping, and the trimming and finishing of excavation lines to such widths, depths, levels and profiles as shown on drawings or to such other dimensions and levels as may be ordered by the Employer's Representative.

12.2 Classification of Materials

For payment purposes materials excavated shall be classified by the types of facilities or structures shown in the Bill of Quantities. The nature of materials such as clay, sand, rock, etc, will not be considered for payment purposes.

12.3 Construction Operations

- A. Preliminary Operations:
 - 1A. Prior to any excavation the work shall be set out as directed by the Employer's Representative.
 - 2A. Before commencement of excavation a survey of the existing ground levels shall be made by the Employer's Representative. The survey records shall serve as initial measurement for the determination of the final quantities of excavation performed under the Contract, and for related purposes.
 - 3A. Clearing and grubbing shall be performed in all excavation areas.
 - 4A. Stripping and storing of topsoil shall be performed as specified.
- B. General Requirements:
 1. All excavation shall be made in accordance with the provision stated herein or as directed by the Employer's Representative and to the grades shown on the Drawings or established by the Employer's Representative.
 2. Change of Slopes: During progress of the work it may be found necessary or desirable by the Employer's Representative to vary the slopes of excavation or the slopes of embankments and the dimensions dependent thereon, and the Contractor shall execute the work in accordance with these specifications. Any increase or decrease of quantities excavated as a result of such variations shall be subject to the provisions stipulated for variations set forth in the Conditions of Contract.
 3. Sliding Material: Materials which will not stand on the slopes shown on the Drawings or established by Employer's Representative, and materials which are a part of slides extending beyond the established lines of excavation which move into excavated areas, shall be removed by the Contractor in an approved

manner, and the slopes shall be refinished to lines and grades established by the Employer's Representative. The Contractor shall be required to excavate potential slide areas beyond the limits of the originally staked excavation where, in the judgment of the Employer's Representative, such excavation is necessary to prevent damage to the work.

4. **Excavation Lines:** Where excavations are not to be covered by structures or other required construction, they shall be made to the full dimensions required and shall be finished to the neat lines and grades shown on the Drawings or to such other lines and levels determined by the Employer's Representative. All necessary precautions shall be taken to preserve the material below the lines of all excavation in the soundest possible condition. Any over excavation made for the convenience of the Contractor or for any purpose or reason, except as otherwise provided herein, shall be refilled and compacted by the Contractor at his expense as directed by the Employer's Representative.
5. **Use of Material:** It is anticipated that most of the materials from required excavation will be suitable for use in the construction required under the Contract. As far as practicable, all suitable materials shall be placed in the designated final locations directly from the excavation, except the backfill materials, which shall be placed in temporary stockpiles and later placed in the designated location. As determined by the Employer's Representative, all materials designated for use in compacted embankments shall be brought to the proper water content before and during excavation.
6. **Subsurface Water:** Part of the required excavation will be below the subsurface water level. Any lines of water levels shown on the Drawings can be considered as tentative information only. The Contractor shall not be entitled to derive any claim therefrom and he shall select his equipment and programme his constructional operations and the timing of these operations so as to complete the works to the satisfaction of the Employer's Representative.
7. **Surface Water:** The Contractor shall take all necessary precautions to protect the work from surface water by constructing provisional bunds, drains or similar means, or by pumping, as may be approved or directed by the Employer's Representative.
8. Whenever it becomes necessary during the course of the work to determine the volume of excavation in channels which are filled or partially filled with water, the Contractor shall furnish and maintain the required equipment for measuring and shall assist the Employer's Representative in making such measurements.
9. **Gravel:** Where gravel is encountered during excavation and such gravel is suitable for surfacing operations and maintenance or service roads or paths, or for further gravel lining, as may be determined by the Employer's Representative, the materials shall in so far as practicable be stockpiled along the right-of-way where designated by the Employer's Representative.
10. **Spoil Banks:** Excavated materials containing stumps, roots, vegetable matter and other objectionable materials and excavated materials that are not required for backfill, embankments and other permanent construction shall be placed in designated spoil banks in waste areas designated by the Employer's Representative. Spoil banks adjacent to the canal embankments shall be continuous except for gaps at suitable intervals for transverse drainage as shown on the Drawings or as directed by the Employer's Representative. All spoil banks and waste areas shall be levelled and sloped to drain and trimmed to reasonably regular lines as shown on the Drawings or as directed by the Employer's Representative.

C. Rock Excavations:

1. Rock when encountered in the excavation shall be removed down to the foundation level or as otherwise indicated on the Drawings. Where, however, unstable shale or other similar materials are interfaced at the foundation level, these shall be excavated to the extent of 500 mm below the foundation level or as otherwise directed. In all cases, the excavation operations shall be so carried out that at no point on cut formation shall the rock protrude above the specified levels; provided, however, that a negative tolerance of 300 mm shall be permissible.
2. Slopes in rock cuts shall be finished to uniform lines corresponding to slope line shown on the Drawings or as directed by the Employer's Representative. Notwithstanding the foregoing, all loose pieces of rock on excavated slope surface which move when raised by a crowbar shall be removed.
3. Where blasting is to be used, the same shall be carried out as per instruction of Employer's Representative.

D. Slushy Soil Excavation:

1. The excavation of marshes and swamps shall be carried out as per the programme approved by the Employer's Representative.
2. Excavation of marshes shall begin at one end and proceed in one direction across the entire marsh immediately ahead of back filling. The method and sequence of excavation and back filling shall be such as to assure, to the maximum extent practicable, complete removal or displacement of all muck from within the internal limits called for on the Drawings or as stated by the Employer's Representative, and to the bottom of the marsh, firm support, or levels indicated.

E. Excavation for Surface Drains:

Where the Contract provides for construction of surface drains excavation for these shall be carried out in proper sequence with other works as approved by the Employer's Representative.

F. Preparation of Foundation:

1. Upon completion of the excavation of the lines and levels shown on the Drawings or directed by the Employer's Representative, the foundation shall be inspected by the Employer's Representative and the cut formation shall be prepared to receive the base course as directed by the Employer's Representative.
2. Where material in a poor state of compaction is encountered at the foundation level, the same shall be loosened to a depth of 500 mm and compacted in 250 mm thick loose layers in accordance with the requirements of Section 13. Any unsuitable materials encountered shall be removed at the discretion of the Employer's Representative.
3. The bottom of the foundation shall be levelled both longitudinally and transversely or stepped as directed by the Employer's Representative. Before placing the concrete, the surface shall be watered and rammed if necessary, but no standing water shall be permitted on the foundation. In the event of the foundation having been made deeper than that shown on the drawings or as otherwise ordered by the Employer's Representative, the extra depth shall be made up with concrete or masonry to the foundation grade at the Contractor's

cost. Ordinary backfill shall not be used for the purpose of bringing the foundation to level.

4. When rock or other hard stratum is encountered, it shall be left free of all soft and loose material, cleaned out to a firm surface either level, stepped or serrated as directed by the Employer's Representative. All seams shall be cleaned out and filled with cement mortar or grout to the satisfaction of the Employer's Representative.

G. Finishing Operations:

1. Finishing operations shall include the work of properly shaping and dressing all excavated surfaces.
2. When completed, no point from the slopes shall vary from the designated slopes by more than 150 mm measured at right angles to the slope, except where excavation is in rock (hard or soft) where no point shall vary more than 600 mm from the designated slope. In no case shall any portion of the slope encroach on the finished lines of structures.
3. The finished cut formation shall satisfy the surface tolerance described elsewhere.
4. Where directed, the top soil removed earlier and stored shall be spread over cut slopes, embankments and other disturbed areas. Slopes may be roughened and moistened slightly prior to the application of topsoil in order to provide satisfactory bond. The depth of topsoil shall be sufficient to sustain plant growth, the usual thickness being 75 mm to 150 mm.

12.4 Excavation for Structures

- A. General: The bottom and the side slope of excavation upon or against which structures or other required constructions are to be placed shall be finished accurately to the Drawings and, if required by the Employer's Representative, shall be moistened with water and tamped or rolled with suitable tools or equipment for the purpose of forming a firm foundation.
- B. Over Excavation: If, at any point in the excavation, material is excavated beyond the established lines and grades, it shall be over compacted by tamping or rolling in layers not more than 15 cm thick at the Contractor's expense. Whenever the natural foundation material is disturbed or loosened because of the Contractor's excavation operation, it shall be consolidated by tamping or rolling, if required by the Employer's Representative, or shall be removed and replaced at the Contractor's expense with selected material which shall be thoroughly compacted.
- C. After excavation is completed, the Contractor shall inform the Employer's Representative to that effect and no footing, bedding material or structure shall be placed until the Employer's Representative has approved the depth and the suitability of foundation material. Rock and other hard foundation material shall be cleaned of all loose materials.
- D. Unsuitable Material: If, at any point in any structure excavation or excavation for other required construction, material unsuitable for foundations is encountered, as determined by the Employer's Representative, the Contractor shall, if so ordered by the Employer's Representative, in writing, remove all such unsuitable material and refill with selected and approved materials thoroughly compacted by tamping or rolling in layers not more than 15 cm thick.

- E. **Stability of Excavation:** Excavation for structures shall be carried out to the lines necessary to permit the proper construction of the structure and the Contractor will be responsible for ensuring the stability of side slopes and for the provision of such timbering, shuttering or other support as he may deem to be necessary. The approval of the Employer's Representative shall not relieve the Contractor of his obligation to carry out all excavation in a safe manner.
- F. **Variation of Slopes:** During the progress of the work, it may be found necessary to vary the slopes of the dimensions of the Excavation from those shown on the Drawings or established by the Employer's Representative. Subject to the provisions set forth in the Condition of Contract, the Contractor shall not be entitled to additional allowance above the unit rates quoted for structure excavation in the Bill of Quantities or to any other variation of the applicable unit rate for excavation.

12.2 Excavation for Canals and Drains

- A. **Variation of Dimensions:** Canals, farm ditches, and drains shall be excavated (or rehabilitated) to the lines and grades shown on the Drawings, unless the Employer's Representative determines that the stability of the earth material (in which the canals, ditches, and drain will be constructed and which will form the banks) or other factors make it necessary or desirable during the progress of work to vary the slopes of embankment and the dimensions dependent thereon and so informs the Contractor in writing. Subject to the provisions set forth in the Conditions of Contract the Contractor shall not be entitled to the variation of the unit rates quoted for excavation of drains and canals in the Bill of Quantities in payment for such additional work.
- B. **Over Excavation:** Excavation in such a manner as to cause over excavation which in the opinion of the Employer's Representative is excessive will not be permitted. Canals, ditches, and drains shall be excavated to the full depth and width required and shall be finished uniformly to the prescribed lines and grades; provided that if the Contractor prefers to excavate under water that portion of the canal section may be over excavated to not more than 30 centimetres measured normal from the prescribed lines and grades; provided further that where the existing cross section of a canal or drain is exceeding the design section, refilling will not be required.
- C. **De-watering:** De-watering a canal, ditch, or drain for dry excavation will be permitted provided the measures taken by the Contractor have been approved by the Employer's Representative, and provided further that regardless of whether the canal, ditch, or drain is excavation dry or wet the Contractor shall not be entitled to a variation of the unit rates quoted for excavation of canals, ditches, and drains in the Bill of Quantities in payment for such work.
- D. **Interruption of Local Facilities:** Local facilities like irrigation channels, roads etc. are to be properly maintained in the case of their interference with works. The Contractor shall be responsible for maintaining the local facilities so that the services of such facilities are availed. The costs, if any, are to be borne by the Contractor.

12.3 Measurements and Payment

A. Measurement:

1. Excavation shall be measured by taking cross sections at suitable intervals in the original position before the work starts and after its completion and computing the volume in cubic meters by the method of average and areas. Where it is not feasible to compute volumes by this method because of erratic location or isolated deposits, the volume shall be computed by other accepted method.
2. Where the Bills of Quantities includes an item for stripping in the schedule, measurement for payment for excavation will be computed from elevation 0.2 m below original ground level.
3. At the option of the Employer's Representative, the Contractor shall leave depth indications during excavation of such shape and size and in such positions as directed so as to indicate the original ground level as accurately as possible. The Contractor shall see that these remain intact until the final measurements are taken.
4. Excavation for canals, farm ditches, drains and structures shall be measured in cubic meters for the respective features, limited to the dimension shown on the Drawings or as otherwise directed by the Employer's Representative.

B. Payment:

Payment for the various types of excavation shall be made at the Contract unit rates tendered therefore in the Bill of Quantities. The Contract unit rates for the items of excavation shall include full compensation for the following operations:

- a. Site clearance where the Bill of Quantities contains no item for clearing and grubbing in the Schedule.
 - b. Assistance in setting out profiles.
 - c. Removal of boulders including loosening to required depth for the removal of surface boulders and other unsuitable materials if any back filling and compacting, if required.
 - d. Excavation in all types of materials.
 - e. Transporting the excavated material and depositing on the sides of embankments spoil banks or stacking as directed.
 - f. Trimming bottoms and slopes of excavation.
 - g. All labour, equipment, tools sheeting, bracing, drills, explosives and other incidental used to complete the work.
- C. Payment will be made under the applicable item of the Bill of Quantities for the excavation of the unsuitable foundation material, excavation of slide materials from slides which are beyond the control of the Contractor, and for refilling and compacting of such excavation as directed and approved by the Employer's Representative. Measurement and payment will be made under the applicable item of the Bill of Quantities for placing of backfill in such excavations. Cost of re-handling and transporting backfill material from stockpiles, if so required, shall be included in the unit rate tendered in the Bill of Quantities for backfill around structures.
- D. No Payment will be made for excavation made for the convenience to the Contractor for any purpose or reason, for over excavation or fill beyond the established lines and grades, and for removal of materials disturbed or loosened because of the Contractor's Operations.

SECTION 13 EMBANKMENTS AND BACKFILL

13.1 General Description

Embankment shall include the construction of all embankments for canals, drains, roads, river, structures and filling in other parts of works with suitable materials obtained from canals, drains, rivers and structure excavation or extracted from borrow areas.

All embankments shall be constructed to the lines and levels shown on the drawings or as directed by the Employer's Representative. The materials for embankment shall not contain any stump, brush, weed, root, clod, and matter that may decay.

Not less than fourteen (14) days before he intends to commence the work for furnishing the materials, the Contractor shall submit to the Employer's Representative for his approval the details of his proposed method of obtaining such materials from borrow pits within the borrow areas. The Contractor shall not commence any work necessary for furnishing the materials until the Employer's Representative's approval shall have been obtained.

13.2 Borrow Areas

The materials used for embankment shall be obtained from the sources as described in the Bill of Quantities. The Contractor shall arrange the borrow area showing its location on the drawings and request in writing its approval from the Employer's Representative. Upon approval thereafter, the Contractor shall pay to the owners of such borrow area, the cost of procurement of the materials from such privately owned areas as directed by the Employer's Representative, except the cost of furnishing the materials such as excavation of the materials, which shall be included in the rates in the Bill of Quantities.

Borrow pits shall be located in places approved by the Employer's Representative, but shall not be within a minimum of two (2) metres from the toe of a completed embankment, spur, guide bank or other works, and shall not be located on the proposed canal route or other works.

The borrow pits shall be cleared and grubbed as provided in Section 9 so that the excavated materials in the borrow pits shall not contain any stumps, brush, roots, weeds, turf and any matter that may decay.

As far as practicable the moisture content of materials shall be conditioned in the borrow pit before excavation, by irrigation into the borrow pit when moisture shall be introduced or by excavation of drainage or trenches for reducing excessive moisture.

Upon completion of the construction of all embankments, the Contractor shall restore all borrow areas in such a manner that the ground elevation of the restored borrow areas will be as same as the neighbouring areas, so as not allow rain water to stagnate on borrow areas to the satisfaction of the owner of the borrow area and the Employer's Representative, or as otherwise directed by the Employer's Representative.

Except as provided otherwise, no direct payment will be made for preparatory operation and maintenance of borrow pits including clearing, stripping, excavation operations necessary to properly condition the material and any other works to furnish the embankment materials in the borrow areas. These costs shall be included in the appropriate unit rates for the embankment of which materials shall be obtained from the borrow areas from distances as specified in the Bill of Quantities.

The embankments for branch and distributary canals shall be constructed to the lines and grades shown on the drawings or established by the Employer's Representative.

13.3 Embankments

(a) General

The embankments shall be constructed to the lines and grades shown on the drawings or established by the Employer's Representative.

(b) Embankment Construction

Before the materials for the first layer of the embankment is placed, the foundation for the embankment shall be prepared as provided for in Section 9 hereof and shall be moistened or dried and compacted in the manner hereinafter specified for compacted embankment to be placed hereon.

The materials shall be deposited in horizontal layers and the thickness of each horizontal layer after compaction shall not be more than twenty (20) centimetres in any case. Embankments shall not be widened with loose material dumped from the top. All lumps and clods of heavy clay shall be thoroughly broken down by means of proper instruments and moisture control for materials shall be thoroughly made so as to secure high enough unit weight of embankment. Compaction shall not be permitted until the moisture content of the soil has been adjusted unless otherwise approved to within + 3% and – 3% from the optimum moisture content.

When the materials have been satisfactorily conditioned, they shall be compacted by pneumatic tired rollers, sheep foot rollers, tamping rollers, vibration rollers, vibration roller with pad foot, or mechanical tampers upon the Employer's Representative's approval. Where mechanical tampers are used to compact soils in confined areas, they shall be equipped with suitably shaped heads to obtain the required density.

Where placing and spreading operations will be carried out by hand methods, which deposits materials directly from excavation by human power with the Employer's Representative's approval, the materials shall be thoroughly compacted by mechanical tamper or other approved means after spreading the materials horizontally. The distribution of materials will be homogeneous and free from lenses, pockets, streaks or other discontinuities.

In normal circumstances, the dry density of the soil in the compacted material shall not be less than ninety (90) percent of the maximum dry density as determined by Standard Proctor Compaction Test for material being compacted with a probability of the maximum ten (10) percent failure except as otherwise directed by the Employer's Representative. In no case, however, shall the degree of compaction be less than 80 percent. The minimum number of samples for testing shall be as specified in Sub Section 12.7 hereof.

Embankment slopes after trimming work shall be compacted by mechanical tamper or approved means. The trimmed materials shall be spread on the outer slopes of the embankment unless otherwise specified or directed by the Employer's Representative. Compaction to a specified density for the spoil bank is not called for this disposed material, but materials to be disposed of shall be evenly spread over the slope to the satisfaction of the Employer's Representative.

(c) Measurement and Payment:

Measurement for payment of embankments shall be made of the materials in place to the prescribed lines, grades and dimensions shown on the drawing or as directed by

the Employer's Representative. The extra filling to the embankment shall not be measured for payment.

In the event that the compaction of any stretch of the embankment is less than the required degree in normal circumstances but more than the minimum mentioned above, payment for the stretch of the embankment shall be made after deducting an amount as demonstrated below:

M = Required Degree of Compaction in normal circumstances

N = Actual Degree of Compaction Achieved

R = Unit rate of Filling in Embankments which is taken as the higher of the unit rates quoted by the Contractor in the Bill of Quantity or the unit rate of the project in its rate analysis accompanying the Cost estimate.

Unit Rate of Deduction to be Applied (D) = $(1 - N/M) \times R$

Amount of Deduction = D x Measured Quantity

13.4 Embankment for Command Area Development Works

(a) General

The embankment for Command Area Development works is classified into embankment Type A and B depending upon the source of materials and the haul distance as specified in Section 13 hereof and in the Bill of Quantities.

The embankment for Command Area Development works shall be constructed to the lines and grades shown on the Drawings or established by the Employer's Representative.

(b) Embankment Construction

Before the materials for the first layer of the embankment is placed, the foundation for embankment shall be prepared as provided for in Section 9 hereof and shall be moistened or dried and compacted in the manner hereinafter specified for compacted embankment to be placed hereon.

The materials shall be deposited in horizontal layers and the thickness of each horizontal layer after compaction shall not be more than twenty (20) centimetres in any case. Embankments shall not be widened with loose material dumped from the top. All lumps and clods of heavy clay shall be thoroughly broken down by means of proper instruments and moisture control for materials shall be thoroughly made so as to secure high enough unit weight of embankment. Compaction shall not be permitted until the moisture content of the soil has been adjusted unless otherwise approved to within + 3% and – 3% from the optimum moisture content.

When the materials have been satisfactorily conditioned, they shall be compacted by tamping rollers, vibration roller, vibration roller with pad foot, mechanical tampers or hand tampers upon the Employer's Representative's approval. Where mechanical tampers are used to compact soils in confined areas, they shall be equipped with suitably shaped heads to obtain the required density. Where hand tampers are used, the tamper shall be of iron or concrete of weight not less than 15 kg with a gravity fall of a minimum of 30 centimetres.

Where placing and spreading operations will be carried out by hand methods, which deposits materials directly from excavation by human power with the Employer's Representative's approval, the materials shall be thoroughly compacted by mechanical tamper, hand tamper or other approved means after spreading the

material horizontally. The distribution of materials will be homogeneous and free from lenses, pockets, streaks or other discontinuities.

In normal circumstances, the dry density of the soil in the compacted material shall not be less than eighty eight (88) percent of the maximum dry density as determined by Standard Proctor Compaction Test for materials being compacted with a probability of the maximum ten (10) percent failure except as otherwise directed by the Employer's Representative. In no case shall the degree of compaction be less than 80 percent. The minimum number of samples for testing shall be as specified in Sub Section 12.7 hereof.

Embankment slopes after trimming work shall be compacted by mechanical tamper, hand tamper or approved means. The trimmed materials shall be disposed of on the outer slopes of the embankment unless otherwise specified or directed by the Employer's Representative. Compaction to a specified density for the spoil bank is not called for this disposed material, but materials to be disposed of shall be evenly spread over the slope to the satisfaction of the Employer's Representative.

In the event that the compaction of any stretch of the embankment is less than the required degree in normal circumstances but more than the minimum mentioned above, payment for the stretch of the embankment shall be made after deducting an amount as demonstrated below:

M = Required Degree of Compaction in normal circumstances

N = Actual Degree of Compaction Achieved

R = Unit rate of filling in Embankment which is taken higher of the unit rates quoted by the Contractor in the Bill of Quantity or the unit rate of the project in its rate analysis accompanying the Cost estimate.

Unit Rate of Deduction to be Applied (D) = $(1 - N/M) \times R$

Amount of Deduction = D x Measured Quantity

(c) Measurement and Payment

Measurement for payment of embankment for Command Area Development Works shall be made of the material in place to the prescribed lines, grades and dimensions shown on the drawing or as directed by the Employer's Representative. The extra filling to the embankment shall not be measured for payment.

Payment for embankments shall be made at the unit rate per cubic meter of the measured quantity, which unit rate shall include all cost of excavation, transportation of the excavated materials from the excavation sites or from the temporary stockpile including re-handling, if required, to place of final use, and the costs of placing materials in layers, furnishing water, moistening or drying the materials and compacting the materials as provided in this Section and trimming and compacting the slopes, including all cost of labour, materials and construction equipment.

13.5 Embankments for Service Roads

(a) General

The embankments for service roads shall be constructed to the lines and grades shown on the drawings or established by the Employer's Representative.

(b) Embankment Construction

Before the materials for the first layer of the embankment is placed, the foundation for embankment shall be prepared as provided for in Section 9 hereof and shall be moistened or dried and compacted in the manner hereinafter specified for compacted embankment to be placed hereon.

The materials shall be deposited in horizontal layers and the thickness of each horizontal layer after compaction shall not be more than twenty (20) centimetres in any case. Embankments shall not be widened with loose material dumped from the top. All lumps and clods of heavy clay shall be thoroughly broken down by means of proper instruments and moisture control for materials shall be thoroughly made so as to secure high enough unit weight of embankment. Compaction shall not be permitted until the moisture content of the soil has been adjusted unless otherwise approved to within + 3% and – 3% from the optimum moisture content.

When the materials have been satisfactorily conditioned, they shall be compacted by pneumatic tired rollers, sheep foot rollers, tamping rollers vibration rollers, vibration roller with pad foot, or mechanical tampers upon the Employer's Representative's approval. Where mechanical tampers are used to compact soils in confined areas, they shall be equipped with suitably shaped heads to obtain the required density.

Where placing and spreading operations will be carried out by hand methods, which deposits materials directly from excavation by human power with the Employer's Representative's approval, the materials shall be thoroughly compacted by mechanical tamper or other approved means after spreading the material horizontally. The distribution of materials will be homogeneous and free from lenses, pockets, streaks or other discontinuities.

The dry density of the soil in the compacted material shall not be less than ninety five (95) percent of the maximum dry density as determined by Standard Proctor Compaction Test for material being compacted with a probability of the maximum ten (10) percent failure except as otherwise directed by the Employer's Representative. The maximum number of samples for testing shall be as specified in Sub Section 13.7 hereof.

Embankment slopes after trimming work shall be compacted by mechanical tamper or approved means. The trimmed materials shall be disposed of on the outer slopes of the embankment unless otherwise specified or directed by the Employer's Representative. Compaction to a specified density for the spoil bank is not called for this disposed material, but materials to be disposed of shall be evenly spread over the slope to the satisfaction of the Employer's Representative.

(c) Measurement and Payment

Measurement for payment of embankments for service roads shall be made of the materials in place to the prescribed lines, grades and dimensions shown on the drawing or as directed by the Employer's Representative. The extra filling to the embankment shall not be measured for payment.

Payment for embankments shall be made at the unit rate per cubic meter of the measured quantity, which unit rate shall include all cost of excavation, transportation

of the excavated materials from the excavation sites or from the temporary stockpile including re-handling, if required, to place of final use, and the costs of placing materials in layers, furnishing water, moistening or drying the materials and compacting the materials as provided in this section and trimming and compacting the slopes, including all costs of labour, materials and construction equipment.

13.6 Embankment/Backfill Around Structures

(a) Embankment Construction

Backfill/Embankments around structures shall be placed to the lines shown on the Drawings, as prescribed in this paragraph, or as directed by the Employer's Representative. The type of material used for backfill, the amount thereof, and the manner of depositing the material shall be subject to approval. So far as practicable, backfill material shall be obtained from material already moved. If material is not available from this source or from adjacent excavations, additional material shall be obtained from approved sources.

Backfill around or on sides of the following structures or portions of structures, shall be compacted to slopes shown on the drawings from the top of the concrete walls, provided that where the structure is located in compacted embankment, the backfill shall be compacted to the elevation prescribed for the adjacent compacted embankment.

- Regulators and check structures
- Escape channel and bridge over it.
- Open transitions at the ends of all structures.
- Cut and cover conduits
- Cross drainage works

To avoid interference with the construction of abutments, walls or return walls, the Contractor shall, at points to be determined by the Employer's Representative, suspend work on embankments forming approaches to such structures, until such time as the construction of the latter is sufficiently advanced to permit the completion of approaches without the risk of interference or damage to the works.

Unless directed otherwise, the filling around structures shall be carried out independent of the work on the main embankment. The fill material shall not be placed against any abutment or wing wall unless permission has been given by the Employer's Representative, but in any case not until the concrete or masonry has been in position for 14 days. The embankment shall be brought up simultaneously in equal layers on each side of the structure to avoid displacement and unequal pressure. The sequence of work in this regard shall be approved by the Employer's Representative.

All material used for backfilling shall not be an organic soil or highly plastic clay having plasticity index and liquid limit more than 20 and 40 respectively when tested according to IS:2720 (Part V). The fill material shall be deposited in horizontal layers not exceeding 20 centimetres in loose thickness and compacted thoroughly.

Where the provision of any filter medium is specified behind the abutment, the same shall be laid in layers simultaneously with the laying of fill material.

Where it may be impracticable to use power rollers or other heavy equipment, the compaction shall be carried out by mechanical tampers or other methods approved

by the Employer's Representative. Care shall be taken to see that the compaction plant does not hit or come too close to any structural member so as to cause any damage to them or excessive pressure against the structure.

In placing and compacting backfill or embankments adjoining concrete pipes or small structures, sufficient material shall be carefully placed and compacted in layers equally along the sides of the pipes or structures in order to firmly establish line and grade before placing and compacting the adjoining embankment. The Contractor shall be responsible for any damage to structures caused by his operation in placing or compacting embankments or backfill material adjoining to structures, and shall repair damage to the full satisfaction of the Employer's Representative. Construction traffic shall not use the prepared surface of the embankment without the prior permission of the Employer's Representative. Any damage arising out of such use shall, however, be made good by the Contractor at his own expense.

(b) Measurements and Payment

Earth embankment and backfill construction shall be measured by taking cross sections at intervals in the original position before the work starts and after its completion and computing the volumes of earthwork in cubic meters by the method of average end areas.

Filter gravel behind abutments shall be measured and paid for as separate item of work, in position in cubic meters.

The Contract unit rates for the items of embankment and backfill construction shall include the following:

- i) Setting out;
- ii) Compacting original ground;
- iii) Scarifying or cutting continuous horizontal benches 0.3 m wide on side slopes of existing embankment or slopes as applicable;
- iv) Compaction to specification requirements;
- v) Shaping and dressing top and slopes of the embankment and backfill including rounding off corners;
- vi) Working on narrow widths off embankment;
- vii) Restricted working of embankment;
- viii) Restricted working at sites of structures;
- ix) Excavation in all soils from designated borrow areas and transporting the materials to embankment site within all lifts and loads not exceeding 50 m unless otherwise provided for in the Contract, and
- x) All labour, materials tools, equipment and incidental necessary to complete the work to the Specification.

13.7 Field Embankment Test

The field embankment tests shall be made in such a manner as to obtain the optimal passage number of compaction equipment in relation to the thickness of layer after spread to attain the highest dry density of the embankment after compaction, and to obtain the allowable moisture content range of the materials.

No separate payment shall be made for the field embankment tests. All costs of furnishing materials, labour, construction equipment and executing the field embankment test shall be included in the unit rates for applicable embankment items in the Bill of Quantities.

The Contractor shall carry out the control tests on fill materials as required in the Specification as and when required by the Employer's Representative. Tests required are:

- Specific Gravity Test
- Moisture Content Test
- Grain Size Analysis
- Liquid limit
- Plastic Limit
- Compaction Test
- Field Density Test

As an approximate average, a compaction, specific gravity test, grain size analysis and plastic index will be required per 4,000 cubic metres of filling materials.

The Contractor shall provide the necessary equipment, labour and transport equipment for carrying out the sampling and testing in the Project Laboratory. The soil samples shall be stored and tested at the Project Laboratory under the supervision of the Employer's Representative.

SECTION 14 GABIONS, RIPRAP AND STONE SLOPE PROTECTION

14.1 General Description

This Specification Section covers riprap and slope protection of the following types:

1. Boulder apron placed with and without wire mesh gabions.
2. Stone/boulder pitching (riprap) on slopes, placed by hand with filter layer.

14.2 Materials

- A. Stone for apron and pitching shall be sound, hard, durable, and fairly regular in shape with at least one side broken. Stone subject to marked deterioration by water or weather shall not be used.
- B. All stone shall be taken from approved sources. The stones shall be fine boulders or rock, quarrying of granite, quartzite, or similar materials having a specific gravity of at least 2.4 and a compressive strength of at least 400 kg/cm²
- C. Stones for apron and pitching shall weigh at least 40 kg. Spalls shall be minimum 25 mm size and suitable to fill voids in apron and pitching.
- D. The material for filters shall consist of sound gravel, stone or brick ballast and coarse sand, For a single layer filter the compacted thickness of the filter shall not be less than 150 mm. For a multi layer filter, the compacted thickness of each layer filter material shall not be less than 115 mm.
- E. Gabions and Reno Mattresses
 1. The galvanized iron wire shall fulfil the specification of IS 280 or BS 443.
 2. The Minimum weight of Zinc coating per unit area of uncoated wire surface shall be as given below:

Nominal diameter of wire (mm)	2.2	2.7	3.0	3.4	3.9
Nominal weight of coating gm/cm ²	240	260	275	275	290

3. The tensile strength of the wire shall be between 40-55 kg/mm²
4. Gabions shall consist of wire netting double knotted to form a square mesh of 100 mm x 100 mm and the stone for filling gabions shall be hard clean stone between 10 cm and 25 cm. The gauge of the GI wire will be 10 SWG or as specified. The gauge if GI wire used as Selvedge wire will be of 8 SWG.
5. Box gabions shall have wire frames securely tied to the netting at the edges of the box. Before placing any orders for gabion baskets, the Contractor shall submit for the Employer's Representative's approval, full details of the baskets he proposes to use.

14.3 Apron

A. General:

This work shall consist of laying boulders directly, or in wire crates on the bed of rivers or wherever directed by the Employer's Representative for protection against scour. The thickness and shape of aprons shall be as indicated on the drawings or as decided by the

Employer's Representative. The surface on which the apron is to be laid shall be levelled and prepared for the length and width as shown on the drawings.

B. Laying Boulder Apron:

To ensure regular and orderly disposition of the full intended quantity of stone in the apron, template walls in dry masonry shall be built about a meter thick and to the full height of the specified thickness of the apron at intervals of 30 meters all along the length and width of the apron. Within these walls, the stone then shall be hand-packed.

C. Laying Wire Mesh Gabions in the Apron:

1. Before placing in position, the gabions shall be stretched to their full size and shall be wired at all edges.
2. Each row of gabions shall be wired to the adjoining row at the top and bottom edges and at the corners.
3. Each gabion shall be carefully packed by hand with stone so placed as to minimize voids. The Top layers of stones shall be placed with their flattest sides uppermost to provide a smooth surface for placing the lid. The gabions shall be filled 25 mm above the top so that the lid can be tightly stretched over the stone. The lid shall be wired all round.
4. Adjoining rows of gabions shall first be part filled to ensure that the sides of the mesh do not bulge.
5. Care must be taken that the gabions are not distorted during filling.
6. Gabions and mattresses shall be placed on top of a filter fabric. In no case will it be allowed to place gabions and mattresses directly in contact with the soil.

14.4 Pitching on Slopes

A. General:

This work shall consist of covering the slopes of guide banks, embankments and wherever directed by the Employer's Representative, with stone, boulders or bricks over a layer of granular material called filter to drain off seepage water and to prevent erosion of the base materials by providing graded material. The pitching shall extend from the maximum water level, including allowance for wave action, if any, down and about 30 cm below the bed level or as specified in the drawings. The thickness of pitching shall be provided as shown on the drawings.

B. Construction Operations:

1. Before laying the pitching, the sides of banks shall be trimmed to the required slope profile put up by means of lines and pegs at intervals of 3 metres to ensure regular straight work and a uniform slope throughout. Depressions shall be filled and thoroughly compacted.
2. The filter granular material is to be laid over the prepared base and suitably compacted to a thickness of 150 mm or as specified on the drawings.
3. The lowest course of pitching shall be started from the toe wall and build up in courses upwards. The toe shall be in dry rubble masonry (uncoursed).
4. The stone/boulder pitching shall commence in a trench below the toe of the slope. Stone shall be placed by derrick or by hand to the required length, thickness and depth conforming to the Drawings. Stone shall be set normal to the slope and placed so that the large dimension is perpendicular to the face of the slope unless such dimension is greater than the specified thickness of

pitching. The largest stone shall be placed in the bottom courses and for use as headers for subsequent courses.

5. When full depth or pitching can be formed with a single stone, the stones shall be laid breaking joints and all interstices between adjacent stones shall be filled in with spalls of the proper size and wedged in with hammers to ensure tight packing.
6. When there are two or more layers the stones must be laid to obtain the design thickness of pitching, dry masonry shall be used and stones shall be well bonded.

14.5 Measurement and Payment

A. Measurement:

The protection works shall be measured as set forth below:

1. If directed by the Employer's Representative for measurement the materials may have to be stacked at site before laying and nothing extra will be paid to the Contractor for this stacking.
2. The wire mesh gabions (boulders and wire crates) will be measured in cubic meters.
3. The filter and stone/boulder pitching (riprap) will be measured separately in cubic meters for each class of material.
4. Preparation of base for laying the flooring shall be deemed incidental to the work.
5. For laying apron, excavation up to an average depth of 15 cm shall be deemed to be included in the main item and shall not be measured separately unless otherwise specified.

B. Payment:

1. The tender price quoted per cubic metre of wire mesh gabions shall include the cost of all materials, labour tools and paint for completing the works according to the Specification. Excavation up to an average depth of 15 cm shall also be deemed to be included in the rate as dressing of the bed. Excavation beyond this depth shall be paid separately unless otherwise specified.
2. The tender price quoted per cubic metre of filter or stone/boulder pitching, (riprap) shall include the cost of preparing the bases, putting to the profiles, laying and compacting the filter and stone or boulder pitching for embankment slopes to the specified thickness lines, curves, slopes and levels and all labour and materials as well as tools and plant required for the work.

SECTION 15 GEOTEXTILES

15.1 General

Geotextiles are used as filters beneath gabions and reno mattresses to provide for the transmission from the fine-grained subgrade soil to the large opening sizes in the revetment.

15.2 Material

Geotextiles shall be non-woven fabric made of 100% polypropylene continuous fibre, spun-bonded with the exclusion of glues or welds.

Material shall comply with the following requirements:

- Minimum tensile strength = 9.5 KN/m
- Minimum trapezoidal tear = 225 N
- Minimum vertical water flow 50 mm head = 115 mm/s
- Minimum apparent opening size (AOS) = 0.26 mm
- Nominal Mass = 125 gm/m²

15.3 Installation

Geotextiles shall be supplied in rolls or folded.

Geotextiles shall be laid in accordance with the lines and grades shown in the Drawings.

Panels must be unrolled transversely to the bank and the overlapping area should be at least 0.3 m wide. Installation shall be made proceeding from downstream to upstream, against the flow direction.

The geotextile must be carefully anchored at the top, at the bottom and at the edges of the revetment in order to avoid possible erosion. Anchoring shall be made bending downwards the geotextile in order that a minimum earth cover of 50 cm shall be provided for a width of 30 cm.

15.4 Measurement and Payment

Geotextiles shall be measured in square metres in accordance to the lines and grades shown in the Construction Drawings.

Payment shall be made according to the appropriate Contract List Price and shall include overlaps and anchoring not shown in the Construction Drawings.

SECTION 16 TURFING WITH SODS

16.1 General Description

This Specification Section covers furnishing and laying of live sod of perennial turf forming grass on embankment slopes, or other locations shown on the Drawings or as directed by the Employer's Representative.

16.2 Material

- A. The sod shall consist of dense, well-rooted growth of permanent and desirable grasses, indigenous to the locality where it is to be used, and shall be practically free from weeds or other undesirable matter. At the time sod is cut, the grass on the sod shall be free of debris.
- B. Thickness of the sod shall be as uniform as possible with approximately 5–8 cm of soil covering the grass roots depending on the nature of the sod, so that practically all the dense root system of the grasses is retained in strips of uniform width, not less than about 25 cm x 30 cm in size but not so large that it is inconvenient to handle and transport these without damage. During wet weather, the sod shall be allowed to dry sufficiently to prevent tearing during handling. During dry weather, it shall be watered before lifting to ensure its vitality and prevent the dropping of the soil in handling.

16.3 Construction Operation

- A. Preparation of the Earth Bed:
 - 1. Unless otherwise specified, the work shall be taken up as soon as possible following construction of the embankment, provided the season is favourable for establishment of the sod.
 - 2. The area to be sodded shall have been previously constructed to the required slope and cross section. Soil on the area shall be loosened, freed of all stones larger than 50 mm diameter, sticks, stumps and any undesirable foreign matter, and brought to a reasonably fine granular texture to a depth of not less than 25 mm for receiving the sod.
 - 3. Where required, top soil shall be spread over the slopes; prior to placing the top soil the slopes shall be scarified to a depth of 10–15 cm. The top soil shall be spread to a depth which after settlement will provide the required nominal depth shown on the Drawings. Spreading shall not be done when the ground is excessively wet.
 - 4. Following soil preparation and top soiling, where required by the Employer's Representative, fertilizer and ground limestone shall be spread uniformly at the rate directed by the Employer's Representative. After spreading, the materials shall be incorporated in the soil by discing or other means to the depths shown on the drawings.
- B. Placing the Sods:
 - 1. The prepared sod bed shall be moistened to the loosened depth, if not already sufficiently moist, and the sod shall be placed thereon within approximately 24 hours after the same has been cut. Each sod strip shall be laid edge to edge such that the joints caused by abutting ends are staggered. Every strip after it is snugly placed against the strips already in position shall be lightly tamped in position, to eliminate air pockets and pressed into the underlying soil.

2. On side slopes steeper than 2 to 1, the laying of sod shall be started from bottom upwards.
3. At points where water may flow over a sodded area, the upper edges of the sod strips shall be turned into the soil below the adjacent area and a layer of earth placed over this followed by its thorough compaction.

C. Staking the Sods:

Where the side slope is 2 to 1 or steeper and the distance along the slope is more than 2 meters, the sods shall be staked with pegs or nails spaced at approximately 50 to 100 cm along the longitudinal axis of the sod strips. Stakes shall be driven approximately plumb through the sods to be almost flush with them.

D. Top Dressing:

After the sod has been laid in position, the surface shall be cleaned of loose sod, excess soil and other foreign material. Thereafter a thin layer of top soil shall be scattered over the surface as top dressing and the area thoroughly moistened by sprinkling with water.

E. Watering and Maintenance:

1. The sods shall be watered by the Contractor for a period of at least four weeks after laying. Watering shall be done as to avoid erosion and prevent damage to sodded areas by wheels of water tanks.
2. The Contractor shall erect necessary warning signs and barriers, repair or replace sodded areas failing to show uniform growth of grass or areas that are damaged by his operations, and shall otherwise maintain the sod at his cost until final acceptance.

16.4 Measurement and Payment

- A. Turfing with sods shall be measured as finished work in square meters, measured along the slope.
- B. The tender price quoted for turfing with sods shall include payment in full for carrying out all the required operation explained above including compensation for furnishing all the materials to be incorporated in the Works; and all labour, tools, equipment and incidentals to complete the work in accordance with the Specification, except that fertilizer and ground limestone when required by the Employer's Representative shall be paid for in accordance with the variations and provisions of the Conditions of Contract.

SECTION 17 GRAVEL SURFACED ROADS

17.1 General

This Section refers to the surfacing of canal roads. The earthworks for the roads shall be in accordance with the requirement of Section 13 of the Specification except where otherwise provided herein.

Various terminologies related with surface road construction shall have the following definitions:

"Sub-grade" means the zone immediately below the pavement.

"Pavement" means any part or all of the construction comprising base course and surface course

"Base Course" means the material which is placed on the compacted sub-grade to form the lower part of the pavement.

"Surface Course" means the material placed over the base course to form the wearing surface.

"Shoulders" means the fill placed either side of the wearing surface above the base course.

17.2 Tolerances

- (i) The surface level of the layer making up the road shall be constructed to the levels and lines shown on the drawings or ordered by the Employer's Representative within the following limits:

	Above required Level	Below required Level
Surface Course	15 mm	15 mm
Base Course	10 mm	10 mm
Sub-grade	20 mm	20 mm
Side slopes from positions shown on the drawing	0.15 m to one side or other	
Centre-line of roads	0.25 m to one side or other	

- (ii) Where any tolerances are exceeded, the Contractor shall determine the full extent of the area which is out of tolerance and shall make good the surface of the pavement course or formation as follows:

If the formation level is too high, it shall be retrimmed and recompact as specified. If the formation level is too low the deficiency shall be corrected by the addition of suitable material of the same classification or other approved by the Employer's Representative laid and compacted to Specification.

The layer shall be scarified to a depth of 75 mm, reshaped with material added or removed as necessary and recompact all to the Specification.

17.3 Grade and Alignment Control

Grade and alignment control stakes shall be supplied, set and maintained by the Contractor subject to checking by the Employer's Representative in order that the work shall conform to the lines, grades and cross-sections shown on the drawings or ordered by the Employer's

Representative. The stakes shall be set in rows on and parallel with the centreline of the roadway and spaced so that string lines may be stretched between them.

Curve radii, super elevation profiles and vertical and horizontal transitions shall be as shown on the drawings or as directed by the Employer's Representative.

17.4 Works to be Kept Free of Water

The Contractor shall make prior arrangements for the rapid removal of any water which may fall on or be discharged into the site of roadworks under active construction or in a partially completed state.

The Contractor shall provide where necessary temporary drains, pumps or other means of maintaining the roadworks free from water. Such provision shall include forming the embankments in such a manner that their surfaces have at all times a sufficient cross fall to enable them to shed water. The Contractor shall ensure that there is no ponding of water adjacent to the road and side drains.

17.5 Sub-grade

Materials for sub-grade shall be excavated from road side drains or from approved borrow areas or be excess material from excavation in cut to sub-grade level. All unsound material shall be removed from the sub-grade, which shall then be compacted in accordance with the requirement for road embankment in Section 13.

The sub-grade once it has been finally compacted, shaped and approved, shall be protected and kept well drained. Storage or stockpiling of materials or contractor's equipment on the formation shall not be permitted.

Traffic shall be permitted to pass over the compacted sub-grade only with the approval of the Employer's Representative. Use of prepared sub-grade by Contractor's equipment or public traffic which will damage or cause the sub-grade to deteriorate will not be permitted and the Contractor shall, at his own expense, repair any soft spots or any damage caused by his operations or by public traffic.

17.6 Base Course

Base course shall be natural river sand and gravel mixture of consistent grading and strength with the following properties:

The base course material shall have following textural gradation:

Nominal Maximum Size 3"

BS Sieve	% Passing by weight
3"	100
2"	85–100
3/8"	37–75
3/16"	25–60
No. 7	20–50
No. 36	10–30
No. 200	0 –15

The base course shall only be constructed provided that the underlying layer conforms to the requirements specified for the layer concerned. Immediately before placing the material, the underlying layer shall be checked for any damage or deficiencies which shall be made good.

The Contractor shall arrange his sequence of transporting, spreading and compacting the pavement so that segregation is avoided and the required compacting is achieved over the full width. Before commencing work the Contractor shall submit his proposals for the working and compaction of road materials to the Employer's Representative for approval. Contractor's equipment for compaction may consist of sheep foot roller, rubber tyre or vibrating rollers or other suitable plant which will compact the respective materials to their specified densities and as approved by the Employer's Representative.

17.7 Surface Course

The material for the surface course shall consist of a well graded crushed stone or natural river gravel, free from vegetable matter, lumps of clay or other deleterious substances. The material shall conform to the particle size distribution given hereunder:

Sieve Size (mm)	% Passing
37.5	100
20.0	80–100
10.0	55–80
5.0	40–60
2.36	30–50
0.60	15–30
0.75	5–15

All clay lumps shall be excluded but dust or powdered silt shall be added in controlled amounts to achieve the required grading and plasticity modulus.

The surface course shall only be constructed provided that the underlying base course layer conforms to the requirements specified for the layer concerned. Immediately before placing the material, the underlying layer shall be checked for any damage or deficiencies, which shall be made good.

The Contractor shall arrange his sequence of transporting, spreading and compacting the pavement, so that segregation is avoided and the required compaction is achieved over the full width. Before commencing work, the Contractor shall submit his proposals for the working and compacting of road materials to the Employer's Representative for approval. Contractor's equipment for compaction may consist of sheep foot roller, rubber tyre or vibrating rollers or other suitable plant which will compact the respective materials to their specified densities and as approved by the Employer's Representative.

17.8 Inspection, Sampling and Testing

While the construction work is in progress, regular inspection, sampling and testing of the Sub-grade base course and surface course shall be carried out by the Contractor under supervision of the Employer's Representative.

Five samples, for each 500 m length of road or as determined by the Employer's Representative, shall be taken for determining field density. The field density shall not be less than ninety five (95) percent of the optimum dry density determined by Standard Proctor Compaction Test in the Laboratory for the material being compacted. The cost of such tests shall be born by the Contractor.

The Compacted base course and surface course shall have a surface smoothness such that waves and irregularities do not exceed 10 mm in 3 m as measured against straight edge, for surface course and 15 mm in 3 m for base course.

The compacted base course and surface thickness shall not be less than that shown on the drawings. Any areas of the compacted base course or surface course having a compacted thickness or smoothness less than those specified shall be corrected by scarifying the surface, adding approved material, reshaping, re-compacting and finishing as specified and approved by the Employer's Representative. Skin patching an area without scarifying the surface to permit proper bonding of the added material will not be permitted.

17.9 Measurement and Payment

Measurement for payment for base course and surface course shall be made of the materials in place to the prescribed lines, grades and dimensions shown on the drawings or as directed by the Employer's Representative to the required degree of compaction.

The volume shall be measured by taking the area of the compacted course at regular interval of 30 m or as directed by the Employer's Representative and following average end area method. The thickness shall be measured by making holes into the compacted layer at three points at each cross-section; two on the sides and one at the centre. The average thickness so measured shall be taken as the thickness of the compacted layer. Alternatively, the thickness can also be determined by taking the differences in the level before and after the construction of the layer in consideration.

Payment for base course and surface course shall be made at the unit rate per cubic meter of the respective item in the Bill of Quantities. The unit rate shall include all cost for preparation of formation, selection of materials, supply control of moisture content and compaction in layers as specified for pavement and shoulder materials; testing and forming to tolerances.

SECTION 18 CONCRETE CONSTRUCTION

18.1 Scope

- A. This Specification Section includes furnishing all materials and production, transportation, placing, finishing, curing, repair and protection of all concrete, grout used in connection with the concrete work, and grout, mortar or concrete used for setting in equipment which is a part of this Contract.
- B. All concrete required to be used for structures to be constructed under the Contract and for all related purposes and as may be required by the Employer's Representative, shall consist of the materials herein specified and shall be according to the Drawings and the requirements stated herein. The stipulations and requirements herein set forth shall apply except when such stipulations are specifically modified by the Employer's Representative for any particular item of the work. Any stipulations and requirements not specified herewith shall conform to IS or BS standards.

18.2 Storage and Handling Cement

- A. The Contractor shall provide suitable storage for cement at approved places convenient to the work. The cement shall at all times be carefully protected against moisture and exposure. Cement store house shall be weather tight, shall have close fitting floors set at a height of at least 30 cm above ground, shall be large enough to maintain a sufficient supply of cement on hand to prevent delays or interruptions to the work and shall have sufficient floor space to store each truck load of cement separately and affording convenient access thereto for sampling, counting of sacks and removal. The height shall be limited to one meter when the storage period is expected to be longer than 60 days.
- B. To prevent undue aging of sacked cement after delivery, the Contractor shall use sacked cement in the chronological order in which it was delivered on the job. Each shipment of sacked cement shall be stored so that it may readily be distinguished from other shipments. All condemned sacks shall be promptly disposed of or marked by means approved by the Employer's Representative.

18.3 Class and Grade of Concrete

- A. General:

All structural concrete shall conform to the appropriate class and grade for strength and exposure conditions of the appropriate IS or BSS standards.
- B. Unreinforced Concrete for Foundation and Floor Slabs and other structural Parts (M10, M15 and M20):

Furnish forms and place foundation concrete as specified. Concrete shall be placed in sections according to the construction drawings or as specified by the Employer's Representative. Contraction joints shall not be the subject of separate payment items. Construction joints in the foundation slab shall be only allowed if directed by the Employer's Representative. On connection to walls, water stops shown on the Drawings or as specified by the Employer's Representative shall be cast into the fresh concrete. Visible concrete surfaces shall be finished in fair-faced concrete. This item includes the construction of all recesses, block outs and voids.
- C. Concrete Mixes:

Concrete shall consist of cement, graded aggregate and water thoroughly mixed and completed to provide the strengths as IS Code detailed below:

	<u>Nom max size of Agg</u>	<u>Proportion of aggregate</u>	<u>Min. Compressive strength at 28 days</u>
A	38mm	1:2:4	150kg/cm ²
AA	19mm	1:2:4	150kg/cm ²
B	38mm	1:3:6	100kg/cm ²
C	38mm	1:4:8	

The mix proportions shown in the table above are given as a guide to the mixes ordinarily needed to achieve the specified strengths. The actual mix designed after tests will depend upon the closeness of control which the contractor is prepared to exercise in production and upon the quality of the materials which will be obtained. The contract rates included in the Bill of Quantities for all types of concrete are to allow for any additional cement which may be required to achieve the specific strengths and to produce a dense impermeable and stable concrete.

Preliminary trial mix design of concrete will be carried out by the Contractor in the presence of the Employer's Representative to determine the design mixes which will satisfy the specification with the available materials. These mixes will be designed with due regard for the workability necessary to allow the contractor to place and compact the concrete with the equipment he proposes to use in any particular situation.

D. Water Cement Ratio:

The water cement ratio for the various types of concrete shall be determined by the preliminary tests and in no case shall the water ratios used be allowed to exceed those determined by the preliminary tests.

The contractor shall be required to have knowledge of the moisture content of all sand and coarse aggregate as they reach the mixer and shall make such adjustments to the mix, as are necessitated by changes in the moisture content of all aggregates.

18.4 Composition

- A. Unless otherwise specified and/or approved by the Employer's Representative, concrete shall be composed of Portland cements and aggregate and water as specified, well mixed and brought to the proper consistency.
- B. Grout shall be composed of Portland cement, sand and water all proportioned and mixed to the consistency approved by the Employer's Representative. A nonshrink compound may be required by the Employer's Representative where this is deemed necessary, in which case an extra payment shall be agreed upon between the Employer's Representative and the Contractor.
- C. For nonstructural concrete and blinding, the proportion of Portland cement to sand and aggregate shall not be less than 1 to 8 by volume. The minimum weight of cement in each cubic meter of concrete placed shall be 225 kg.
- D. For structural concrete the "Design Mix" shall be used. The "Design Mix" will be established from the test mixes to attain the stipulated characteristic strength. The minimum quantity of cement in each cubic meter of concrete placed shall be 325 kg.

- E. The proportion in which various ingredients are to be used shall be as determined and approved from time to time during the progress of the works and tests made of the aggregates and the resulting concrete. The mix proportion and the appropriate water/cement ratio will be determined on the basis of producing concrete having suitable impermeability, durability, workability and required strength without the use of an excessive amount of water or cement. The new water/cement ratio of the concrete (inclusive of the water within or absorbed by the aggregate) shall not exceed 0.54 by weight for structural concrete, and not exceed 0.66 by weight for other classes. Tests for the concrete will be made by the Employer's Representative and the mix proportions shall be changed whenever necessary for the purposes of securing the required economy, workability, density, impermeability, durability or strength, and the Contractor shall not be entitled to additional compensation because of changes.
- F. Additives: Plasticizers, waterproofing compounds and the other additives will not be used unless approved in writing by the Employer's Representative.
- G. The Contractor at his expense shall provide the Employer's Representative with such equipment and activities as may be necessary for procuring and testing representative samples of the concrete or cement to the satisfaction of the Employer's Representative.
- H. The frequency of the tests shall be determined by the Employer's Representative on the basis of placement rate and the structure, but not more often than necessary to make sure that the concrete being placed conforms to the Specification and the design requirements.

18.5 Materials for Concrete

- A. Portland Cement:
The Portland cement shall conform to the IS Code or equivalent.
- B. Concrete Reinforcement Steel:
The Contractor-furnished steel reinforcement bars shall conform to IS Code or equivalent.
- C. Water:
The Water in the concrete, mortar and grout shall be free from objectionable quantities of silt, organic matter, alkalis sulphates, and other impurities. The water to be used in all concrete, mortar and grout will be subject to the approval of the Employer's Representative.

18.6 Aggregate

- A. General:
All aggregate materials to be used for the Contract and for all related purpose, and as may be required by the Employer's Representative, shall consist of materials herein specified and the requirements set forth herein shall apply except where such stipulations and requirements are specifically modified by the Employer's Representative for any particular item of work.
- B. Handling and Stockpiling:
 - 1. The Contractor shall excavate as required, load, transport, unload, handle and stockpile sand and aggregates as required to perform the construction of the Works and structures herein. All methods employed by the Contractor for unloading, loading, handling and stockpiling of sand and aggregates and the

location and arrangement of all stockpile areas shall be subject to the approval of the Employer's Representative.

2. The Contractor shall clear and evenly grade for drainage all sites destined for stockpiling and shall handle stockpiling operations of sand and aggregates so that the segregation and breakage will be kept to a minimum and that stockpiled materials will not be contaminated with soil or other foreign material due to surface floods of ground water.
3. The Contractor will be required at his own expense to reprocess any sand or aggregates which may become segregated or contaminated due to improper stockpiling and lack of adequate protection as directed by the Employer's Representative.
4. The Contractor shall conduct all stockpiling operations in such a manner as to deposit all materials directly in final position in the stockpiles and in layers of not more than 1.5 meter height. Sand and aggregates shall not be moved from place to place in the stockpiles except as superficial levelling may be necessary to provide suitable road-ways for trucks in placing successive layers, and the Contractor shall provide effective means to prevent breakage of aggregates caused by trucks operating over stockpiles. Dumping over the ends or sides of the stockpiles will not be permitted.

C. Sand:

1. All natural sand required for the construction of the works shall be furnished by the Contractor and may be obtained from river deposits or other approved natural sources. If natural sand is obtained from sources not owned or controlled by the Employer, the Contractor shall make all necessary arrangements with the source owner and shall pay all rentals or other costs connected therewith.
2. Samples: The Contractor shall submit to the Employer's Representative, for preliminary tests and approval of the material, a representative sample of about 15 kg of natural sand proposed for use at least 14 days before use of such materials is required. Approval by the Employer's Representative of sources of natural sand shall not be construed as constituting approval of all materials taken from the sources, and the Contractor shall be responsible for the specified quality of all such materials used in the work.
3. The deposit of natural sand shall be cleared by the Contractor of all vegetation and other objectionable matters, and all unsuitable soil, sand and gravel shall be removed. The deposit shall be developed and operated so as not to detract from the usefulness of the deposits. The materials shall be screened and washed as necessary to produce natural sand meeting the requirements set forth herein.
4. Cleanliness and Quality: Sand or fine aggregates shall be clean and free from clay lumps, soft and flaky particles, alkali, organic matter, loam, mica and injurious amounts of deleterious substances. The sum of percentages of all deleterious substances must not exceed 5% by weight. Sand shall be sharp, cubical, hard and durable. Loss of fine aggregate subject to five cycles of sodium sulphate soundness test shall not exceed 5 percent.
5. Fine Aggregates:
Fine aggregate shall be natural sand or sand derived by crushing gravel or stone and shall be free from coagulated lumps; sand derived from stone unsuitable for

coarse aggregate shall not used as fine aggregate. The following grading shall be taken for general guidance.

Percentage Weight Passing B.S. Sieves

B.S. 410 Test Sieve	Grading Zone 2
5.52 mm	100
4.76	91-100
2.40	75-100
1.20	55-90
1.60	35-59
0.30	8-30
0.15	0-10

6. All natural and blended sand will be subject to testing by the Employer's Representative to determine whether the sand produced conforms to the requirements of the specification. The Contractor shall furnish, without charge, such assistance as the Employer's Representative may require in obtaining representative samples for testing purposes and in inspecting plant facilities and operations of the Contractor. The Contractor shall at his expense furnish the Employer's Representative with all the equipment needed in order to make above tests and analysis.

D. Coarse Aggregate:

Coarse Aggregate shall be crushed or uncrushed gravel or crushed stone. The pieces shall be angular or rounded in shape and shall have granular or crystalline or smooth (but not glossy) non-powdery surfaces. Friable, flaky, and laminated pieces of mica shall only be present in such quantities as not to affect adversely the strength and durability of the concrete. The nominal sizes of the coarse aggregate shall be 38 mm to 5 mm in structural Concrete and well graded to the satisfaction of the Employer's Representative.

The coarse aggregates are required to conform to the specifications and if, when tested by the Employer's Representative, they do not meet the specified grading requirements, the Contractor shall re-screen or process the materials, at his own cost, to the extent necessary to produce aggregates to the satisfaction of the Employer's Representative.

The following grading shall be taken for general guidance percentage by weight passing 85 sieves:

B.S. 410	Normal Size of graded aggregate	
	38 mm to 5 mm	19 mm to 5 mm
76.20	100	0
63.05	0	0
38.10	95.00	100
19.5	30.00	95.00
12.70	0	0
19.50	10.35	22.55
4.66	0.5	0.10

18.7 Batching

The Contractor shall provide such means and equipment as are required accurately to determine and control the amount of each separate ingredient entering the concrete mix. Such means and the equipment and its operation shall at all times be subject to approval of the Employer's Representative. All dry materials entering the mixer shall be measured by weight or calibrated volume boxes.

18.8 Mixing

- A. The concrete ingredients shall be mixed in a batch mixer or portable mixer for not less than 1 ½ minutes after all ingredients (except for the full amount of water) are in the mixer. The mixing time will be increased where the batch mixer exceeds a capacity of 1.5 m³. The Employer's Representative reserves the right to increase the mixing time when the charging and mixing operations fail to produce a concrete batch throughout which the ingredients are evenly distributed and consistency uniform. The concrete shall be uniform in composition and consistency from batch to batch except when changes in composition, consistency are required. Water shall be added prior to, during and following the mixer charger operations. Excessive overmixing requiring the addition of water to preserve the required concrete consistency will not be permitted.
- B. Hand mixing of concrete will not be permitted, except that the Employer's Representative may approve such operations for small size concrete works upon request of the Contractor.
- C. Truck mixers will be permitted only when the mixers and their operation are such that the concrete throughout the mixed batch and from batch to batch is uniform with respect to consistency and grading. Any concrete retained in truck mixers so long as to require additional water to permit satisfactory placing shall be discarded at the expense of the Contractor.
- D. Any mixer that at any time produces unsatisfactory results shall be repaired. Mixers in centralized batch and mixing plants shall be arranged so that mixing action in the mixers can be observed from a location convenient to the mixing plant operator's station. Mixers shall not be loaded in excess of their rated capacity unless specifically authorized.

18.9 Formwork (Shuttering and Centering)

A. Design and Material:

Forms shall conform to the various shapes, lines, grades, and dimensions of the concrete structures as shown on the Drawings or as determined by the Employer's Representative. The material to be used and the design of the forms shall be subject to approval by the Employer's Representative before the construction of the forms is started; provided however that such approval will not relieve the Contractor from his responsibility for the adequacy of the forms or from his obligation to remedy any defects which may develop or become apparent with use of the forms. The Employer's Representative may at any time condemn any sections of forms found deficient in any respect, and the Contractor shall promptly remove the condemned forms from the work and replace them at his expense. Drawings showing the general design and dimensions for forms for structures need not be submitted by the Contractor to the Employer's Representative for approval unless the Employer's Representative orders such submission.

B. Form Constructions:

1. Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. Forms shall be of metal, of metal lined timber, plywood lining, tempered pressed wood lining, or of smooth planed boards, in good condition as required to produce the surface finish specified herein.
2. The surface of concrete exposed to view on completion of the works shall be fair faced. The forms for such surfaces may be made of metal and shall be true in every respect to required shape and size and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. All forms on waterway surfaces shall be planed and cleaned to eliminate marks in so far as it is practicable. Suitable and effective means shall be provided in the construction of forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridge line offsets or similar surface defects in the finished concrete. Forms when erected shall be grout tight. Only in specific cases, where it requires smoothing of the corners and curves, wooden forms shall be allowed upon the approval by the Employer's Representative.

C. Surface Treatment:

Adequate and suitable means for removing the forms without injury to the surface of the finished concrete shall be provided. Before concrete is placed, the surface of the forms shall be oiled with commercial form oil that will effectively prevent sticking of the concrete to the forms and will not stain the concrete. Bond breaking materials or processes shall be used only after approval by the Employer's Representative. Care shall be taken in applying oil to avoid contact with reinforcing steel with resulting loss of bond.

D. Chamfering:

Chamfer strips shall be placed in the corners so as to produce bevelled edges on permanently exposed concrete surfaces. Interior angles on such surfaces and edges at formed joints will not require bevelling unless requirement for bevelling is so indicated on the Drawings.

E. Centering:

Forms shall be properly secured in position so as to prevent floating or other movement during the placing of concrete. They may be supported during placement of concrete on concrete piers, metal pedestals or by other approved means. Form supports shall be carried to firm foundation so that no settlement of the forms will be possible during construction.

18.10 Fabrication and Cleaning Reinforcing Steel

- A. Reinforcement bars before being placed shall be free from loose mill scale rust, oil, grease and any coatings that will destroy or reduce the bond. When after placing there is delay in placing the concrete, the steel bars shall be re-inspected and cleaned when required by the Employer's Representative.
- B. The steel bars shall be accurately bent and formed to the dimensions indicated on the Drawings included herein or on the approved reinforcing steel detail drawings.
- C. The steel bars shall not be straightened or be bent in a manner that will injure the material. Bars with kinks or bends not shown on the Drawings shall not be used. All bars shall be bent cold. Heating of the bars for bending will be permitted only if the entire operation is approved by the Employer's Representative.

18.11 Placing of Reinforcement

- A. General: Reinforcement bars shall be accurately positioned as shown on the Drawings and secured against displacement by using iron wire ties or suitable clips at intersections, and shall be supported as required by concrete or metal supports. Supports for horizontal reinforcement shall be used so that there will be no sagging of the bars or mesh. Where portions of the supports will be exposed on concrete surfaces designed to receive a smooth finish, the supports shall be made of non-corrodible metal.
- B. Cover: The minimum concrete cover to reinforcement shall be 30 mm or as specified by the Employer's Representative, but in no case will the minimum concrete cover be less than 1.5 bar diameters. Bars shall be bent and fixed with suitable spacers to ensure that the minimum cover is maintained. The ends of tying wires shall be bent inwards or cut off so as to have 30 mm minimum concrete cover.
- C. The minimum distance between parallel bars shall be 25 mm, but in no case be less than 1.5 times the maximum size of the coarse concrete aggregate, unless particular instruction are given by the Employer's Representative.

18.12 Splicing

When it becomes necessary to splice reinforcement bars at points other than shown on the Drawings, for floors, walls and columns the minimum overlaps of splices shall be thirty times the steel diameter of the larger bar and shall be subject to approval of the Employer's Representative.

18.13 Preparation for Placing of Concrete

- A. No concrete shall be placed until all form work, reinforcement, installation of parts to be embedded, bracing of forms and preparation of surfaces necessary before placing have been approved by the Employer's Representative. No concrete shall be placed in water without the written permission of the Employer's Representative, and the method of depositing the concrete shall be subject to his approval. Concrete shall not be placed in running water until the concrete has sufficiently hardened. All surfaces of forms and embedded materials that have become encrusted with dried mortar or grout from concrete previously placed shall be cleaned of all such mortar or grout before the surrounding or adjacent concrete is placed.
- B. Cleaning of Surface: Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris or loose material. The surfaces of absorptive materials against or upon which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete.
- C. Blinding Course: Where shown on the Drawings or where required by the Employer's Representative, the Contractor shall lay a blinding course of non structural concrete. The surface of the blinding course shall be finished to the dimensions shown on the Drawings and shall be dense and smooth. No concrete shall be placed on the blinding course until at least 24 hours after laying. No structural concrete shall be placed against the ground without either form work or blinding.
- D. Construction Joint Surfaces: Concrete surfaces upon or against which concrete is to be placed, and to which new concrete is to adhere, and which have become so rigid that the new concrete cannot be incorporated integrally, are defined herein as "construction joints". The surfaces of construction joints shall be clean and moistened before being covered with fresh concrete or mortar. Cleaning shall consist of the removal of all loose or defective concrete coatings or foreign material. The surface of construction joints shall be cleaned by wet sandblasting, scraping, chipping or other approved methods and then washed thoroughly (e.g. with high pressure air-water jets) to the satisfaction of the Employer's Representative immediately prior to placement of fresh concrete. All pools of water shall be removed from the surface of construction joints before placing of the following concrete layer.
- E. Placing Equipment: Concrete shall be compacted, except when the Employer's Representative decides otherwise, with the help of concrete vibrators of approved type and capacity. Transporting concrete inside the forms with the help of vibrators will not be allowed. Before placing of any concrete the Contractor shall present to the Employer's Representative for approval the list of all equipment available for the particular pour of concrete, including number, capacity and the state of repair of the said equipment. The methods and equipment used for transporting and placing of concrete will be such that concrete having the required composition and consistency will be delivered to and placed into the work, without objectionable segregation or loss of slump.

18.14 Placing of Concrete

- A. Concrete shall be placed only in the presence of the Employer's Representative or his authorised representative. After the surface has been prepared satisfactorily, surfaces or construction joints upon which new concrete is to be placed, shall be flushed with a coat or neat cement grout or covered with a layer of mortar approximately 3 cm thick. The mortar shall have the same proportion of cement and sand as the regular concrete mixture, unless otherwise directed. The water-cement ratio of the mortar shall be suitable for placing and working in the manner herein specified. The mortar shall be spread uniformly and shall be worked thoroughly into all irregularities of the surfaces. Concrete shall then be placed immediately upon the fresh mortar. In placing concrete against formed construction joints, special contact with the surface of the joints shall be achieved by careful puddling and spading with the aid of suitable tools.
- B. Retempering of concrete will not be permitted. Any concrete which has become so stiff that proper placing cannot be assured shall be discarded and no payment will be made to the Contractor for such wasted concrete. Concrete shall be deposited in all cases as nearly as practicable directly in its final position and shall not flow in a manner to permit or cause segregation. Excessive separation of coarse aggregates in concrete, caused by allowing the concrete to fall freely from too great a height or at too great an angle from the vertical, or to strike the forms or reinforcement steel, will not be permitted and where such separation would otherwise occur, the Contractor shall provide suitable drop chutes and baffles to confine and control the falling concrete.
- C. Except as intercepted by joints, all formed concrete shall be placed in continuous horizontal layers, the depths of which generally shall not exceed 50 cm. The Employer's Representative reserves the right to require lesser depths of layers where concrete in 50 cm layers cannot be placed in accordance with the requirements of this specification. All intersections of construction joints with concrete surfaces which will be exposed to view shall be made straight and level or plumb, unless otherwise shown on the Drawings as ordered by the Employer's Representative.
- D. Large Blocks: In placing Concrete in large thick exposed areas the Contractor shall maintain the exposed area of fresh concrete at the practicable minimum by first building up the concrete to full width of structures and to full height of the lift over a restricted area at one end of the structure and then continuing in similar progressive stages across the structure and then continuing in similar progressive stages to the full area of the structure. The slope formed by the unconfined edges of concrete shall be kept as steep as practicable in order to keep its area to a minimum. Concrete along these edges shall not be vibrated until adjacent concrete in the layer is placed except that it shall be vibrated immediately when conditions are such that the concrete will harden to the extent that later vibrations will not fully consolidate and integrate it with more recently placed adjacent concrete. Clusters of large aggregate shall be scattered before new concrete is placed over it. Once placement of concrete has commenced in a structure, placement shall not be interrupted, unless adequate construction joints can be made.
- E. Rain: Concrete shall not be placed during rains sufficiently heavy or prolonged to wash mortar from coarse aggregate on the slopes of the placement. During such rains mortar should not be spread on construction joints and diluted mortar already spread shall be removed and replaced before continuing with the work.

- F. Buckets: Concrete buckets where used shall be capable of promptly discharging the low-slump concrete mixes specified and the dumping mechanism shall be designed to permit the discharge of as little as 0.35 m³ portions of the load in one place. Buckets shall be suitable for attachment to and use of drop chutes where required in confined locations.
- G. Concrete around Openings: If concrete is placed monolithically around openings having vertical dimensions greater than 60 mm, and if concrete in decks, floor slabs, beams, girders or other similar parts of structures is placed monolithically with the concrete of structures, the following instructions shall be strictly observed;
1. Placing of concrete shall be delayed from one to three hours at the top of openings and at the bottom of bevels under decks, floor slabs, girders or other similar parts of structure members when bevels are not specified, but in no case shall placing be delayed so long that the vibrating unit will not readily penetrate of its own weight into concrete placed before the delay. When consolidating the concrete placed after the delay, the vibrating unit shall penetrate and vibrate the concrete placed before the delay.
 2. The last 60 cm or more of concrete placed immediately before the delay shall be placed with as low slump as practicable and special care shall be exercised to effect thorough consolidation of the concrete.
 3. The surface of concrete where delays are made shall be clean and free from loose and foreign material when concrete is started after the delay.
 4. Concrete placed over openings and in decks, floors, beams, girders and other similar parts of structures shall be placed with as low a slump as practicable and special care shall be exercised to effect thorough consolidation of concrete.
- H. Consolidation: Each layer of concrete shall be consolidated to the maximum practicable density, so that it is free from pockets of aggregates and closes snugly against all surfaces of forms and embedded materials. In consolidating each layer of concrete, the vibrating head of the vibrator shall be allowed to penetrate and revibrate the concrete in the upper portion of the underlying layer. All concrete for major structures shall be consolidated with electric or pneumatic power driven immersion type vibrators, operating at speeds of at least 7,000 revolutions per minute when immersed in the concrete. Hand consolidation, using slice bars, may be employed for minor structures at the Employer's Representative's direction. Additional layers of concrete shall not be placed until the layers previously placed have been compacted thoroughly as specified. Equipment used for consolidating the concrete shall be subject to the approval of the Employer's Representative.

18.15 Temperature of Concrete

The temperature of concrete when it is being placed, in general, shall not be more than 30°C. When the temperature is high, the concrete shall be mixed at the job site and be placed immediately after mixing. If the weather conditions are such that the temperature rise above + 32° C, the contractor shall take the necessary steps to keep the concrete temperature below that specified above (e.g. placing of concrete during the night).

18.16 Removal of Forms

- A. The time and method of removal and moving of forms shall be subject to approval by the Employer's Representative, and this work shall be done with care so as to avoid injury to the concrete. No loading on "green" concrete will be permitted. As soon as the forms are removed, the surface of the concrete shall be carefully examined and any irregularities in the surface shall be immediately repaired to the satisfaction of the Employer's Representative.
- B. In general, the minimum time between placing of the concrete and the removal of forms shall be two days for unloaded walls and other side forms, seven days for supporting walls and conduits, and 14 days for bridge decks.

18.17 Curing of Concrete and Protection of Surfaces

- A. All concrete shall be cured by water or by white pigmented sealing compound, as hereinafter specified. The Employer's Representative shall have the right to determine which type of curing shall be used by the Contractor in the different portions of the work in order to prevent damage.
- B. Concrete cured with water shall be kept wet for at least fourteen consecutive days immediately following placement, beginning as soon as the concrete has hardened sufficiently to prevent damage. Curing shall consist of covering the exposed concrete surfaces and the forms with water saturated material or a system of perforated pipes, mechanical sprinklers or porous hose, or by any other approved method which will keep all surfaces to be cured continuously (not periodically) wet. Water used for curing shall meet the requirements of the Specification for water used for mixing concrete.
- C. Exposed surfaces of all concrete, except surfaces of concrete coated with white pigmented sealing compound, shall be protected against direct access of sun rays for at least the first three days after placing. Such protection shall be made effective as soon as practicable after the removal of the forms. The Contractor shall protect all concrete against injury until final acceptance by the Employer's Representative.
- D. Testing of Irregularities:
 - 1. Finishing and repair of concrete surfaces shall be performed only by skilled workmen and in the presence of the Employer's Representative. Concrete surfaces will be examined by the Employer's Representative where necessary to determine whether surface irregularities are within the limits hereinafter specified.
 - 2. Surface irregularities will be classified as "abrupt" or "gradual". Offsets caused by displaced sheeting or lining of form sections or by loose knots or otherwise defective form lumber will be considered as abrupt irregularities and will be tested by direct measurement.

All other irregularities will be considered as gradual irregularities and will be tested by use of a template, consisting of a straight edge or the equivalent thereof for curved surface. The length of the template will be 1.5 m for testing of formed surfaces and 3 m for testing of unformed surfaces.
- E. Finishing of Formed Surfaces: Finishing of formed surfaces shall consist of filling all recesses larger than 5 mm, or which have been caused by removal of form ties, and grinding or filling as necessary to produce surfaces with no abrupt irregularities exceeding 6 mm and no gradual irregularities exceeding 13 mm. Before acceptance

of the work, the Contractor shall clean all exposed surface of unsightly encrustation and stains.

F. Sloping of Unformed Surface: Interior unformed surfaces shall be sloped for drainage where shown on the Drawings or as directed by the Employer's Representative. Surfaces which will be exposed to the weather shall be sloped for drainage. Unless the use of other slopes on normally level surfaces is indicated on the Drawings or directed by the Employer's Representative, narrow surfaces such as tops of walls and curbs shall be sloped approximately 20 mm per metre of width; broader surfaces such as platforms and decks shall be sloped approximately 10 mm per metre.

G. Finishing of Unformed Surfaces: Clauses of finish for unformed surfaces shall be as follows:

1. Unformed surfaces that will be covered by backfill or by concrete shall be finished by sufficient levelling and screening to produce an even uniform surface. Surface irregularities measured as described in paragraph D above shall not exceed 1.9 cm.
2. A hard steel trowel finish shall be applied to unformed surfaces that will be subjected to the action of flowing water. Bridge deck surfaces which are subject to pedestrian or vehicular traffic shall be given a standard light broomed finish. Floating and trowelling may be performed by use of hand or power driven equipment. Floating and trowelling shall be started as soon as the screened surface has stiffened sufficiently and shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture.

Surface irregularities, measured as described in paragraph D above shall not exceed 6 mm, no trowel marks or abrupt irregularities will be permitted. Joints and edges shall be tooled.

H. Repair of Concrete Surface:

1. If, after stripping of forms, any concrete is found to be not formed as shown on the Drawings or is out of alignment of level or shows a defective surface, it shall be considered as not conforming with the intent of the specification and shall be removed and replaced by the Contractor within 72 hours of concrete age at his expense unless the Employer's Representative grants permission to patch the defective area, in which case patching shall be performed as described in the following paragraphs and subject to further detailed instruction as the Employer's Representative may consider necessary.
2. Defects that require replacement or repair are those that consist of honeycombs, damage due to stripping of forms, loose pieces of concrete, bolt holes, tie-rod holes, ridges at formed joints, and bulges due to movement of the forms.
3. Ridges and bulges shall be removed by chipping or tooling followed by rubbing with a grinding stone.
4. Honeycombed and other defective concrete shall be chipped out, the chipped openings being sharp-edged and shaped so that the filling will be keyed in place. All holes shall be thoroughly moistened for 24 hours before the filling is placed. The surface or the filling shall be finished flush with the surrounding concrete surface and shall have the same texture. All patches shall be cured as specified above for concrete, and to the satisfaction of the Employer's Representative.
5. Imperfections, bolt and tie-rod holes, and the chipped out honeycomb areas to be repaired, shall be filled with dry patching mortar composed of one part of Portland cement and two parts of regular concrete sand (volume measurement) together

with a non-shrink patching compound approved by the Employer's Representative, in the amount specified by the manufacturer, and just enough water, so that after the ingredients are thoroughly mixed the mortar will stick together on being moulded into a ball by slight pressure of the hands and will not extrude free water. Mortar repairs shall be placed in thin layers and thoroughly compacted by suitable tools. Care shall be taken in filling rod, bolt and pipe holes so that the entire depths of the holes are completely filled with compacted mortar.

6. Where concrete be exposed to view, the mortar shall be made to match the colour of concrete by substituting white Portland cement in the required amount for a portion of the regular cement. When, in the opinion of the Employer's Representative, the extent of the imperfections in structures exposed to view is such that patching alone would not produce a surface of satisfactory appearance the Contractor will be required to give such surfaces, as well as adjacent surfaces a sack rubbed mortar finish in accordance with the Employer's Representative's instructions.

18.18 Joints in Concrete

A. General

Joints shall only be formed in the positions shown on the Drawings or approved by the Employer's Representative. Construction, contraction and expansion joints shall be formed to the details shown on the Drawings and as specified herein, and from the specified materials.

B. Construction Joints

Whenever concrete is placed on or against previously placed concrete which has become so hard that the new concrete cannot be monolithically compacted therewith, the resulting place of separation shall be defined as a construction joint.

Where the locations of construction joints have not been shown on the Drawings then the Contractor shall decide the locations of construction joints to suit the concreting programme. The positions of construction joints shall be to the approval of the Employer's Representative, which shall be obtained before any concreting takes place. The Contractor shall submit to the Employer's Representative drawings showing the positions of constructions joints. Construction joints shall be located so that in conjunction with the programme for concreting, the effects of shrinkage and temperature are minimized. Construction joints shall be formed in straight lines at right angles to the general direction of the member and shall take account of shear and other stresses, and as far as is practical shall be located at points of least shear. Construction joints shall be formed with clean sharp arises.

Construction joints shall be formed using rigid shuttering or other approved method, with joint lines at exposed surfaces of concrete being straight and continuous, plumb, level or inclined. Before placing new concrete against that which has already set, the surface shall be cleaned over the full section to leave a sound irregular clean surface free from laitance, loose and foreign matter by green cutting using an air/water jet, by chipping or other approved means.

C. Contraction Joints

Contraction joints shall be as located and detailed on the Drawings. The joints shall be made by forming with smooth forms the concrete on the side of the joint and allowing it to set before placing concrete on the other side of the joint. The concrete surface on one side of each joint shall be given two coats of approved bitumen before the concrete on the other side of the joints is placed. Waterstops shall be placed in the joints in accordance with the Drawings.

D. Expansion Joints

Expansion joints shall be constructed in the locations and to the details shown on the Drawings. Preformed joint filler, bond breaker and joint sealing compound and waterstops, dowel bars and bitumen coating shall be placed in the joints in accordance with the Drawings.

E. Installation of Joint Sealer

The Contractor shall prepare the surface of the joint and shall fill or caulk the recess completely with the joint sealer strictly in accordance with the manufacture's instructions. The application of joint sealer shall not be commenced without the Contractor having first obtained the approval of the Employer's Representative.

Where a polysulphide joint sealer is used an approved bond breaker shall be provided between the joint filler and the sealer.

18.19 Water Stops and Elastomeric Bearing Pads

- A. Rubber or uPVC water stops approved by the Employer's Representative shall be placed in joints of structures as shown on the Drawings. The Contractor shall furnish all waterstops, including rubber plugs, gum rubber, rubber cement, bolts, nuts, washers and other articles required for construction of the joints. The Contractor shall make all splices, joints and bonds, and shall fabricate any special intersections in accordance with the Drawings or as directed by the Employer's Representative.
- B. All joints, splices, bonds and intersections shall be made in strict accordance with the manufacturer's printed instructions using material approved by the manufacturer, and shall be formed to produce strong, sound and watertight joints.
- C. The Contractor shall take suitable precautions to support and protect the water-stops during the progress of the work, and to ensure their proper incorporation in the Works.
- D. Elastomeric bearing pads shall be neoprene, bonded in laminations by vulcanising to metal plates to prevent extrusion under load. Class of material shall have had at least five years successful usage as bridge bearing pads. Thickness and dimensions shall be as shown on the Drawings.

18.20 Measurement and Payment

- A. No separate payment will be made for handling cement or for formwork (shuttering and centering), contraction joints, fine concrete topping or grout, and all costs in connection therewith shall be included in the prices quoted for the various types of concrete.
- B. Expansion joint material and elastomeric bearing pads will each be measured for payment by the square metre. Quantities for payment will be determined by direct measurement of the joint material and bearing pads in place.
- C. Payment for expansion joint material and elastomeric bearing pads will each be made at the unit price per square metre; except in case where the Bill of Quantities do not show expansion joint material in the Schedule, such material shall be included in the price for concrete.

- D. Waterstops will be measured for payment by the linear metre. Quantities for payment will be determined by direct measurement of the water stop in place.
- E. Payment for Waterstops will be made at the unit price per linear metre; except in cases where the bills of quantities do not show Waterstops in the Schedule, such material shall be included in the price for concrete.
- F. Concrete will be measured for payment by the cubic metre. Quantities for payment for formed concrete and slabs will be computed from the line, grades and dimensions shown on the Drawings. Concrete used as backfill of holes and other areas directed by the Employer's Representative will be measured for payment at the mixer.
- G. Concrete will be paid for at the respective unit prices per cubic metre quoted; except that where backfill concrete is required due to fault for negligence of the Contractor such concrete will be at the Contractor's expense.
- H. No separate payment will be made for the Sampling and Testing of concrete.

18.21 Measurement and Payment of Reinforcing Steel

Measurement for payment for furnishing and placing reinforcement bars will be made only of the weight of the bars placed in the concrete in accordance with the Drawings or as directed by the Employer's Representative. Payment for furnishing and placing reinforcement bars will be made at the Contract rate per kg in the Bill of Quantities, which contract rate shall include the cost of furnishing reinforcement bars, furnishing and attaching wire tied and metal supports of use, and of delivering unloading, hauling, storing, sorting, cutting bending, cleaning, placing and securing and maintaining in position all reinforcement bars as shown on the Drawings or as directed by Employer's Representative.

Payment for handling and installing Employer furnished Steel reinforcing Bars will be made at the unit price per kg quoted therefore in the Bill of Quantities which price shall include full compensation for furnishing labour, tools, equipment, and incidentals, and for doing all the work involved in handling, cutting, bending and placing the bar reinforcing steel, complete in place as shown or directed.

18.22 Concrete Sampling and Testing

Sampling and testing shall be in accordance with BS 1881.

The Contractor shall establish a system for regular sampling and testing of concrete to the approval of the Employer's Representative. Samples shall be taken from randomly selected batches of each class of concrete used in the Works, and at approximately equal intervals throughout the placement. Where more than one mixer is in use, sampling shall be from each mixer in turn. Rates of sampling and testing shall generally be as directed by the Employer's Representative. Higher rates of sampling and testing may be used at the start of the Works to establish the quality quickly or during periods of production when quality is in doubt.

The Contractor shall provide the necessary equipment, labour and transport for carrying out the sampling and testing in the Laboratory.

The concrete test cubes shall be stored and tested at the Site Laboratory under the supervision of the Employer's Representative.

Records of concrete sampling and testing shall be kept by the Contractor and forwarded to the Employer's Representative within 24 hours of sampling and testing. Samples for testing shall be taken at the point of discharge into the Works.

SECTION 19 BRICK WORK

19.1 General

All Brick, brick lining, brick paving and brick masonry required to be constructed under the Specification and for all related purposes and as may be required by the Employer's Representative shall consist of the materials herein specified. The stipulation and requirements herein set forth shall apply to all brickwork, except when such stipulations and requirements are specifically modified by the Employer's Representative for any particular item of work.

19.2 Materials

- A. All brick supplied or used for the works shall conform to the requirements of Indian Standards for brick or such other standards as the Employer's Representative may determine.
- B. The earth material used for manufacturing the bricks shall be carefully selected and shall be of good firm loam or clay. The material shall be free from objectionable quantities of lime, gravel, coarse sand, roots, or other organic matter, and saline deposits.
- C. Bricks shall be classified as follows:
 - 1. Handmade Burnt Bricks:
 - (a) First class bricks shall be thoroughly burnt without being vitrified, shall be regular and uniform in space and size with sharp and square edges, paralleled faces and of deep red or copper colour. They shall be homogeneous in texture and emit a clear ringing sound when struck, and shall be free from flaws, cracks, chips, stones and nodules of lime. The average compressive strength of five representative bricks shall be not less than 10 kg/cm²
 - (b) Second class bricks shall be as well burnt as first class bricks, or slightly over-burnt, and shall give a clear ringing sound when struck. Slight irregularities in size, shape of colour will be accepted, but not such which may give irregular or uneven courses when used. The average compressive strength of five representative bricks shall not be less than 8 kg/cm²
 - 2. The Bricks shall be tested dry and flat-wise: first class bricks should not absorb more than 15 percent of their weight.
- D. Lime: lime shall be ordinary lime conforming to the requirement of the IS standards.
- E. Portland cement: The Employer will furnish Portland cement conforming IS Code or British standards Institute specification BS 12.
- F. Special Cement: Special cement shall conform to the applicable standards.
- G. Sand: Sand for mortar used in the construction of brick lining, brick paving masonry etc. shall be furnished by the contractor in accordance with provision of and in complete conformity with the stipulations and requirements for sand specified in Section 17.

- H. Water: The water used for the preparation of mortar shall be free from objectionable quantities of silt, organic matter, alkali, sulphates and other salts and other impurities, and will be subject to approval of the Employer's Representative.
- I. Brick to be used in brickwork with mortar joints shall be moistened with water from three to four hours before they are used by a method which will ensure that each brick is thoroughly and uniformly wetted.
- J. Bricks shall be skilfully laid with level courses, uniform and completely filled joints, square corners, plumb verticals and true surfaces, except when otherwise shown on Drawings or directed by the Employer's Representative.
- K. Brick work constructed for a waterway shall be of the best standard of workmanship and objectionable offsets in the brickwork shall be removed by and at the expense of the Contractor. The smoothest practicable finished surface of the brickwork will be required whenever it is a part of a waterway, if not otherwise directed by the Employer's Representative.

19.3 Curing and Repair

- A. Brickwork requiring mortar shall be cured by water curing or other acceptable methods. All methods and operations of the Contractor in curing the different portions of the work are subject to the Employer's Representative's approval.
- B. When curing by water the brickwork shall be kept wet continuously for at least 14 days, unless otherwise specified by the Employer's Representative. Water used for curing shall meet the requirements of the specification of water used in the construction of brickwork.
- C. If, after the completion of any brickwork, a brick is out of alignment or not level, or does not conform to the lines and grades shown on the Drawings or shows a defective surface, it shall be removed and replaced by the Contractor at his expense, unless the Employer's Representative grants permission, in writing, to patch or replace part of the defective area to his satisfaction.

19.4 Pointing (Cement Mortar)

- A. The joints of the brick, stone masonry shall be raked out to a depth of 20 mm (3/4") and the surface of the wall washed and kept wet for two days before pointing. The material of mortar, cement and sand shall be of standard specification. Mortar shall then be applied in the joints slightly in excess and pressed by a proper tool of the required shape, extra mortar should not spread over the faces of bricks, or stone and the edges of bricks. Bricks shall be clearly defined to give a neat appearance. After pointing, the surface shall be kept wet for seven days.
 - 1. Flush Point: The mortar shall be pressed into the raked, cleaned and wet joints and shall be finished of flush and level with the edges of brick or stone to give a smooth appearance. The edges shall be neatly trimmed with a towel and straight edge.
 - 2. Ruled Pointing: The mortar shall be pressed into the raked, cleaned and wet joints and a groove of shape and size 5 to 6 mm depth shall be formed running a forming tool to steel along the centre of line of the joint. The vertical joints also shall be finished in a similar way at right angles to horizontal lines. The finished work shall give neat and clean appearance with straight edges.

3. Weather or struck pointing: The mortar shall be applied on the raked clean and wet joints, and the horizontal joints shall be pressed and finished with a pointing tool so that the slope is from top to bottom. The vertical joints shall be finished as ruled pointing.
 4. Raised or Trucked Pointing: The mortar shall be applied in raked clean and wet joints excess to form base of 6 mm (1/4") raised and 10 mm (3/8") width or as directed.
- B. Subject to the Employer's Representative's directions the pointing shall be carried out as;
1. Inside pointing shall consist of filling of joints to about 1 cm average depth from the face of brick.
 2. Flat pointing shall consist of filling the joints to about 1 cm and not less than 2 cm width above the face.
- C. After raking, the joints shall be compressed with a pointing tool. All tooling of joints shall be done after the mortar shall be partially set but is still sufficiently plastic to bond. Bricks with mortar voids visible beyond the depth of the raking shall be removed and re-laid with fresh mortar unless such voids can be completely filled by other methods, as approved by the Employer's Representative.

19.5 Measurement and Payment

- A. Brick masonry will be measured for payment by the cubic metre. Quantities for payment will be computed from the lines and dimensions shown on the Drawings.
- B. Payment for brick masonry will be made at the unit price per cubic metre quoted therefore in the Bill of Quantities, which price shall be full compensation for all costs in connection with brick masonry except that separate payment will be made for pointing of the masonry surface where required by the Employer's Representative.
- C. Pointing of brick masonry surfaces will be measured for payment by the square metre. Quantities for payment will be the square metres of overall (gross) wall surfaces designated by the Employer's Representative to have joint pointing.
- D. Payment for pointing brick masonry surface will be made at the unit price per square metre quoted therefore in the Bill of Quantities.

SECTION 20 STONE MASONRY

20.1 General

All stone masonry required to be constructed under the specification, and for all related purposes or as directed by the Employer's Representative, shall consist of the materials herein specified, which shall be proportioned, mixed, formed and placed in accordance with these stipulations and requirements. The stipulations and requirements herein set forth shall apply to all stone work, except when such are specifically modified by the Employer's Representative for any particular item of work.

20.2 Materials

- A. Stone shall be procured from approved sources. The stones to be used shall be from boulders or rock quarrying of granite, quartzite, or similar materials having a minimum specific gravity of 2.4. The compression strength shall be not less than 400 kg/cm² unless otherwise approved by the Employer's Representative.
- B. For use in masonry work, the stone shall be hard, tough compact and durable, free from faults and cleavage.
- C. Stone masonry shall be dressed to the size and shape as shown on the Drawings or as required by the Employer's Representative to fit the size of the wall lining or slab in the configuration as shown on the Drawings.
- D. Special Cement: Special cement shall conform to the applicable standards.
- E. Sand: Sand for mortar used in the construction of stone masonry for walls, lining, paving etc. shall be furnished by the Contractor in accordance with the provision of and in complete conformity with the stipulations and requirements for sand specified in Section 17.
- F. Water: The water used for the preparation of mortar shall be free from objectionable quantities for silt, organic matter, alkali, sulphates and other salts and other impurities, and will be subject to approval of the Employer's Representative.
- G. Mortar Composition and Mixing:
 - 1. Mortar for stone masonry shall, except where otherwise directed by the Employer's Representative, consist of one part Portland cement and three parts of damp loose mortar sand, by volume and sufficient water to produce the proper consistency for the intended use.
 - 2. Methods and equipment used for mixing mortar shall be such as will accurately determine and control and amount of each separate ingredient entering into mortar and shall be subject to the approval of the Employer's Representative. If a mixer is used, it shall be of approved design and the mixing time after all ingredients are in the mixer, except for the full amount of water, shall be not less than two minutes.
 - 3. Mortar shall be mixed only in quantities sufficient for immediate use, and all mortar not used within 30 minutes after adding water to the mix shall be discarded. Retempering of mortar will not be allowed. Mixing troughs and pans shall be thoroughly cleaned and washed at the end of each day's work.

20.3 Placing of Stone Masonry

- A. Stone used in masonry shall be properly cleaned before placing and shall be approved by the Employer's Representative.
- B. Stone shall not be placed during rains sufficiently heavy or prolonged to wash the mortar from the masonry. Mortar already spread which becomes diluted by rain shall be removed and replaced before continuing with the work. Loads shall not be allowed on the stone before it is fully set.
- C. Stone to be used in masonry with mortar joints shall be moistened with water from three to four hours before they are used, or by a method which will ensure that each stone is thoroughly and uniformly wetted.
- D. Stone masonry shall be placed on properly prepared and firm foundations and in accordance with the Drawings or directions of the Employer's Representative. Foundations used shall be approved by the Employer's Representative before placing the masonry.
- E. Walls shall be uncoursed but shall include a bond stone of at least 0.3 m² area showing on the exposed face and continuous through the wall for every m² of projected face.
- F. Full mortar coverage shall be provided on all non-exposed stone faces.
- G. Stone masonry constructed for a waterway shall be of the best standards of workmanship and objectionable matters in the masonry surface shall be removed by and at the expense of the Contractor. The smoothest practicable finished surface of the masonry will be required whenever it is a part of a waterway, if not otherwise directed by the Employer's Representative.

20.4 Pointing of Stone Masonry

- A. Where shown on the Drawings or directed by the Employer's Representative, the Contractor shall point masonry surfaces. Mortar for pointing, except as otherwise directed by the Employer's Representative, shall be of the same composition as used for placing the masonry.
- B. In preparation of the pointing work the joints at the exposed surface of stone masonry shall be raked out (before the mortar is set) or chiselled out. The surface shall be cleaned by wire brush and shall be moistened. Subject to the Employer's Representative's directions, the pointing shall be carried out as follows;
 1. Inside pointing shall consist of filling of joints to about 1 cm average depth from the face of stone.
 2. Flat pointing shall consist of joints to about 1 cm depth and height flush with the face of the stone.
 3. Raised pointing shall consist of filling of joints to about 1 cm depth and height not less than 1 cm above the face of stone.
- C. After raking the joints shall be compressed with a printing tool. All tooling of joints shall be done after the mortar has partially set but is still sufficiently plastic to bond. Stones with mortar voids visible beyond the depth of the raking shall be removed and re-laid with fresh mortar unless such voids can be completely filled by other methods as approved by the Employer's Representative.

20.5 Curing and Repair

- A. Stone masonry including pointing shall be cured by water curing or other acceptable methods as approved by the Employer's Representative.
- B. When curing by water the stone masonry shall be kept wet continuously for at least 4 days, unless otherwise specified by the Employer's Representative. Water used for curing shall meet the requirements of the specification for water used for mortar.
- C. If after completion, any stone masonry is out of alignment or not level, or does not confirm to lines and grades shown on the Drawings, it shall be removed and replaced by the Contractor at his expense, unless the Employer's Representative grants permissions in writing to patch or replace part of the defective area to his satisfaction.

20.6 Plastering Cement Mortar

The joints of the brickwork or stone shall be raked out to a depth of 12 mm (1/2") and the surface wall shall be washed and cleaned and kept wet for two days before plastering.

The materials of mortar, cement and sand specified should be of standard specification. The Materials of mortar shall be first dry mixed by measuring with boxes to have the required proportion as specified and then water added slowly and gradually and mixed thoroughly.

The thickness of plastering shall be as specified usually 12 mm (1/2") to ensure uniform thickness of plaster. Patches of 5 mm x 15 cm (6") strips 1 m (3 ft) apart or 10 cm (4") wide plaster shall be applied first at about 2 m (6 ft) apart to act as a guide. First mortar shall be dashed and pressed over the surface and the brought to a smooth and uniform surface by means of float and trowel. Wall plastering shall be started from the top and worked down towards the floor. Ceiling plastering shall be completed before starting on wall plaster. All corners and edges shall be rounded and protected from rain, sun, frost, etc.

20.7 Measurement and Payment

- A. Stone masonry will be measured for payment by the cubic metre. Quantities for payment will be computed from the lines and dimension shown on the Drawings.
- B. Payment for stone masonry will be made at the unit price per cubic metre quoted therefore in the Bill of Quantities, which price shall be full compensation for all costs in connection with stone masonry except that separate payment will be made for pointing of the masonry surface where required by the Employer's Representative.
- C. Pointing of stone masonry surface will be measured for payment by the square metre. Quantities for payment will be the square metres of overall (gross) wall surface designated by the Employer's Representative to have joint pointing.
- D. Payment for pointing stone masonry surfaces will be made at the unit price per square metre quoted therefore in the Bill of Quantities.

SECTION 21 LAYING AND JOINTING PRECAST CONCRETE PIPES

21.1 General

The Contractor shall supply and lay precast concrete pipes and materials, including pipe-jointing material, in those structures where the installation of R.C. pipes is shown on the Drawings or as directed by the Employer's Representative. The pipes shall be reinforced concrete non-pressure pipe to be furnished in accordance with the reinforced concrete pipes Class NP2 and Class NP3 of IS 458. The pipe diameter to be used in each location is shown on the Drawings or shall be as specified by the Employer's Representative. The class of reinforced concrete pipes shall be as indicated in the Drawings.

21.2 Materials

The material used in the manufacture of reinforced concrete pipes shall conform to the following requirements:

- A. Cement: In accordance with Section 17.
- B. Water: In accordance with Section 17.
- C. Additives: All concrete used for the manufacture of pipes shall contain an entrainment of not more than 2.5 percent of air, by volume, in the concrete as discharged from the mixer. Calcium chloride shall not be used except when approved by the Employer's Representative.
- D. Aggregates: Fine and coarse aggregates for concrete shall be in accordance with Section 17, except that other grading may be used. The maximum size of coarse aggregate for each size of pipe shall be the largest size compatible with satisfactory placing of the concrete.
- E. Reinforcement Steel: In accordance with Section 17.

21.3 Pipe Installation

During manufacturing, transporting, storing, and laying of concrete pipes, the pipes shall not be dropped or handled in a way that might crack the wall or otherwise cause damage. The pipes shall not be moved until after the specified curing period. Any length of pipe that, in the opinion of the Employer's Representative, is damaged beyond repair, shall be removed from the site of the work and replaced by the Contractor at his own expense.

21.4 Trench Excavation

The trench for laying precast concrete pipes shall be carefully excavated to required lines and levels shown on the drawings or to such other lines and levels as the Employer's Representative may direct. The sides of excavations shall be supported where necessary to ensure their stability; if for any reason, portions or a trench whether supported or unsupported should give way, the Contractor shall excavate and remove at no extra cost of the Employer, such disturbed ground until the trench is to the satisfaction of the Employer's Representative.

The thickness and shape of foundations shall be as indicated on the drawings or as directed by the Employer's Representative, according to soil conditions. If soft material is encountered such materials shall be excavated and removed, or if the trench bottom is

unstable the invert of the trench shall be excavated below the level specified and brought up to the required level by suitable fill materials thoroughly consolidated to at least the same degree of compaction as the undisturbed material as directed by the Employer's Representative.

21.5 Bedding of Pipe

Excavation of pipe trench shall be done to the grade and line shown on the Drawings. The pipe shall be supported firmly throughout its entire length.

Bedding of reinforced concrete pipes shall conform to the requirement given below for compacted earth cradle or concrete cradle, whichever is called for on the Drawings or otherwise directed by the Employer's Representative.

If the type of bedding is not shown, compacted earth cradle shall be provided.

- A. Compacted earth cradle: shall be constructed by bedding the pipe in a shallow trench cut in compacted earth layers to a depth of not less than 10 cm and shall be accurately shaped by a template to fit the lower pipe exterior for the specified embedment.
- B. Concrete cradle: concrete cradle for pipe shall consist of a continuous concrete cradle constructed of Class C concrete in conformity with the details shown on the Drawings and requirements of Section 17.

21.6 Laying

The method of lowering the pipes into the trench and laying them in position shall be such as to prevent dirt from entering the pipe and couplings and to prevent damage to the pipe. Before and during execution of the joints all surfaces shall be clean and free of mud, oil or grease. The pipe shall be aligned straight with ends squared, and the joining of pipe sections shall be such as to produce watertight joints.

21.7 Joints and Collars and Pipe Bend Joint

A. Joints

Pipe joints shall conform to the type as shown on the Pipe Installation Drawing.

If the joint of pipe is not indicated on the section and plan of the structures required, flush joint shall be provided.

Cement mortar used in jointing shall be 1 part of cement and 2 parts of sand, conforming to the requirements of Section 17.

B. Collar and Pipe Bend Joint

The collars and pipe bend joints shall be constructed where shown on the Drawings, and the concrete shall conform to concrete Class A in Section 17 and reinforcement steel shall conform to Section 17.

21.8 Water Testing

Where required by the Employer's Representative, sections of pipeline shall be tested for leakage, before backfilling.

21.9 Backfill

As each unit of pipe is laid, sufficient backfill material shall be tamped about the pipe to hold it rigidly in place until the joints are completed. After the joints have been completed, the backfilling shall be completed as hereinafter specified. Loads up to the design loading will not be permitted to travel over the pipes until backfill and embankment material have been placed to a minimum thickness of at least 0.50 m over the top of the pipe. This minimum cover requirement is not always adequate during construction when equipment heavier than design traffic loads is routed over or close to the installed culverts. The Contractor shall be responsible for providing the additional cover necessary to avoid damage to the pipes due to such loads.

21.10 Measurement and Payment

Measurement for direct payment of furnishing and laying the precast pipes will be made along the centreline from end to end of the pipe in place and no allowance will be made for lap of joints.

The Contract Unit Prices covering the supply and laying of pipes shall include the entire cost of furnishing the pipes and all materials for joints and lean concrete bedding if needed, the cost of all labour and equipment required for transporting, laying, jointing and bedding the pipes.

The supplying and laying of pipes of each diameter will be paid per linear metre of pipe actually laid, while the excavation and backfilling shall be paid per cubic metre, at the appropriate Contract Unit Prices.

Reinforced concrete for pipe bend and collar shall be measured in cubic meters and shall be paid at appropriate Contract Unit Prices.

SECTION 22 LIFTING GATES

22.1 General

Hand operated vertical lift gates of various dimensions as stated in the Bill of Quantities shall be supplied and installed as directed by the Employer's Representative.

Each gate shall be designed to withstand and operate against a head of water equal to the depth of the gate with no water downstream, and shall be capable of being raised a height equivalent to the gate depth.

Each gate shall consist of framing incorporating guide grooves and sealing faces, together with a sill member and gear supporting members, movable gate leaf with sealing faces and operating gear. Gates shall be provided with operating platform with handrailing and access ladders wherever needed.

22.2 Framing

The gate framing shall consist of guide grooves fabricated from steel plate with sill and gear supporting members connected to the grooves by bolts.

The groove members shall extend upwards sufficiently to support and guide the gate through its travel and shall be fitted with adjusting and fixing devices to enable them to be accurately positioned and securely held within the recesses in the concrete work during setting-in. The groove members shall be fitted with machined non-ferrous faces upon which the gate shall slide and seal.

The sill member shall consist of a rolled steel angle or other suitable section having a machined upper surface upon which the lower sealing member of the gate shall bear when the gate is fully closed. The sill member shall be fitted with levelling screws to permit its accurate alignment and levelling within the recess formed in the concrete floor. The ends of the sill member shall be connected to the groove members at each end.

The gear supporting members shall be designed to support the operating gear and the loads resulting from gate operation and shall be connected to the groove members at each end.

22.3 Gate

The gate shall be of welded steel construction consisting of a steel skinplate supported on the upstream side by horizontal stiffening members connected to vertical side guiding and stiffening members contained within the side grooves. Arrangement shall be provided at the top of the gate for attachment of the gate to the operating spindles by means of non-ferrous hinge pins.

The skinplate shall be stiffened along its upper edge by means of a rolled steel angle or other suitable section and along its lower edges by a sealing bar.

The gate shall be fitted with machined steel sliding and sealing faces to match those incorporated into the framing as directed by the Employer's Representative.

22.4 Measurement and Payment of Gates

Measurement for payment for supplying and installing of gates will be made against the number of gates as mentioned in the Bill of Quantities. For the Gates of sizes other than mentioned in the Bill of Quantities, an equivalent rate on prorata basis comparing with the sizes, shall be considered.

SECTION 23 SUPPLY OF INSTRUMENTS

23.1 Levelling Instruments

The levelling instruments shall be brand new and shall be manufactured by a reputed manufacturer. The instrument shall be equivalent to "Sokisha" make or better. The instrument shall meet the following technical specification:

Accuracy

Mean Error on 1 km of double levelling	+/-2.0mm
--	----------

Telescope

Magnification	24x
Aperture	35mm
Image	Erect
Field of View at 100 m	2.5
Shortest Focusing distance	0.5
Stadia Constant	100

Compensator

Working Range	±15'
Repetition accuracy	±0.5'

Horizontal Circle

Graduation	360 degree
Interval	1 degree
Estimation	0.1 degree

General

Sensitivity of Circular Level	15'/2 mm
Estimation of mm on rods with cm graduation up to approx.	100 m

23.2 Measurement and Payment

Each levelling instrument to be supplied as per the BOQ shall be comprised of the following:

Levelling Instrument	1 No.
Metallic Tripod	1 No.
Plumb Bob	1 No.
Other accessories	1 No.
Operation Manual	1 No.

Before procuring the instrument, the Contractor shall submit the required brochures of at least three different makes along with the specifications. The Employer's Representative, after reviewing the specification, shall order the required type of the instrument and accessories to be procured.

The payment for the supply shall be made upon receipt of the complete set of instruments by the Project. The unit rate shall include all the costs of receiving the brochures, cost of instrument along with the accessories, cost of transporting to the Project Office, any local taxes excluding the Value Added Tax and maintenance during the Contract Period.

23.3 Supply of Measuring Staff

The measuring staff shall be brand new and of the length of 5 m when fully stretched. The staff shall be telescopically foldable to length suitable for transportation. The staff shall be made of aluminium metal. The staff shall be graduated suitably to read the reading by Levelling or Theodolite instrument directly up to 5 mm.

23.4 Supply of Measuring Tapes

The Measuring Tapes shall be brand new and made of the fibreglass reinforced material as approved by the Employer's Representative.

23.5 Measurement and Payment

Before procuring the instrument, the Contractor shall submit the required brochures of at least three different makes along with the specifications. The Employer's Representative, after reviewing the specification, shall order the required type of the instrument and accessories to be procured.

The payment for the supply shall be made upon receipt of the complete set of instruments by the Project. The unit rate shall include all the costs of receiving the brochures, cost of the instrument along with the accessories, cost of transporting to the Project Office, any local taxes excluding the Value Added Tax and maintenance during the Contract Period.

SECTION 24 CONSTRUCTION AND MAINTENANCE OF ACCESS TO SITE

24.1 Provision of Access

The Contractor shall construct all access and haul roads required by him in order to fulfil his obligations under the Contract. The Contractor shall maintain such access roads in a condition suitable for the safe and easy passage of plant and vehicles and shall provide means of access to enable the adjacent occupiers to carry on their normal operations.

24.2 Restoration of Private or Public Lands

The Contractor shall make a record to be agreed by the Employer's Representative of the condition of the surfaces of any private or public lands over which access to the site lies and he shall keep such surfaces in a reasonable state of cleanliness and repair during the execution of the Works. On termination of the Contractor's use of such access, he shall restore the surfaces to a condition at least equal to that obtaining prior to his first entry on them.

24.3 Measurement and Payment

The work is a lump sum item which is to be carried out throughout the execution of the Contract. The payment for this work under the appropriate item in the Bill of Quantities shall be done on the prorata basis of the progress of the Works certified during the interim certificates in respect to the Contract Price. Any remaining amount shall be paid after the successful completion of the works.

SECTION 25 CONSTRUCTION AND MAINTENANCE OF CONTRACTOR'S LABOUR CAMP

25.1 General

The Contractor shall construct all the temporary labour camps for construction works to the satisfaction of the Employer's Representative, and in a manner as to least affect the local environment. The camps shall be maintained while they are in use and cleanly removed after the works are completed. The item of work shall consist of the following activities.

- Construction and maintenance of labour camps including temporary offices and store.
- Removal of the camps after the works are completed.
- Line clearance for initiating works including clearing of bushes and some trees if any
- Arrangement of water for construction as well as for drinking.
- Procuring of survey consumables such as wooden pegs.

25.2 Measurement and Payment

The work is a lump sum item which is to be carried out throughout the execution of the Contract. The payment for this work under the appropriate item in the Bill of Quantities shall be done on the prorata basis of the progress of the Works certified during the interim certificates in respect to the Contract Price. Any remaining amount shall be paid after the successful completion of the works.

SECTION 26 INSURANCE OF WORKS, DAMAGE TO PROPERTY AND LOSS TO THIRD PARTY AND ACCIDENT TO WORKMEN

26.1 General

The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover as per Clause 13 of the Conditions of Contract from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:

- (a) loss of or damage to the Works, Plant and Materials;
- (b) loss of or damage to Equipment
- (c) loss of damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
- (d) Personal injury of death.

26.2 Measurement and Payment

The Contractor shall produce the insurance policy from any insuring company operative and recognised within Nepal. The Contractor shall, immediately after securing the insurance policy(ies) shall produce to the Employer's Representative the original bills paid against the premiums. The Contractor shall be paid for insurance under Items as specified in BOQ in the following manner:

- If the premium amount as per the original bills is more than the amount stated in the BOQ, the amount of the BOQ less any taxes, if applicable, shall be paid. Any amount in excess of BOQ amount shall be borne by the Contractor.
- If the premium amount as per the bills is less than the amount stated in the BOQ less any taxes, if applicable, the amount of the bills, shall be paid.
- The Bidders are required to fill in the unit rates item "The Insurance Against Accident" not exceeding 0.15 percent of the sum of the bid prices for Canal and Canal Structures as specified in BOQ. If in case, it is found that the quoted rates for this item is in excess of the said sum, the quoted unit rate shall be corrected to be equal to 0.15 percent of the sum and the tender evaluated accordingly.
- The Bidders are required to fill in the unit rates of Item "The Third Party Insurance" not exceeding 0.15 percent of the sum of the bid prices for Canal and Canal Structures as specified in BOQ. If in case, it is found that the quoted rates for this item is in excess of the said sum, the quoted unit rate shall be corrected to be equal to 0.15 percent of the sum and the tender evaluated accordingly.
- The Bidders are required to fill in the unit rates item "The Insurance of Work" not exceeding 0.15 percent of the sum of the bid prices for Canal and Canal Structures as specified in BOQ. If in case, it is found that the quoted rates for this item is in excess of the said sum, the quoted unit rate shall be corrected to be equal to 0.15 percent of the sum and the tender evaluated accordingly.

SECTION 27 TEST RUN OF CANAL SYSTEM

27.1 General

Prior to preparation and handing over of a certificate of Completion of the Works, the Contractor shall carry out a test run of the irrigation system in the presence of the WUA and the Project Manager (or his Representative).

The test run is to provide assurance that all works are built to the correct levels and dimensions and do not exhibit leakage. Gates shall be shown to operate properly and easily. Flow measurements shall be made to ensure proper system operation. The discharges at head regulator and individual canal heads, and functionality of outlets will be recorded and compared against the design and report of the test will be submitted to the Employer.

Major defects shall be rectified prior to issue of the certificate of Completion of the Works. Minor defects may be repaired during the defects liability period if the Project Manager so approves. A further test run may be requested by the Project Manager after completion of repairs.

27.2 Payment

No payment shall be made for carrying out test runs, any costs incurred shall be deemed to be covered in the prices tendered for related items in the Bill of Quantities, or shall be considered incidental to the Works.

SECTION 28 ENVIRONMENTAL MANAGEMENT PLAN

A specific Environmental Management Plan is included with the Detailed Design Report for each subproject under CMIASP. This document is to be included here and form part of the Technical Specification.

SECTION 29 SUBPROJECT SIGNBOARD

29.1 General

The Contractor shall provide and erect a Signboard at appropriate location instructed by the Project Manager with the following details:

Provincial Government Ministry of Province No. Office Name Name of Subproject and Location:
Date of Start: Date of Completion: Contract Amount (including VAT): Name of Contractor:

The Board shall be made of galvanized steel with an approximately size of 2.0 m width and 1.5 m height

The Contractor shall be responsible for the repair and maintenance of the Signboard until the completion of all construction works

29.2 Payment

Measurement and Payment: All the costs in providing, erecting and maintaining the Signboard are assumed to be built-in in the unit rates of other BOQ items and hence no separate payment shall be made to the Contractor for this item.

Drawings

[Attached at the end of the Technical Bid]

Supplementary Information Regarding Works to Be Procured

Personnel Requirements

Using Form PER-1 and PER-2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

No.	Position	Total Work Experience [years]	Experience In Similar Work [years]
1	Project Manager (Civil Engineer with experience in construction management)	5	3
2	Site Engineer	5	1

Equipment Requirements

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

No.	Equipment Type and Characteristics	Minimum Number Required
1	Concrete Mixer	1
2	Dump trucks/Tractors	1
3	Vibrator	1

Annex - A: Environmental Management Plan

Section 7 - General Conditions of Contract

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General Conditions of Contract

A. General

1. Definitions

1.1 Boldface type is used to identify defined terms.

- (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
- (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.
- (c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 29.1[Appointment of Adjudicator] hereunder.
- (d) **Bank** means the financing institutions named in the **Particular Conditions of Contract (PCC)**.
- (e) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.
- (f) **Compensation Events** are those defined in GCC 51.1[Compensation Events]hereunder.
- (g) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 69.1 [Completion].
- (h) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below.
- (i) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer.
- (j) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer.
- (k) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.
- (l) **Days** are calendar days; months are calendar months.
- (m) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.
- (n) A **Defect** is any part of the Works not completed in accordance with the Contract.
- (o) The **Defects Liability Certificate** is the certificate issued by the Project Manager upon correction of defects by the Contractor.

- (p) The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects.
- (q) **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract.
- (r) The **Employer** is the party who employs the Contractor to carry out the Works, as specified in the PCC.
- (s) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
- (t) **Force Majeure** means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.
- (u) **In writing** or **written** means hand-written, type-written, printed or electronically made, and resulting in a permanent record.
- (v) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.
- (w) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the PCC. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.
- (x) **Letter of Acceptance** means the formal acceptance by the Employer of the Bid and denotes the formation of the Contract at the date of acceptance.
- (y) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.
- (z) **Party** means the Employer or the Contractor, as the context requires.
- (aa) **PCC** means Particular Conditions of Contract.
- (bb) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.
- (cc) The **Project Manager** is the person named in the PCC (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.
- (dd) **Retention Money** means the aggregate of all monies retained by the Employer pursuant to GCC 55.1 [Retention].
- (ee) **Schedules** means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Tender, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates

and/or prices.

- (ff) The **Site** is the area defined as such in the PCC.
- (gg) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.
- (hh) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.
- (ii) The **Start Date** is given in the PCC. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.
- (jj) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.
- (kk) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.
- (ll) A **Variation** is an instruction given by the Project Manager which varies the Works.
- (mm) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the PCC.

2. Interpretation

- 2.1 In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
- 2.2 If sectional completion is specified in the **PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
- 2.3 The documents forming the Contract shall be interpreted in the following order of priority:
 - (a) Contract Agreement,
 - (b) Letter of Acceptance,
 - (c) Letter of Bid,
 - (d) Particular Conditions of Contract,
 - (e) the List of Eligible Countries that was specified in Section 5 of the bidding document,
 - (f) General Conditions of Contract,
 - (g) Specifications,
 - (h) Drawings,

- (i) Completed Activity Schedules or Bill of Quantities, and
 - (j) any other document listed in the PCC as forming part of the Contract.
- 3. Language and Law**
 - 3.1 The language of the Contract and the law governing the Contract are stated in the PCC.
 - 3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when
 - (a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from, or any payments to, a particular country, person, or entity. Where the borrower's country prohibits payments to a particular firm or for particular goods by such an act of compliance, that firm may be excluded.
- 4. Contract Agreement**
 - 4.1 The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance, unless the Particular Conditions establish otherwise. The Contract Agreement shall be based upon the attached Contract forms in Section 8. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer.
- 5. Assignment**
 - 5.1 Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party
 - (a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party; and
 - (b) may, as security in favor of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract.
- 6. Care and Supply of Documents**
 - 6.1 The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, two copies of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.
 - 6.2 Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.
 - 6.3 The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.
 - 6.4 If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect.
- 7. Confidential**
 - 7.1 The Contractor's and the Employer's Personnel shall disclose all such

Details

confidential and other information as may be reasonably required in order to verify the Contractor's compliance with the Contract and allow its proper implementation.

7.2 Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.

7.3 Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this Clause.

8. Compliance with Laws

8.1 The Contractor shall, in performing the Contract, comply with applicable Laws.

8.2 Unless otherwise stated in the Particular Conditions,

(a) the Employer shall acquire and pay for all permits, approvals, and/or licenses from all local, state, or national government authorities or public service undertakings in the [Employer's Country or country where the Site is located] which (i) such authorities or undertakings require the Employer to obtain in the Employer's name, and (ii) are necessary for the execution of the Contract, including those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract;

(b) the Contractor shall acquire and pay for all permits, approvals, and/or licenses from all local, state, or national government authorities or public service undertakings in the [Employer's Country or country where the Site is located] which such authorities or undertakings require the Contractor to obtain in its name and which are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals, and/or licenses that are not the responsibility of the Employer under Subclause 8.2(a) hereof and that are necessary for the performance of the Contract. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties, and expenses of whatever nature arising or resulting from the violation of such laws by the Employer or its personnel, including the Subcontractors and their personnel, but without prejudice to Subclause 8.1 hereof.

9. Joint and

9.1 If the Contractor is a joint venture of two or more persons, all such persons shall be jointly and severally liable to the Employer for the

Several Liability		fulfillment of the provisions of the Contract, and shall designate one of such persons to act as a leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.
10. Project Manager's Decisions	10.1	Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.
11. Delegation	11.1	The Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.
12. Communications	12.1	Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.
13. Subcontracting	13.1	The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.
14. Other Contractors	14.1	The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the PCC. The Contractor shall also provide facilities and services for them as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.
15. Personnel and Equipment	15.1	The Contractor shall employ the key personnel and use the equipment identified in its Bid to carry out the functions stated in the Schedule or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.
	15.2	If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within 7 days and has no further connection with the work in the Contract.
	15.3	If the Employer, Project Manager, or Contractor determines, that any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or other prohibited practices during the execution of the Works, then that employee shall be removed in accordance with Clause 15.2 above.
16. Employer's and Contractor's Risks	16.1	The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
17. Employer's Risks	17.1	From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks: (a) The risk of personal injury, death, or loss of or damage to

property (excluding the Works, Plant, Materials, and Equipment), which are due to

- (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works, or
 - (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.
- (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed.

17.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to

- (a) a Defect which existed on the Completion Date,
- (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or
- (c) the activities of the Contractor on the Site after the Completion Date.

18. Contractor's Risks

18.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks, are Contractor's risks.

19. Insurance

19.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the PCC for the following events, which are due to the Contractor's risks:

- (a) loss of or damage to the Works, Plant, and Materials;
- (b) loss of or damage to Equipment;
- (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
- (d) personal injury or death.

19.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

19.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance, which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

- 19.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.
- 19.5 Both parties shall comply with any conditions of the insurance policies.
- 20. Site Investigation Reports**
- 20.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the PCC, supplemented by any information available to the Contractor.
- 21. Contractor to Construct the Works**
- 21.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.
- 22. The Works to Be Completed by the Intended Completion Date**
- 22.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.
- 23. Designs by Contractor and Approval by the Project Manager**
- 23.1 The Contractor shall carry out design to the extent specified in the **PCC**. The Contractor shall promptly submit to the Employer all designs prepared by him. Within 14 days of receipt, the Employer shall notify any comments. The Contractor shall not construct any element of the permanent work designed by him within 14 days after the design has been submitted to the Employer or where the design for that element has been rejected. Design that has been rejected shall be promptly amended and resubmitted. The Contractor shall resubmit all designs commented on, taking these comments into account as necessary.
- 23.2 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings..
- 23.3 The Contractor shall be responsible for design of Temporary Works.
- 23.4 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.
- 23.5 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.
- 23.6 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.
- 24. Safety**
- 24.1 The Contractor shall be responsible for the safety of all activities on the Site.
- 25. Discoveries**
- 25.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
- 26. Possession of**
- 26.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the



the Site	PCC , the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
27. Access to the Site	27.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.
28. Instructions, Inspections, and Audits	28.1 The Contractor shall carry out all instructions of the Project Manager, which comply with the applicable laws where the Site is located. 28.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and subconsultants to keep accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs. 28.3 The Contractor shall permit KFAED to inspect the Contractor's accounts, records, and other documents relating to the submission of bids and contract performance and to have them audited by auditors appointed by KFAED. The Contractor shall maintain all documents and records related to the Contract for a period of three (3) years after completion of the Works. The Contractor shall provide any documents necessary for the investigation of allegations of fraud, collusion, coercion, or corruption and require its employees or agents with knowledge of the Contract to respond to questions from KFAED.
29. Appointment of the Adjudicator	29.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the PCC, to appoint the Adjudicator within 14 days of receipt of such request. 29.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority at the request of either party, within 14 days of receipt of such request.
30. Procedure for Disputes	30.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision. 30.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute. 30.3 The Adjudicator shall be paid by the hour at the rate specified in the PCC, together with reimbursable expenses of the types specified in the PCC, and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party

refers the dispute to arbitration within the above 28 days, the Adjudicator's decision shall be final and binding.

- 30.4 The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and in the place specified in the PCC.

B. Staff and Labor

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| 31. Forced Labor | 31.1 The Contractor shall not employ forced labor, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor–contracting arrangements. |
| 32. Child Labor | 32.1 The Contractor shall not employ children in a manner that is economically exploitative, or is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. Where national laws have provisions for employment of minors, the Contractor shall follow those laws applicable to the Contractor. Children below the age of 18 years shall not be employed in dangerous work. |
| 33. Workers' Organizations | 33.1 In countries where national law recognizes workers' rights to form and to join workers' organizations of their choosing without interference and to bargain collectively, the Contractor shall comply with national law. Where national law substantially restricts workers' organizations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. In either case described above, and where national law is silent, the Contractor shall not discourage the Contractor's Personnel from forming or joining workers' organizations of their choosing or from bargaining collectively, and shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and bargain collectively. The Contractor shall engage with such workers representatives. Worker organizations are expected to fairly represent the workers in the workforce. |
| 34. Nondiscrimination and Equal Opportunity | 34.1 The Contractor shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. In countries where national law provides for non-discrimination in employment, the Contractor shall comply with national law. When national laws are silent on nondiscrimination in employment, the Contractor shall meet this Subclause's requirements. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. |

C. Time Control

- 35. Program**
- 35.1 Within the time stated in the PCC, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.
- 35.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
- 35.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period stated in the PCC. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the PCC from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.
- 35.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.
- 36. Extension of the Intended Completion Date**
- 36.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.
- 36.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 37. Acceleration**
- 37.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
- 37.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
- 38. Delays Ordered**
- 38.1 The Project Manager may instruct the Contractor to delay the start or

- by the Project Manager** progress of any activity within the Works.
- 39. Management Meetings**
- 39.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 39.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
- 40. Early Warning**
- 40.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.
- 40.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

D. Quality Control

- 41. Identifying Defects**
- 41.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
- 42. Tests**
- 42.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
- 43. Correction of Defects**
- 43.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the PCC. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- 43.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.
- 44. Uncorrected**
- 44.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the

Defects

cost of having the Defect corrected, and the Contractor shall pay this amount.

E. Cost Control**45. Contract Price**

45.1 In the case of an admeasurement contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.

45.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.

46. Changes in the Contract Price

46.1 In the case of an admeasurement contract:

- (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25%, provided the change exceeds 1% of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.
- (b) The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15%, except with the prior approval of the Employer.
- (c) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

46.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.

47. Variations

47.1 All Variations shall be included in updated Programs, and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.

47.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

47.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

47.4 If the Project Manager decides that the urgency of varying the work

would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

47.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

47.6 In the case of an admeasurement contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in GCC46.1 [Changes in the Contract Price] or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.

48. Cash Flow Forecasts

48.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

49. Payment Certificates

49.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

49.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

49.3 The value of work executed shall be determined by the Project Manager.

49.4 The value of work executed shall comprise,

- (a) in the case of an admeasurement contract, the value of the quantities of work in the Bill of Quantities that have been completed; or
- (b) in the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule.

49.5 The value of work executed shall include the valuation of Variations and Compensation Events.

49.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

50. Payments

50.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid

interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.

50.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

50.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.

50.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

51. Compensation Events

51.1 The following shall be Compensation Events:

- (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 26.1 [Possession of the Site].
- (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.
- (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
- (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- (e) The Project Manager unreasonably does not approve a subcontract to be let.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to Bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effects on the Contractor of any of the Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate

of Completion.

- 51.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.
- 51.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.
- 51.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.
- 52. Tax**
- 52.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 54.1 [Price Adjustment].
- 53. Currencies**
- 53.1 Where payments are made in currencies other than the currency of the Employer's country specified in the PCC, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.
- 54. Price Adjustment**
- 54.1 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the PCC. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type indicated below applies to each Contract currency:

$$P_c = A_c + B_c \text{ Imc/loc}$$

where:

P_c is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."



A_c and B_c are coefficients¹ specified in the PCC, representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency “c;” and

I_{mc} is a consolidated index prevailing at the end of the month being invoiced and I_{oc} is the same consolidated index prevailing 28 days before Bid opening for inputs payable; both in the specific currency “c.”

54.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next payment certificate. The index value shall be deemed to take account of all changes in cost due to fluctuations in costs.

55. Retention

55.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the PCC until Completion of the whole of the Works.

55.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC 69.1 [Completion], half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an “on demand” bank guarantee.

56. Liquidated Damages

56.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the PCC for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the PCC. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.

56.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC 50.1 [Payments].

57. Bonus

57.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in the PCC for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

58. Advance

58.1 The Employer shall make advance payment to the Contractor of the amounts stated in the PCC by the date stated in the PCC, against

¹ The sum of the two coefficients A_c and B_c should be 1 (one) in the formula for each currency. Normally, both coefficients shall be the same in the formulas for all currencies, since coefficient A_c , for the nonadjustable portion of the payments, is a very approximate figure (usually 0.10 ~ 0.20) to take account of fixed cost elements or other nonadjustable components. The sum of the adjustments for each currency is added to the Contract Price.

Payment

provision by the Contractor of an unconditional bank guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

58.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

58.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

59. Securities

59.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount specified in the PCC, by a bank acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a bank guarantee.

60. Dayworks

60.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

60.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within 2 days of the work being done.

60.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

61. Cost of Repairs

61.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

F. Force Majeure**62. Definition of Force Majeure**

62.1 In this Clause, "Force Majeure" means an exceptional event or circumstance,

(a) which is beyond a Party's control;

- (b) which such Party could not reasonably have provided against before entering into the Contract;
- (c) which, having arisen, such Party could not reasonably have avoided or overcome; and
- (d) which is not substantially attributable to the other Party.

62.2 Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:

- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies;
- (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war;
- (c) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel;
- (d) munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; and
- (e) natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity.

63. Notice of Force Majeure

63.1 If a Party is or will be prevented from performing its substantial obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.

63.2 The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.

63.3 Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

64. Duty to Minimize Delay

64.1 Each Party shall at all times use all reasonable endeavours to minimize any delay in the performance of the Contract as a result of Force Majeure.

64.2 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.

65. Consequences of Force Majeure

65.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under GCC Subclause 63 [Notice of Force Majeure], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to GCC Subclause 30.1 [Procedure for

Disputes] to

- (a) an extension of time for any such delay, if completion is or will be delayed, under GCC Subclause 36 [Extension of the Intended Completion Date]; and
- (b) if the event or circumstance is of the kind described in subparagraphs (a) to (d) of GCC Subclause 62.2 [Definition of Force Majeure] and, in the case of subparagraphs (b) to (d), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destructed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in GCC Subclause 19 [Insurance].

65.2 After receiving this notice, the Project Manager shall proceed in accordance with GCC Subclause 10 [Project Manager's Decisions] to agree or determine these matters.

**66. Force Majeure
Affecting
Subcontractor**

66.1 If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader force majeure events or circumstances shall not excuse the Contractor's nonperformance or entitle him to relief under this Clause.

**67. Optional
Termination,
Payment and
Release**

67.1 If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under GCC Subclause 63 [Notice of Force Majeure], or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the Contractor shall proceed in accordance with GCC Subclause 73.5 [Termination].

67.2 Upon such termination, the Project Manager shall determine the value of the work done and issue a Payment Certificate, which shall include

- (a) the amounts payable for any work carried out for which a price is stated in the Contract;
- (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
- (c) other Costs or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works;
- (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and
- (e) the Cost of repatriation of the Contractor's staff and labor

employed wholly in connection with the Works at the date of termination.

68. Release from Performance

68.1 Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises, which makes it impossible or unlawful for either or both Parties to fulfill its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance,

- (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract; and
- (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under GCC Subclause 67 [Optional Termination, Payment and Release] if the Contract had been terminated under GCC Subclause 67.

G. Finishing the Contract

69. Completion

69.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed.

70. Taking Over

70.1 The Employer shall take over the Site and the Works within 7 days of the Project Manager's issuing a certificate of Completion.

71. Final Account

71.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

72. Operating and Maintenance Manuals

72.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the PCC.

72.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the PCC pursuant to GCC 72.1, or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount stated in the PCC from payments due to the Contractor.

73. Termination

73.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

73.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

- (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;
- (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
- (c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager's certificate;
- (e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
- (f) the Project Manager gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with GCC Subclause 22.1 [The Works to be Completed by the Intended Completion Date] and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Project Manager;
- (g) the Contractor does not maintain a Security, which is required;
- (h) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the PCC; and
- (i) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC 74.1 [Fraud and Corruption].

73.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC 73.2 above, the Project Manager shall decide whether the breach is fundamental or not.

73.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

73.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

74. Fraud and Corruption

74.1 KFAED's Anticorruption Policy requires that Borrowers (including beneficiaries of KFAED-financed activity), as well as Contractors, Subcontractors, Manufacturers, and Consultants under KFAED-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this

policy, the KFAED

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
 - (i) “corrupt practice” means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
 - (ii) “fraudulent practice” means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
 - (iii) “coercive practice” means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - (iv) “collusive practice” means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
 - (v) “obstructive practice” means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an KFAED investigation; (b) making false statements to investigators in order to materially impede an KFAED investigation; (c) failing to comply with requests to provide information, documents or records in connection with an Office of Anticorruption and Integrity (OAI) investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or (e) materially impeding KFAED’s contractual rights of audit or access to information; and
 - (vi) “integrity violation” is any act which violates KFAED’s Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of KFAED sanctions, retaliation against whistleblowers or witnesses, and other violations of KFAED’s Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
- (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the borrower or of a beneficiary of KFAED-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that contract, without the borrower having taken timely and appropriate action satisfactory to KFAED to remedy the

situation; and

- (d) will impose remedial actions on a firm or an individual, at any time, in accordance with KFAED's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate² in KFAED-financed, administered, or supported activities or to benefit from an KFAED-financed, administered, or supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations.

75. Payment upon Termination

75.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the PCC. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

75.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

76. Property

76.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.

77. Release from Performance

77.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterward to which a commitment was made.

78. Suspension of KFAED Loan or Credit

78.1 In the event that KFAED suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made,

(a) the Employer is obligated to notify the Contractor, with copy to

² Whether as a Contractor, Nominated Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document). A Nominated Subcontractor is one which either has been: (i) included by the Bidder in its prequalification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the Bidder's prequalification application or the bid; or (ii) appointed by the Employer.

the Project Manager, of such suspension within 7 days of having received KFAED's suspension notice.

- (b) if the Contractor has not received sums due it within the 28 days for payment provided for in GCC50.1 [Payments], the Contractor may immediately issue a 14-day termination notice.

79. Eligibility

- 79.1 The Contractor shall have the nationality of an eligible country as specified in Section 5 [Eligible Countries] of the bidding document. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, or incorporated, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.
- 79.2 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as specified in Section 5 [Eligible Countries] of the bidding document and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment, and services.
- 79.3 For purposes of GCC 79.2, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

Section 8 - Particular Conditions of Contract

The following Particular Conditions of Contract shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Particular Conditions of Contract

A. General	
GCC 1.1 (d)	The financing institutions is Kuwait Fund (KFAED)
GCC 1.1 (r)	The Employer is Water Resources and Irrigation Development Division, Makwanpur, Bagmati Province
GCC 1.1 (w)	The Intended Completion Date for the whole of the Works shall be Five hundred Forty-Eight (548) days from the start date.
GCC 1.1 (cc)	The Project Manager is Division Chief, WRIDD- Makwanpur
GCC 1.1 (ff)	The Site is located at Makwanpur
GCC 1.1 (ii)	The Start Date shall be Fifteen (15) days from the Date of signing of Contract Agreement.
GCC 1.1 (mm)	The Works consist of Construction of Side Intake, Canal & Canal Structures of Chauraha Dhol Khola Ratamate Irrigation Project, Manahari-05, Makwanpur.
GCC 2.2	Sectional Completions are: Not Applicable
GCC 2.3(j)	The following documents also form part of the Contract: Document negotiated with or submitted by the contractor in reply to the clarifications sought for “equipment” and/or “key Personnel”, if applicable.
GCC 3.1	The language of the contract is English The law that applies to the Contract is the law of Nepal
GCC 11.1	The Project Manager may delegate any of his duties and responsibilities.
GCC 14.1	Schedule of other contractors: Not Applicable
GCC 19.1	The minimum insurance amounts and deductibles shall be: (a) for loss or damage to the Works, Plant and Materials (i) Minimum insurance amount: One Hundred and Ten (110) Percent of Contract Price (ii) Maximum deductible for insurance: NPR 100,000.00 (b) for loss or damage to Equipment: (i) Minimum insurance amount: 2,000,000.00 (ii) Maximum deductible for insurance: 25,000.00 (c) For loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract:

	(i) Minimum insurance amount: 1,000,000 (Nepalese Rupees One Million Only) with unlimited number of occurrences; and (ii) Maximum deductible for insurance: 25,000 (d) for personal injury or death: (i) of the Contractor's employees: As per the labor Act of Nepal (ii) of Other People: NPR 1,000,000.00 (Nepalese rupees One Million only) per person for 10 persons with unlimited number of occurrences
GCC 20.1	Site Investigation Reports are: None
GCC 21.1	The contractor shall adequately record the condition of roads, agriculture land and other infrastructure prior to the start of transporting materials, goods and equipment, and construction.
GCC 23.1	The following shall be designed by the Contractor: None
GCC 24	The Contractor shall provide on the Site such lifesaving apparatus as may be appropriate and an adequate and easily accessible first aid outfit or such outfits as may be required in any government ordinances, factories, acts etc., subsequently published and amended from time to time. In addition, an adequate number of persons permanently on the Site shall be instructed in their use, and the persons so designated shall be made known to all employees by the posting of their names and designations in a prominent position on Site. The Contractor shall take due care and ensure that medical staff, first aid room are available at the camps, housing and on the Site at all times throughout the period of the Contract and that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements. The contractor shall at all times take all reasonable precautions to maintain the health and safety of the contractor's personnel and to provide a safe work environment. The Contractor shall conduct health and safety programs for workers employed under the project, and shall include information on the trafficking of women and the risk of sexually transmitted diseases, including HIV/AIDS in such programs.
GCC 26.1	The Site Possession Date(s) shall be: Within Fifteen (15) Days from the Date of Signing of Contract Agreement
GCC 29.1	Appointing Authority for the Adjudicator: Nepal Council of Arbitration (NEPCA)
GCC 30.1	In addition to the foregoing, the contractor shall provide the Engineer with a written notice of any unanticipated environmental, resettlement or indigenous peoples risk or impacts that arise during construction, implementation or operation of the plant or permanent works, which were not considered in the initial environmental examination or the environmental management plan attached hereto as Annex A.
GCC 30.3	The Adjudicator shall be paid by the hour at the rate of: NPRinclusive of other applicable taxes, but excluding VAT. The reimbursable expenses are: Site visit costs would be reimbursed.

GCC 30.4	Institution whoses arbitration procedures shall be used: (a) Arbitration shall be conducted in accordance with the Arbitration Act 2055 (1999) of Nepal. The Place of Arbitration shall be Kathmandu, Nepal
GCC 32.2	The contractor shall comply with all applicable labor, health and safety laws and regulations of Nepal and, in particular, (a) shall not employ child labor (<16 Years) for construction and maintenance activities, and (b) provide appropriate facilities (Latrines, etc) for workers at construction site. The contractors shall not differentiate wages between men and women for work of equal value.
C. Time Control	
GCC 35.1	The Contractor shall submit for approval a Program for the Works within Fifteen (15) days from the date of the Letter of Acceptance.
GCC 35.3	The period between Program updates is Ninety (90) days. The amount to be withheld for late submission of an updated Program is NPR 100,000
GCC 39	"Add the following paragraph" under GCC 39.1: Management meetings shall be held on a monthly basis. The management meetings shall be attended by the Project Manager, site in-charge of responsible for supervision of contract, Contractor's representative and his Key Personnel. If any of the issues related with the execution of contract are not resolved during such meetings, then the prime contractor shall attend the ensuing meeting(s) on compulsory basis.
GCC 41.1	Add at the beginning of GCC 41.1 "The contractor shall submit a detailed quality assurance plan (QAP) along with the program in the format approved by the Project Manager".
D. Quality Control	
GCC 43.1	The Defects Liability Period is: 365 days.
E. Cost Control	
GCC 53.1	The currency of the Employer's country is: Nepalese Rupees (NRs.)
GCC 54.1	The Contract is not subjected to price adjustment in accordance with GCC Clause 54, and the following information regarding coefficients does not apply. The coefficients and indexes for adjustment of prices in local and international currencies shall be as specified in the Table(s) of Adjustment Data submitted together with the Letter of Bid.
GCC 55.1	The proportion of payments retained is: Five (5) Percent
GCC 55.2	Replace GCC 55.2 by: The amount of retention money shall be released after the expiry of defects liability period and certification of correction of all defects by the Employer and submission of evidential documents by the Contractor of having submitted income return issued from the Inland Revenue Office. The Contractor

	may substitute retention money with an “on demand” bank guarantee.
GCC 56.1	The liquidated damages for the whole of the Works are <i>0.05% of the contract price</i> per day. The maximum amount of liquidated damages for the whole of the Works is Ten (10) percent of the final Contract Price.
GCC 57.1	The Bonus for the whole of the Works is Not Applicable
GCC 58.1	The Advance Payments shall be: 15% (Fifteen Percent) of the Contract Price excluding provisional sums and Value Added Tax (VAT) and shall be paid to the contractor in two equal installments of 7.5% each. The first installment shall be paid within 28 days of the submission of request along with acceptable required security and second installment shall be paid after the mobilization of manpower and submission of satisfactory evidence that the first installment of advance payment amount has been used for the construction materials, resources, capital goods and installation expenses.
GCC 58.3	Recovery of Advance Payments shall be 25% to be deducted from each payment, which shall start after the payment of statement/s amounting to 20% of the contract price. Recovery of the advance payment shall be completed after payments to the contractor reach 80% of the contract amount
GCC 59.1	The Performance Security amount is Five (5) Percent of The Contract Price or as per the GoN laws.
G. Finishing the Contract	
GCC 72.1	The date by which operating and maintenance manuals are required is Not Applicable The date by which “as built” drawings are required is Thirty (30) Days after the Date of Completion.
GCC 72.2	The amount to be withheld for failing to produce “as built” drawings by the date required in GCC 72.1 is: NPR 200,000.00
GCC 73.2 (h)	The maximum number of days is: 200 Days
GCC 75.1	The percentage to apply to the value of the work not completed, representing the Employer’s additional cost for completing the Works, is Twenty Five (25) Percent
ADDITIONAL CLAUSES – PCC	
Add GCC 80.1 Reinstatement and Compensation for Damage to	The Contractor shall reinstate all properties whether public or private which are damaged in consequence of the execution and maintenance of the works to a condition as specified and at least to that obtaining before his first entry on them. If in the opinion of the Project Manager the Contractor shall have failed to take reasonable and prompt action to his obligations in the matter of reinstatement, the

Persons or Property	Project Manager will inform the Contractor in writing of his opinion, in which circumstance the Employer reserves the right to employ others to do the necessary work of reinstatement and to deduct the cost thereof from any money due or which shall be due from the Employer to the Contractor. Upon the completion of construction, the contractor shall fully reinstate pathways, other local infrastructure, and agriculture land to at least their pre-project condition as recorded by the contractor in consonance with its obligation in Clause 21.1.
Add GCC 80.2 Obligation of the Contractor	The Contractor shall pay compensation for all temporary use of private or community/village lands and for any loss of livelihood arising there from.
Add GCC 80.3 Environmental Management Plan	The Contractor shall be responsible for the implementation of Environmental Management Plan (EMP) and comply with the requirements of EMP in the execution of the Works. In addition, the Contractor shall abide by the terms and conditions set forth in the environmental clearance provided by the relevant authority. The contractor shall comply with all applicable national, provincial, and local environmental laws and regulations. The contractor shall (a) establish an operational system for managing environmental impacts, (b) carry out all of the monitoring and mitigation measures set forth in the initial environmental examination and the environmental management plan, (c) allocate the budget required to ensure that such measures are carried out, and (d) comply with any corrective or preventive actions set out in safeguards monitoring reports that the Employer will prepare from time to time to monitor implementation of the Initial Environmental Examination (IEE) and the Environmental Management Plan (EMP). The contractor shall submit quarterly reports on the carrying out of such measures to the Employer.
Add GCC 81.1	The contractor shall provide the Employer with quarterly reports of its activities, including each of its obligations in clauses 23, 24, 31, 32, 34, and 80.

Section 9 - Contract Forms

This section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.

Table of Forms

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Letter of Acceptance

---- on letterhead paper of the employer ----

..... date.

To: name and address of the contractor

Subject: Notification of Award Contract No.

This is to notify you that your Bid dated date for execution of the name of the contract and identification number, as given in the Bid Data Sheet for the Accepted Contract Amount of the equivalent of amount in numbers and words and name of currency, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.

[Choose one of the following statements:]

We accept that _____ [insert the name of adjudicator proposed by the bidder] be appointed as the Adjudicator.

[or]

We do not accept that _____ [insert the name of the adjudicator proposed by the bidder] be appointed as the Adjudicator, and by sending a copy of this Letter of Acceptance to _____ [insert name of the appointing authority], the Appointing Authority, we are hereby requesting such Authority to appoint the Adjudicator in accordance with GCC 29.1.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made the day of, between *name of the employer*. (hereinafter "the Employer"), of the one part, and *name of the contractor*. (hereinafter "the Contractor"), of the other part:

WHEREAS the Employer desires that the Works known as *name of the contract*. should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
 - (a) the Contract Agreement,
 - (b) the Letter of Acceptance,
 - (c) the Letters of Technical Bid and Price Bid,
 - (d) the Particular Conditions of Contract,
 - (e) the List of Eligible Countries that was specified in Section 5 of the bidding document,
 - (f) the General Conditions of Contract,
 - (g) the Specification,
 - (h) the Drawings,
 - (i) the Completed Activity Schedules or Bill of Quantities, and
 - (j) any other documents shall be added here.¹
3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of *name of the borrowing country*. on the day, month and year indicated above.

¹ Tables of Adjustment Data may be added if the contract provides for price adjustment (see GCC 54.1).

Signed by
for and on behalf of the Employer

Signed by
for and on behalf the Contractor

in the presence of:

in the presence of:

Witness, Name, Signature, Address, Date

Witness, Name, Signature, Address, Date

Performance Security

Bank's name, and address of issuing branch or office¹

Beneficiary: *Name and address of employer*

Date:

Performance Guarantee No.:

We have been informed that *name of the contractor* (hereinafter called "the Contractor") has entered into Contract No. *reference number of the contract* dated with you, for the execution of *name of contract and brief description of works* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we *name of the bank* hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *name of the currency and amount in figures²* (..... *amount in words*) such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire, no later than the Day of³, and any demand for payment under it must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.⁴

.....
Seal of Bank and Signature(s)

-- Note to Bidder --

If the institution issuing the performance security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.

- ¹ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.
- ² The guarantor shall insert an amount representing the percentage of the contract price specified in the contract and denominated either in the currency(ies) of the contract or a freely convertible currency acceptable to the employer. If the bank issuing the performance security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer.
- ³ Insert the date 28 days after the expected completion date. The employer should note that in the event of an extension of the time for completion of the contract, the employer would need to request an extension of this guarantee from the guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months][1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."
- ⁴ Or the same or similar to this clause specified in the Uniform Rules for Demand Guarantees, ICC Publication No. 758 where applicable.

Advance Payment Security

Bank's name, and address of issuing branch or office¹

Beneficiary: *Name and address of employer*

Date:

Advance Payment Guarantee No.:

We have been informed that *name of the contractor*. (hereinafter called "the Contractor") has entered into Contract No. *reference number of the contract*. dated with you, for the execution of *name of contract and brief description of works*. (hereinafter called "the Contract").

Furthermore, we understand that, according to the Conditions of the Contract, an advance payment in the sum *name of the currency and amount in figures²*. (..... *amount in words*.) is to be made against an advance payment guarantee.

At the request of the Contractor, we *name of the bank*. hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of *name of the currency and amount in figures³*. (..... *amount in words*.) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number *contractor's account number*. at *name and address of the bank*.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that eighty percent (80%) of the Contract Price has been certified for payment, or on the ... day of⁴, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

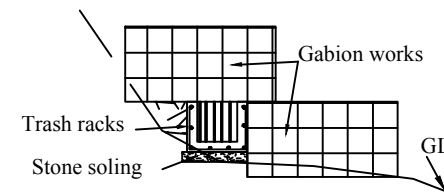
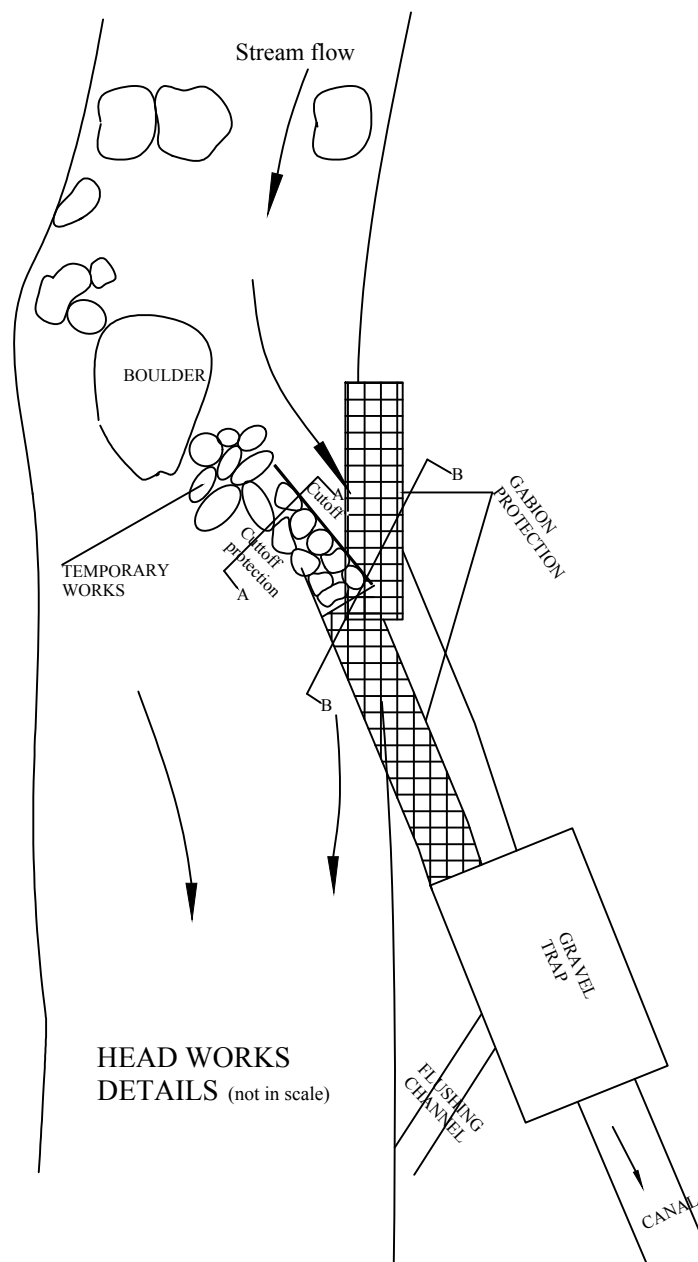
This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458(*or ICC Publication No. 758 as applicable*).

.....
Seal of Bank and Signature(s)

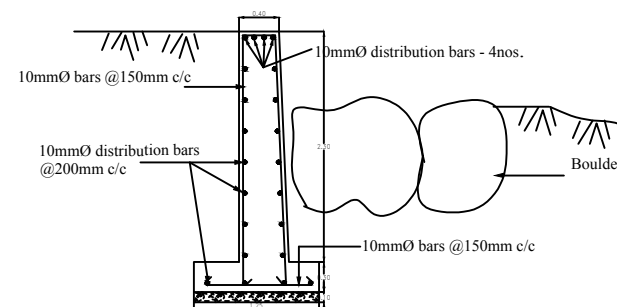
-- Note to Bidder --

If the institution issuing the advance payment security is located outside the country of the employer, it shall have a correspondent financial institution located in the country of the employer to make it enforceable.

- ¹ All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.
- ² The guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the employer.
- ³ Footnote 2.
- ⁴ Insert the expected expiration date of the time for completion. The employer should note that in the event of an extension of the time for completion of the contract, the employer would need to request an extension of this guarantee from the guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [6 months] [1 year], in response to the Employer's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."



Section at B-B

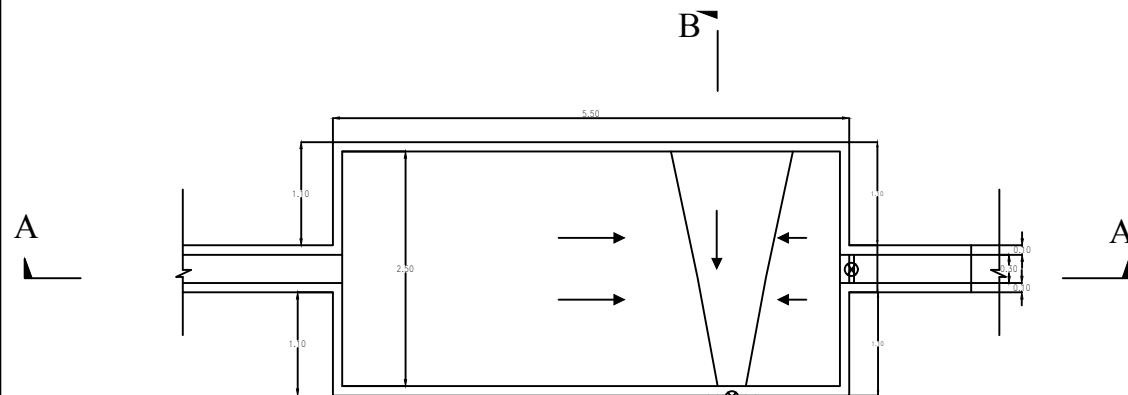


Section at A-A

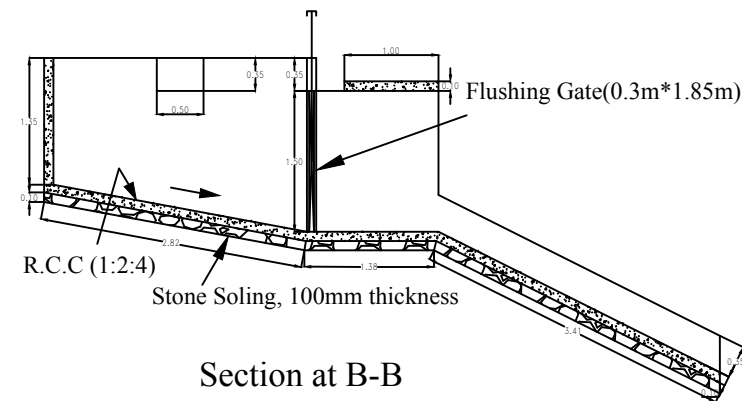


Note:- All Dim. are in "m" unless otherwise specified

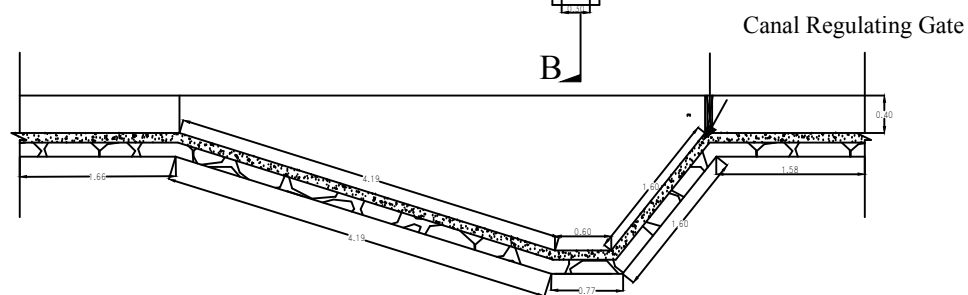
CLIENT	NAME OF PROJECT	PROJECT			MRM			DRAWING DETAIL	
Bagamati Province Government Ministry of Water Supply, Energy and Irrigation Water Resources and Irrigation Development Division Office Hetauda, Makawanpur	Detailed Project Report of Chauraha Dhol Khola Ratomate Irrigation Project, Manahari Rural Municipality-05, Makawanpur		Name	Sign		Name	Sign	Drawing Title:	Headwork
		Designed By			Checked By			Drawing No.:	H-01
		Drawn By			Recommended By			Sheet No:	39
		Checked By			Approved By			Scale:	As mentioned.



Plan of Gravel Trap



Section at B-B



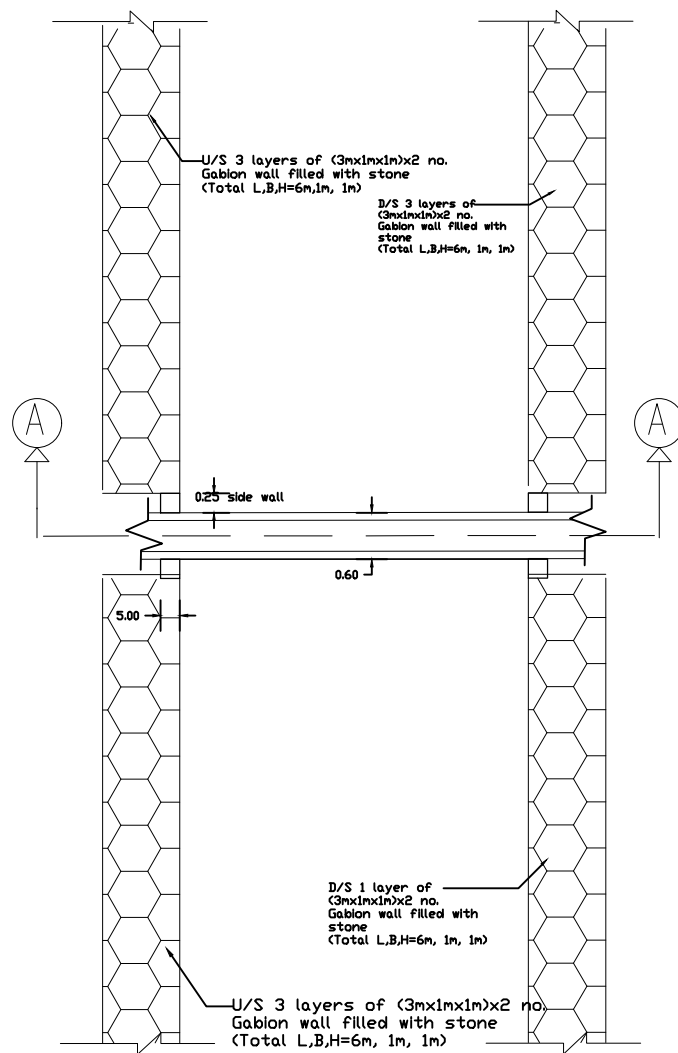
Section at A-A

S. N.	Description	L	B	H
1.	Gravel Trap (0+020)	5.5	2.7	2.0

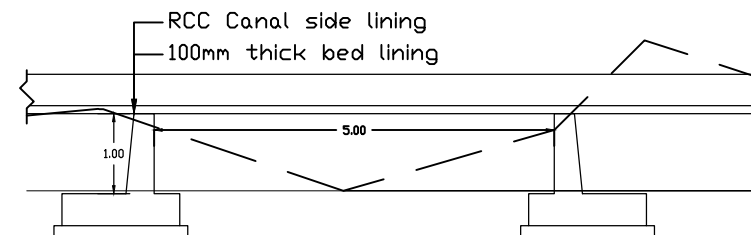


Note:- All Dim. are in "m" unless otherwise specified

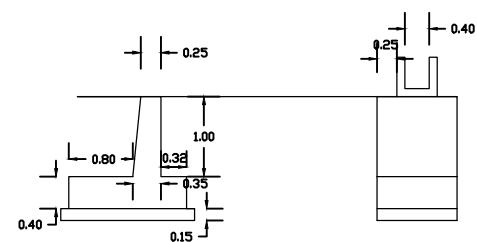
CLIENT	NAME OF PROJECT		PROJECT			MRM			DRAWING DETAIL	
Bagamati Province Government Ministry of Water Supply, Energy and Irrigation Water Resources and Irrigation Development Division Office Hetauda, Makawanpur	Detailed Project Report of Chauraha Dhol Khola Ratomate Irrigation Project, Manahari Rural Municipality-05, Makawanpur			Name	Sign		Name	Sign	Drawing Title:	Gravel Trap
			Designed By			Checked By			Drawing No.:	GT-01
			Drawn By			Recommended By			Sheet No:	40
			Checked By			Approved By			Scale:	As mentioned.



0.50



Plan of Aqueduct



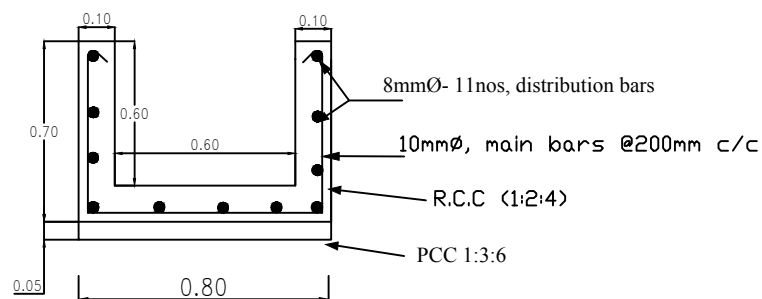
Section at A-A

Note:- All Dim. are in "m" unless otherwise specified

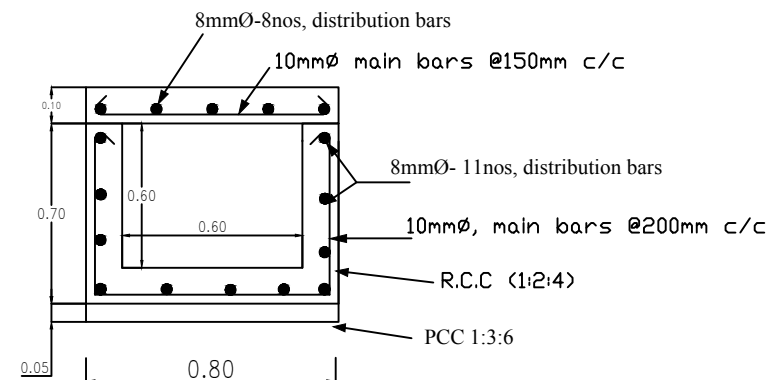
CLIENT	NAME OF PROJECT		PROJECT			MRM			DRAWING DETAIL	
				Name	Sign		Name	Sign	Drawing Title:	Aqueduct
			Designed By			Checked By			Drawing No.:	AQ-01
			Drawn By			Recommended By			Sheet No:	42
			Checked By			Approved By			Scale:	1:10

Bagmati Province Government
Ministry of Water Supply, Energy and Irrigation
Water Resources and Irrigation Development Division Office
Hetauda, Makawanpur

Detailed Project Report of Chauraha Dhol
Khola Ratomate Irrigation Project,
Manahari Rural Municipality-05,
Makawanpur



Canal section



Canal section (covered)

Note:- All Dim. are in "m" unless otherwise specified

CLIENT	NAME OF PROJECT		PROJECT			MRM			DRAWING DETAIL	
Bagamati Province Government Ministry of Water Supply, Energy and Irrigation Water Resources and Irrigation Development Division Office, Hetauda, Makawanpur	Detailed Project Report of Chauraha Dhol Khola Ratomate Irrigation Project, Manahari Rural Municipality-05, Makawanpur			Name	Sign		Name	Sign	Drawing Title:	Canal Lining
			Designed By			Checked By			Drawing No.:	CL-01
			Drawn By			Recommended By			Sheet No:	41
			Checked By			Approved By			Scale:	1:10

SECTION-VI

Bill of Quantities

Notes for Unit Rate Contracts :

Objectives

The objectives of the Bill of Quantities are

- (a) to provide sufficient information on the quantities of Works to be performed to enable Bids to be prepared efficiently and accurately; and
- (b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

Content

The Bill of Quantities should be divided generally into the following sections:

- (a) Preamble;
- (b) Work Items (grouped into parts);
- (c) Day works Schedule;
- d) Provisional Sums; and
- (d) Summary.

Preamble

The Preamble should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bill of Quantities and which are to be used for the measurement of any part of the works.

Work Items

The items in the Bill of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the works may be grouped as a separate section in the Bill of Quantities.

Day work Schedule

A Day work Schedule should be included only if the probability of unforeseen work, outside the items included in the Bill of Quantities, is high. To facilitate checking by the Employer of the realism of rates quoted by the Bidders, the Day work Schedule should normally comprise the following:

- (a) A list of the various classes of labor, materials, and Constructional Plant for which basic day work rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor will be paid for work executed on a day work basis.
- (b) Nominal quantities for each item of Day work, to be priced by each Bidder at Day work rates as bid. The rate to be entered by the Bidder against each basic Day work item should include the Contractor's profit, overheads, supervision, and other charges.

Provisional Sums

A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the Contract Data should state the manner in which they will be used, and under whose authority (usually the Project Manager's).

Summary

The Summary should contain a tabulation of the separate parts of the Bill of Quantities carried forward, with provisional sums for Day work, for physical (quantity) contingencies, and for price contingencies (upward price adjustment) where applicable.

These Notes for Preparing Specifications are intended only as information for the Employer or the person drafting the Bidding documents. They should not be included in the final documents.

Bill of Quantities

1 Provisional Sum						
Procument Item Details						
SL. No	Item Description	Unit	Quantity	Unit Rate(NPR)	Amount(NPR)	
1	Insurance against work, plant and material	PS	1.0	17100.0	17,100.00	
2	Insurance against damage to equipment	PS	1.0	17100.0	17,100.00	
3	Insurance against loss and damage to property	PS	1.0	17100.0	17,100.00	
4	Insurance against personal injury and death	PS	1.0	17100.0	17,100.00	
5	Commision of Performance Bond	PS	1.0	5700.0	5,700.00	
6	Preparation of as built drawing	PS	1.0	5700.0	5,700.00	
7	Environmental Protection works	PS	1.0	114000.0	114,000.00	
2 Construction work						
2.1 Works for complete or part construction and civil engineering work						
2.1.1 Engineering works and construction works						
Procument Item Details						
SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
1	Earthwork in excavation of hard clay and soil mixed with moorum stone with disposal all complete as per instruction.	m3	284.57			
2	Earthwork in backfilling all complete as per instruction.	m3	2.18			
3	Stone Soling works in foundation and levelling all complete as per instruction.	m3	2.51			
4	Concreting of foundation, vertical faces, wall etc. in ratio of 1:2:4 (M15) including supplying of materials and haulage etc. all complete as per instruction.	m3	301.13			
5	P.C.C (1:3:6) works Concreting of foundation, vertical faces, wall etc. in ratio of 1:3:6 (M10) including supplying of materials and haulage etc. all complete as per instruction.	m3	55.82			
6	Wooden form work incl. supply & selection of material fixing , nailing according to drawing, placing seperators dismantaling forms and hauling upto 30m distance all complete as per instruction.	m2	3791.89			
7	RRM in 1:4 works all complete as per instruction.	m3	4.14			

Procument Item Details						
SL. No	Item Description	Unit	Quantity	Bidder's Rate (NPR)	Bidder's Rate (in words)	Total Amount (NPR)
8	Cutting , Bending, placing in position as shown in the Drawing & binding of Reinforcement Bars for RCC works incl. haulage etc. all complete as per instruction.	kg	15879.17			
9	Supply and Weaving gabion box of medium coated 10 gauge SWG wire having rectangle mesh size of 10 cm x 10 cm with two way knots incl. transportation of wire, cutting, netting etc all complete as per instruction.	m2	383.39			
10	Supply and filling stones in gabion boxes all complete as per instruction.	m3	82.12			
11	Supply & Laying Geo.textile all complete as per instruction	m2	23.0			
12	Supply and installation of Trash Rack Works all complete as per instruction.	Job	1.0			
13	Supply and Installation of Irrigation Gate all complete as per instruction.	Job	2.0			
Total of Procument Items						
Total Item Price						
VAT						
Grand Total						