



**GOVT. OF WEST BENGAL**  
**Irrigation & Waterways Directorate**

**NATIONAL HYDROLOGY PROJECT**

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***NATIONAL COMPETITIVE BIDDING FOR***

***(Two-Envelope Bidding Process with e-Procurement)***

***“Supply, installation, testing, commissioning, operation and maintenance of Real Time Monitoring for Mayurakshi Project Canal System of Irrigation & Waterways Department, West Bengal under National Hydrology Project (NHP).”***

BID REFERENCE	: <b>NHP-2021-2022-WBSW-890757</b>
Bid Published Date	: 24-08-2021
DATE OF COMMENCEMENT OF SALE/Download OF BIDDING DOCUMENT	: 25-08-2021, 10:00 Hrs onwards
Clarification Start Date/time	: 25-08-2021, 10:00 Hrs onwards
Clarification End Date/time	: 13-09-2021, 15:00 Hrs
Pre-bid Meeting Date/time	: 17-09-2021, 11:30 Hrs
Bid Submission Start Date/time	: 27-09-2021, 10:00 Hrs
Bid Document Download/sale End date/ time	: 01-10-2021, 15:00 Hrs
Bid Submission End Date/time	: 01-10-2021, 15:00 Hrs
TIME AND DATE OF OPENING OF BIDS– Technical Part	: 01-10-2021, 15:30 Hrs
OFFICER INVITING BIDS	: The Executive Engineer Burdwan Investigation & Planning Division Irrigation & Waterways Directorate, Govt. of West Bengal Purta Bhawan, 3 <sup>rd</sup> Floor, Purba Bardhaman-713103 e-mail: <a href="mailto:eebipd2012@gmail.com">eebipd2012@gmail.com</a>

**SECTION I: INVITATION FOR BIDS (IFB)**

## **NATIONAL COMPETITIVE BIDDING FOR (Two-Envelope Bidding Process with e-Procurement)**

*“Supply, installation, testing, commissioning, operation and maintenance of Real Time Monitoring for Mayurakshi Project Canal System of Irrigation & Waterways Department, West Bengal under National Hydrology Project (NHP).”*

### **INVITATION FOR BIDS (IFB) E-Procurement Notice**

Memo No: 287/NHP-02/02

Date : 24-08-2021

Loan No. : 8725-IN

IFB No. : WBIW/NHP/IFB-07/2020-21

REFERENCE : **NHP-2021-2022-WBSW-890757**

1. This Invitation for Bid follows the General Procurement Notice for this Project that appeared in Development Business on 9<sup>th</sup> March, 2017.
2. The Government of India has received financing from the World Bank towards the cost of *National Hydrology Project* and it is intended that part of the proceeds will be applied to eligible payments under the contract for which this invitation of bids is issued.
3. *The Executive Engineer, Burdwan Investigation & Planning Division, I&WD, Govt. of WB, NH-2, Purta Bhawan, 3<sup>rd</sup> Floor, Purba Burdwan-713103(Purchaser)*now invites online bids from eligible bidders for supply of-
  - (a) Complete package of Supply, installation and commissioning of Real Time Monitoring for Mayurakshi Project Canal System along with Host Server, AWLR etc. as required for the project, including civil and electrical works, for main work site at Mayurakshi Project.
  - (b) Comprehensive Warranty, operation & maintenance for a period of five (5) year from the date of successful commissioning of the project for the supplied and installed articles used for the project along with 5-year warranty for installed software for hassle free running of the whole system.
4. Bidding will be conducted through the National Competitive Bidding (NCB) procedures agreed with World Bank. The bidding is open to all eligible bidders as defined in the Bank's Procurement Guidelines. In addition, please refer to paragraphs 1.6 and 1.7 of the Guidelines setting forth the World Bank's policy on conflict of interest.
5. Bidding documents are available online on [www.wbtenders.gov.in](http://www.wbtenders.gov.in) for downloading free of cost Bidders will be required to register in the website, which is free of cost. The bidder would be responsible for ensuring that any addenda available on the website is also downloaded and incorporated.

Price of bidding document : Free  
Available online at <https://wbtenders.gov.in>

DATE OF COMMENCEMENT OF  
SALE/Download OF BIDDING DOCUMENT : 25-08-2021, 10:00 Hrs onwards

Clarification Start Date/time : 25-08-2021, 10:00 Hrs onwards  
Clarification End Date/time : 13-09-2021, 15:00 Hrs

Pre-bid Meeting Date/time : 17-09-2021, 11:30 Hrs

Bid Submission Start Date/time : 27-09-2021, 10:00 Hrs

Bid Document Download/sale End date/ time : 01-10-2021, 15:00 Hrs

Bid Submission End Date/time : 01-10-2021, 15:00 Hrs

TIME AND DATE OF OPENING  
OF BIDS– Technical Part : 01-10-2021, 15:30 Hrs

6. For submission of the bids, the bidder is required to have Digital Signature Certificate (DSC) from one of the authorized Certifying Authorities, authorised by Government of India for issuing DSC. Aspiring bidders who have not obtained the user ID and password for participating in e-procurement in this Project may obtain the same from *designated firms available on e-Procurement portal and then register with the Government of West Bengal e-Procurement platform and submit Bids by using their user ID and Digital Signature.*
7. All bids must be accompanied by a Bid-Securing Declaration, in approved form and scanned copy of the original document shall be uploaded along with the Technical Part of the bid.
8. Other details can be seen in the bidding document. The Purchaser shall not be held liable for any delays due to system failure beyond its control. Even though the system will attempt to notify the bidders of any bid updates, the Purchaser shall not be liable for any information not received by the bidder. It is the bidders' responsibility to verify the website for the latest information related to this bid.
9. A **pre-bid meeting** will be held on **17-09-2021, 11:30 Hrs** at the office of ***The Superintending Engineer, Investigation and Planning Circle No. II, Jalsampad Bhawan, 5th Floor, Salt Lake, Kolkata-700091*** to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in ITB Clause 7.1 of 'Instructions to Bidders' of the bidding document.

Sd/-

***Executive Engineer,  
Burdwan Investigation & Planning Division  
Purta Bhawan (3<sup>rd</sup> floor), Burdwan-713103  
Telephone number: 0342-2646799  
E-mail address: eebpd2012@gmail.com***

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## **PART 1 – BIDDING PROCEDURES**

# Section I. Instructions to Bidders

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## Section I. Instructions to Bidders

### A. General

- 1. Scope of Bid**
- 1.1 The Purchaser **indicated in the Bidding Data Sheet (BDS)**, issues these Bidding Documents for the supply of Goods and Related Services incidental thereto as specified in Section VII, Schedule of Requirements. The name, identification and number of lots (contracts) of this National Competitive Bidding (NCB) procurement are **specified in the BDS**.
- 1.2 Throughout these Bidding Documents:
- (a) the term “in writing” means communicated in written form (e.g. by mail, e-mail, fax, telex, including if **specified in the BDS**, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;
  - (b) if the context so requires, “singular” means “plural” and vice versa; and
  - (c) “day” means calendar day.
- 2. Source of Funds**
- 2.1 The Government of India (hereinafter called “Borrower”) **specified in the BDS** has applied for or received financing (hereinafter called “funds”) from the International Bank for Reconstruction and Development or the International Development Association (hereinafter called “the Bank”) in an amount **specified in BDS** toward the project **named in the BDS**. The Borrower intends to apply a portion of the funds to eligible payments under the contract for which these Bidding Documents are issued.
- 2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank in accordance with the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the loan or other financing) account for the purpose of any payment to persons or entities, or for any import of goods, if such payment or import, to the knowledge of the Bank, is prohibited by decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan (or other financing) Agreement or have any claim to the funds.

- 3. Corrupt & Fraudulent Practices**
- 3.1 The Bank requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Section VI.
- 3.2 In further pursuance of this policy, Bidders shall permit and shall cause its agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers and to permit the Bank to inspect all accounts, records and other documents relating to the submission of the application, bid submission (in case prequalified), and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.
- 4. Eligible Bidders**
- 4.1 A Bidder may be a firm that is a private entity, or a government owned entity subject to ITB 4.5.
- 4.2 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this bidding process, if the Bidder:
- a. directly or indirectly controls, is controlled by or is under common control with another Bidder; or
  - b. receives or has received any direct or indirect subsidy from another Bidder; or
  - c. has the same legal representative as another Bidder; or
  - d. has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the bid of another Bidder, or influence the decisions of the Purchaser regarding this bidding process; or
  - e. Participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which such Bidder is involved. However, this does not limit the inclusion of the same subcontractor in more than one bid; or
  - f. any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the goods/equipment that are the subject of the bid; or
  - g. any of its affiliates has been hired (or is proposed to be hired) by the Purchaser or Borrower for the Contract implementation; or
  - h. would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any of its affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; or
  - i. has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a

recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding documents or specifications of the contract, and/or the bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the procurement process and execution of the contract.

- 4.3 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.7. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed sub-contractors or sub-consultants for any part of the Contract including related Services.
- 4.4 A Bidder that has been sanctioned by the Bank in accordance with the above ITB 3.1, including in accordance with the Bank's Guidelines on Preventing and Combating Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants ("Anti-Corruption Guidelines"), shall be ineligible to be prequalified for, bid for, or be awarded a Bank-financed contract or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address **specified in the BDS.**
- 4.5 Bidders that are Government-owned enterprises or institutions in the Purchaser's Country may participate only if they can establish that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not dependent agencies of the Purchaser. To be eligible, a government-owned enterprise or institution shall establish to the Bank's satisfaction, through all relevant documents, including its Charter and other information the Bank may request, that it: (i) is a legal entity separate from the government (ii) does not currently receive substantial subsidies or budget support; (iii) operates like any commercial enterprise, and, inter alia, is not obliged to pass on its surplus to the government, can acquire rights and liabilities, borrow funds and be liable for repayment of its debts, and can be declared bankrupt; and (iv) is not bidding for a contract to be awarded by the department or agency of the government which under their applicable laws or regulations is

the reporting or supervisory authority of the enterprise or has the ability to exercise influence or control over the enterprise or institution.

- 4.6 A Bidder shall not be under suspension from bidding by the Purchaser as the result of the operation of a Bid-Securing Declaration.
- 4.7 Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) 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 any country, person, or entity in that country.
- 4.8 A bidder shall provide such evidence of eligibility satisfactory to the Purchaser, as the Purchaser shall reasonably request.

**5. Eligible Goods and Related Services**

- 5.1 All the Goods and Related Services to be supplied under the Contract and financed by the Bank may have their origin in any country in accordance with Section V, Eligible Countries.
- 5.2 For purposes of this Clause, the term "goods" includes commodities, raw material, machinery, equipment, and industrial plants; and "related services" includes services such as insurance, installation, training, and initial maintenance.
- 5.3 The term "origin" means the country where the goods have been mined, grown, cultivated, produced, manufactured or processed; or, through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its components.

**B. Contents of Bidding Document**

**6. Sections of Bidding Documents**

- 6.1 The Bidding Documents consist of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addendum issued in accordance with ITB Clause 8.

**PART 1 Bidding Procedures**

- Section-I. Instructions to Bidders (ITB)

- Section II. Bidding Data Sheet (BDS)
- Section III. Evaluation and Qualification Criteria
- Section IV. Bidding Forms
- Section V. Eligible Countries
- Section VI Bank Policy-Corrupt and Fraudulent Practices

## **PART 2 Supply Requirements**

- Section VII. Schedule of Requirements

## **PART 3 Contract**

- Section VIII. General Conditions of Contract (GCC)
- Section IX. Special Conditions of Contract (SCC)
- Section X. Contract Forms

- 6.2 The Invitation for Bids issued by the Purchaser is not part of the Bidding Document.
- 6.3 Unless obtained directly from the Purchaser, the Purchaser is not responsible for the completeness of the document, responses to requests for clarification, minutes of pre-bid meeting (if any), or Addenda to the Bidding Document in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Purchaser shall prevail.
- 6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Documents and to furnish with its Bid all information or documentation as is required by the Bidding Documents.

## **7. Clarification of Bidding Documents**

- 7.1 The electronic bidding system **specified in the BDS** provides for online clarifications. A prospective Bidder requiring any clarification on the Bidding Documents may notify the Purchaser online. Clarifications requested through any other mode shall not be considered by the Purchaser. The Purchaser will respond to any request for clarification, provided that such request is received no later than fifteen (15) days prior to the deadline for submission of bids. Description of clarification sought and the response of the Purchaser shall be uploaded for information of all Bidders without identifying the source of request for clarification. Should the Purchaser deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so

following the procedure under ITB Clause 8 and ITB Sub-Clause 22.2. It is the bidder's responsibility to check on the e-procurement system, for any addendum/ amendment/ corrigendum to the bidding document.

- 8. Amendment of Bidding Documents**
- 8.1 At any time prior to the deadline for submission of bids, the Purchaser may amend the Bidding Documents by issuing addendum. The addendum will appear on the e-procurement system under "Latest Corrigendum" and email notification is also automatically sent to those bidders who have started working on the tender, or as **otherwise specified in BDS**.
- 8.2 Any addendum thus issued shall be part of the Bidding Documents and shall be deemed to have been communicated to all the bidders.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Purchaser may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB Sub-Clause 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 Purchaser shall not 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 Purchaser, shall be written in English language. 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 into English language, 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 Parts, namely the Technical Part and the Financial Part. These two Parts shall be submitted simultaneously.
- 11.2 **The Technical Part** shall containing the following:
- (a) Letter of Bid – Technical Part, in accordance with ITB Clause 12;
  - (b) Bid Security, in accordance with ITB Clause 19.1, if required;
  - (c) Alternative bids– Technical Part, if permissible, in

accordance with ITB 13, the Technical Part of any Alternative Bid;

- (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB Clause 20.2;
- (e) documentary evidence in accordance with ITB Clause 17 establishing the Bidder's qualifications to perform the contract if its bid is accepted;
- (f) documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to bid;
- (g) documentary evidence in accordance with ITB Clause 16, that the Goods and Related Services to be supplied by the Bidder are of eligible origin;
- (h) documentary evidence in accordance with ITB Clauses 16, that the Goods and Related Services conform to the Bidding Documents;
- (i) Manufacturer's authorization form; and
- (j) Any other document **required in the BDS.**

11.3 The **Financial Part** shall contain the following:

- (a) Letter of Bid – Financial Part: prepared in accordance with ITB 12 and ITB 14;
- (b) Price Schedules: completed prepared in accordance with ITB 12 and ITB 14;
- (c) Alternative Bid - Financial Part; if permissible in accordance with ITB 13, the Financial Part of any Alternative Bid; and
- (d) Any other document **required in the BDS.**

11.4 The Technical Part shall not include any financial information related to the Bid price. Where material financial information related to the Bid price is contained in the Technical Part, the Bid shall be declared non-responsive.

11.5 The Bidder shall furnish in the Letter of Bid, information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

## **12. Process of Bid Submission**

12.1 The Letter of Bid – technical Part, Letter of Bid – Financial Part and Price Schedules shall be prepared using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 20.2. All blank

spaces shall be filled in with the information requested.

- 12.2 Entire Bid including the Letter of Bid and filled-up Price Schedules shall be submitted online on e-procurement system specified in ITB 7.1. Details and process of online submission of the tender and relevant documents are given in the website mentioned above. Scanned copies of documents listed in clauses 11 and 12.3 should also be uploaded on this website.
- 12.3 **Submission of Original Documents:** The bidders are required to separately submit (i) original demand drafts towards the cost of bid document and registration on e-procurement website (if not previously registered) (as per RFB); (ii) original bid security in approved form; and (iii) original affidavit regarding correctness of information furnished with bid document, with the office **specified in the BDS**, before the opening of the technical part of the Bid, either by registered/speed post/courier or by hand, failing which the bids will be declared non-responsive and will not be opened. Hard copy of rest of the bid is not to be submitted.
- 13. Alternative Bids** 13.1 Unless otherwise **specified in the BDS**, alternative bids shall not be considered.
- 14. Bid Prices and Discounts** 14.1 The prices and discounts quoted by the Bidder in the Letter of Bid – Financial Part and in the Price Schedules shall conform to the requirements specified below.
- 14.2 All lots (contracts) and items must be listed and priced separately in the Price Schedules.
- 14.3 The price to be quoted in the Letter of Bid – Financial Part, in accordance with ITB 12.1, shall be the total price of the bid, excluding any discounts offered.
- 14.4 The Bidder shall quote any discounts and indicate the methodology for their application in the Letter of Bid – Financial Part in accordance with ITB 12.1.
- 14.5 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account, **unless otherwise specified in the BDS**. A bid submitted with an adjustable price quotation shall be treated as nonresponsive and shall be rejected, pursuant to ITB 31. However, if in accordance with the BDS, prices quoted by the Bidder shall be subject to adjustment during the performance of the Contract, a bid submitted with a fixed price quotation shall not be rejected, but the price adjustment shall be treated as zero.



- 14.6 If so specified in ITB 1.1, bids are being invited for individual lots (contracts) or for any combination of lots (packages). Unless otherwise **specified in the BDS**, prices quoted shall correspond to 100 % of the items specified for each lot and to 100% of the quantities specified for each item of a lot. Bidders wishing to offer discounts 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. Discounts shall be submitted in accordance with ITB 14.4 provided the bids for all lots (contracts) are submitted and opened at the same time.
- 14.7 The terms EXW and other similar terms shall be governed by the rules prescribed in the current edition of Incoterms, published by The International Chamber of Commerce, **as specified in the BDS**.
- 14.8 Prices shall be quoted as specified in the Price Schedule included in Section IV, Bidding Forms. In quoting prices, the Bidder shall be free to use transportation through carriers registered in any eligible country, in accordance with Section V Eligible Countries. Similarly, the Bidder may obtain insurance services from any eligible country in accordance with Section V Eligible Countries. Prices shall be entered in the following manner:
- (a) **For Goods:**
- (i) the price of the Goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable), excluding GST as applicable payable on the finished Goods;
  - (ii) GST or any other taxes if payable in India on the Goods, if the contract is awarded to the Bidder; and
  - (iii) the price for inland transportation, insurance, and other local services required to convey the Goods to their final destination (Project Site) **specified in the BDS**.
- (b) for the Related Services, other than inland transportation and other services required to convey the Goods to their final destination, whenever such Related Services are specified in the Schedule of Requirements:
- (i) the price of each item comprising the Related Services (inclusive of any applicable taxes).

#### 14.9 Deemed Export Benefits

Bidders may like to ascertain availability of tax/duty exemption benefits, if any, available for contracts financed under World Bank Credits/ Loans. They are solely responsible for obtaining such benefits, which they have considered in their bid and in case of failure to receive such benefits for reasons whatsoever, the Purchaser will not compensate the bidder.

Where the bidder has quoted taking into account such benefits, it must give all information required for issue of necessary Certificates in terms of the Government of India's relevant Notification along with its bid as perform stipulated in Section IV Bidding Forms.

If the Bidder has considered the Deemed Export Benefits in its bid, the Bidder shall confirm and certify that the Purchaser will not be required to undertake any responsibilities of the deemed export scheme or the benefits available during contract execution except issuing the required certificates. Bids which do not conform to this provision or any condition by the Bidder which makes the bid subject to availability of deemed export benefits or compensation on withdrawal of or any variations in the deemed export benefits scheme will make the bid non responsive and hence liable to rejection.

#### 15. Currencies of Bid & Payment

15.1 The Bidder shall quote the Price in Indian Rupees only.

#### 16. Documents Establishing the Eligibility and conformity of the Goods and Related Services

16.1 To establish the eligibility of the Goods and Related Services in accordance with ITB Clause 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section IV, Bidding Forms.

16.2 To establish the conformity of the Goods and Related Services to the Bidding Documents, the Bidder shall furnish as part of its Bid the documentary evidence that the Goods conform to the technical specifications and standards specified in Section VII, Schedule of Requirements.

16.3 The documentary evidence may be in the form of literature, drawings or data, and shall consist of a detailed item by item description of the essential technical and performance characteristics of the Goods and Related Services, demonstrating substantial responsiveness of the Goods and Related Services to

the technical specification, and if applicable, a statement of deviations and exceptions to the provisions of the Section VII Schedule of Requirements.

- 16.4 The Bidder shall also furnish a list giving full particulars, including available sources and current prices of spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods during the period **specified in the BDS** following commencement of the use of the goods by the Purchaser.
- 16.5 Standards for workmanship, process, material, and equipment, as well as references to brand names or catalogue numbers specified by the Purchaser in the Schedule of Requirements, are intended to be descriptive only and not restrictive. The Bidder may offer other standards of quality, brand names, and/or catalogue numbers, provided that it demonstrates, to the Purchaser's satisfaction, that the substitutions ensure substantial equivalence or are superior to those specified in the Section VII Schedule of Requirements.

**17. Documents  
Establishing the  
Eligibility &  
Qualifications  
of the Bidder**

- 17.1 To establish Bidder's eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid – Technical Part, included in Section IV, Bidding Forms.
- 17.2 The documentary evidence of the Bidder's qualifications to perform the contract if its bid is accepted shall establish to the Purchaser's satisfaction:
- (a) that the Bidder meets each of the qualification criterion Criteria specified in Section III, Evaluation and Qualification;
  - (b) (i) that, if **required in the BDS**, a Bidder that does not manufacture or produce the Goods it offers to supply shall submit the Manufacturer's Authorization using the form included in Section IV, Bidding Forms to demonstrate that it has been duly authorized by the manufacturer or producer of the Goods to supply these Goods in the Purchaser's Country;
  - (ii) Supplies for any particular item in each schedule of the bid should be from one manufacturer only. Bids from agents offering supplies from different manufacturers for the same item of the schedule in the bid will be treated as non-responsive.
  - (iii) that, if **required in the BDS**, the Bidder is or will be (if

awarded the contract) represented by an Agent in the country equipped and able to carry out the Supplier's maintenance, repair and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications;

(c) **Bids from Joint Ventures are acceptable.**

- 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 Purchaser in accordance with ITB 22.1. A bid valid for a shorter period shall be rejected by the Purchaser as non-responsive.
- 18.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Purchaser 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 Clause 19, it shall also be extended for a corresponding 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, except as provided in ITB Sub-Clause 18.3.
- 18.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial bid validity, the Contract price shall be determined as follows:
- (a) In the case of fixed price contracts, the Contract price shall be the bid price adjusted by the factor **specified in the BDS** for each week or part of the week that has elapsed from the expiration of the initial bid validity to the date of notification of award to the successful bidder.
  - (b) In the case of adjustable price contracts, no adjustment shall be made.
  - (c) In any case, bid evaluation shall be based on the bid Price without taking into consideration the applicable correction from those indicated above.
- 19 Bid Security**
- 19.1 The Bidder shall furnish as part of the Technical Part of its bid, a Bid Security, if required, as **specified in the BDS**.
- 19.2 Not used.
- 19.3 The Bid Security shall be in the amount **specified in the BDS** and denominated in Indian Rupees or a freely convertible

currency, and shall:

- (a) at the bidder's option, be in the form of either a certified check, demand draft, letter of credit, or a bank guarantee from a Nationalized /Scheduled Bank in India, or another security specified **in the BDS**;
- (b) be substantially in accordance with one of the forms of Bid Security included in Section IV, Bidding Forms, or other form approved by the Purchaser prior to bid submission;
- (c) be payable promptly upon written demand by the Purchaser in case the conditions listed in ITB Clause 19.7 are invoked;
- (d) be submitted in its original form; copies will not be accepted;
- (e) remain valid for a period of 45 days beyond the original validity period of the bids, or beyond any period of extension of bid validity, if so requested under ITB Clause 18.2.

19.4 If a Bid Security is required in accordance with ITB Sub-Clause 19.1, any bid not accompanied by a substantially responsive Bid Security shall be rejected by the Purchaser as non-responsive.

19.5 The Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the contract and furnishing the Performance Security pursuant to ITB Clause 44.

19.6 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:

(a) if a Bidder

- (i) withdraws its bid during the period of bid validity specified by the Bidder in the Letter of Bid (Technical Part and/or Financial Part), except as provided in ITB Sub-Clause 18.2;  
or
- (ii) does not accept the correction of errors in pursuant to ITB35,  
or

- (b) if the successful Bidder fails to:
  - (i) sign the Contract in accordance with ITB Clause 43; or
  - (ii) Furnish a Performance Security in accordance with ITB Clause 44.

The bid security of a JV must be in the name of the JV that submits the bid. If the JV has not been legally constituted into a legally enforceable JV at the time of bidding, the bid security shall be in the names of all future members as named in the letter of intent referred to in ITB 4.1 and ITB 11.2.

19.9 If a bid security is **not required in the BDS**, and

- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid Form, except as provided in ITB 18.2, or does not accept the correction of errors pursuant to ITB 35; or
- (b) if the successful Bidder fails to sign the Contract in accordance with ITB 43; or furnish a performance security in accordance with ITB 44;

the Borrower may, **if provided for in the BDS**, declare the Bidder ineligible to be awarded a contract by the Purchaser for a period of time **as stated in the BDS**.

**20 Format and Signing of Bid**

- 20.1 The Bidder shall prepare the Bid as per details given in ITB 21.
- 20.2 The bid shall be signed by a person duly authorized to sign on behalf of the Bidder. The authorization shall consist of a written confirmation **as specified in the BDS** and shall be uploaded along with the bid.
- 20.3 Not used.
- 20.4 Corrections if any in the bid can be carried out by editing the information before electronic submission on e-procurement portal.

**D. Online Submission of Bids**

**21 Preparation of Bids**

- 21.1 Bids, both Technical and Financial Parts, shall be submitted online on the e-procurement system specified in BDS 7.1. Detailed guidelines for viewing bids and submission of online bids are given on the website. The Invitation for Bids under this Project is published on this website. Any citizen or prospective bidder can logon to this website and view the Invitation for Bids and can view the details of goods for which bids are invited. A

prospective bidder can submit its bid online; however, the bidder is required to have enrolment/registration in the website, and should have valid Digital Signature Certificate (DSC) in the form of smart card/e-token obtained from any authorised certifying agency of Government of India (for class of DSC **specified in BDS**). The bidder should register in the website using the relevant option available. Then the Digital Signature registration has to be done with the e-token, after logging into the website. The bidder can then login the website through the secured login by entering the password of the e-token & the user id/ password chosen during registration. After getting the bid schedules, the Bidder should go through them carefully and submit the specified documents, along with the bid; otherwise the bid will be rejected.

- 21.2 The completed bid comprising of documents indicated in ITB 12, should be uploaded on the e-procurement portal along with scanned copies of requisite certificates as are mentioned in different sections in the bidding document and scanned copy of the bid security.
- 21.3 All the documents are required to be signed digitally by the bidder. After electronic on line bid submission, the system generates a unique bid identification number which is time stamped as per server time. This shall be treated as acknowledgement of bid submission.
- 21.4 Physical, Email, Telex, Cable or Facsimile bids will be rejected as non-responsive.
- 22 Deadline for Submission of Bids**
- 22.1 Bids must be uploaded online no later than the date and time **specified in the BDS**.
- 22.2 The Purchaser may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Documents in accordance with ITB Clause 8, in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 23 Late Bids**
- 23.1 The electronic bidding system would not allow any late submission of bids after due date & time as per server time.
- 24 Withdrawal, Substitution, and Modification of Bids**
- 24.1 Bidders may modify their bids by using appropriate option for bid modification on the e-procurement portal, before the deadline for submission of bids. For this the bidder need not make any additional payment towards the cost of bid document. For bid modification and consequential re-submission, the bidder is not required to withdraw his bid submitted earlier. The last modified

bid submitted by the bidder within the bid submission time shall be considered as the bid. For this purpose, modification/withdrawal by other means will not be accepted. In online system of bid submission, the modification and consequential re-submission of bids is allowed any number of times. A bidder may withdraw his bid by using appropriate option for bid withdrawal, before the deadline for submission of bids, however, if the bid is withdrawn, re-submission of the bid is not allowed (or allowed **if specified in BDS**).

- 24.2 Bids requested to be withdrawn in accordance with ITB Sub-Clause 24.1 shall not be opened.
- 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 Letter of Bid (Technical Part and/or Financial Part) or any extension thereof.

### **E. Public Opening of Technical Parts of Bids**

#### **25 Public Opening of Technical Parts of Bids**

- 25.1. The Purchaser shall publicly open Technical Parts of all bids received by the deadline, at the date, time and place **specified in the BDS**, in the presence of Bidder's designated representatives and anyone who chooses to attend, and this could also be viewed by the bidders online. The Financial Parts of the bids shall remain unopened in the e-procurement system, until the subsequent public opening, following the evaluation of the Technical Parts of the Bids. In all cases, original documents submitted as specified in ITB 12.3 shall be first scrutinized, and Bids that do not comply with the provisions of ITB 12.3 will be declared non-responsive and will not be opened. Thereafter, bidder's names, and such other details as the Purchaser may consider appropriate will be notified online as Technical Part bid opening summary.

In the event of the specified date of bid opening being declared a holiday for the Purchaser, the bids will be opened at the appointed time and location on the next working day.

- 25.2 The electronic summary of the bid opening will be generated and uploaded online. The Purchaser will also prepare minutes of the Bid opening, including the information disclosed and upload the same for viewing online. Only Technical Parts of Bids, alternative bids - Technical Parts if permitted in ITB 13 that are opened at Bid opening shall be considered further for evaluation.



## **E. Evaluation of Bids – General Provisions**

- 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 in accordance with ITB 42.
- 26.2 Any effort by a Bidder to influence the Purchaser in the examination, evaluation, comparison, and post-qualification of the bids or contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB Sub-Clause 26.2, from the time of bid opening to the time of Contract Award, if any Bidder wishes to contact the Purchaser on any matter related to the bidding process, it should do so in writing.
- 27 Clarification of Bids** 27.1 To assist in the examination, evaluation, comparison of the bids and post-qualification of the Bidders, the Purchaser may, at its discretion, ask any Bidder for a clarification of its Bid. Any clarification submitted by a Bidder in respect to its Bid, that is not in response to a request by the Purchaser shall not be considered. The Purchaser's request for clarification and the response shall be in writing. No change, including any voluntary increase or decrease, in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Purchaser in the Evaluation of the bids, in accordance with ITB Clause 35.
- 27.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Purchaser's request for clarification, its bid may be rejected.
- 28 Deviations, Reservations, Omissions** 28.1 During the evaluation of bids, the following definitions apply:
- (a) "Deviation" is a departure from the requirements specified in the Bidding Documents;
  - (b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and
  - (c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Documents.
- 29 Nonconformitie** 29.1 Provided that a Bid is substantially responsive, the Purchaser

**s, Errors and Omissions**

may waive any nonconformities or omissions in the Bid which do not constitute a material deviation, reservation or omission.

29.2 Provided that a Bid is substantially responsive, the Purchaser may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Bid related to documentation requirements. Such omission shall not be related to any aspect of the price or substance of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

29.3 Provided that a Bid is substantially responsive, the Purchaser 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 in the manner specified **in the BDS.**

**G. Evaluation of Technical Parts of Bids**

**30 Evaluation of Technical Parts**

30.1 In evaluating the Technical Parts of each Bid, the Purchaser shall use the criteria and methodologies listed in ITB 31, ITB 32, and Section III, Evaluation and Qualification Criteria. No other evaluation criteria or methodologies shall be permitted.

**31 Determination of Responsiveness**

31.1 The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself as defined in ITB 11.

31.2 A substantially responsive Bid is one that meets the requirements of the Bidding Documents 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 Goods and Related Services specified in the Contract; or
  - (ii) limit in any substantial way, inconsistent with the Bidding Documents, the Purchaser's rights or the Bidder's obligations under the Contract; or
- (b) if rectified would unfairly affect the competitive position of other bidders presenting substantially responsive bids.

- 31.2.1 Bids from Agents, without proper authorization from the manufacturer as per Section IV, shall be treated as non-responsive.
- 31.3.1 The Purchaser shall examine the bids to confirm that all documents and technical documentation requested in ITB Clause 11 have been provided, and to determine the completeness of each document submitted.
- 31.3.2 The Purchaser shall examine the bid to confirm that the Bidder has accepted all terms and conditions specified in GCC and the SCC without material deviations or reservations. Deviations from or objections or reservations to critical provisions such as those concerning Performance Security (GCC Clause 18), Warranty (GCC Clause 28), Force Majeure (Clause 32), Limitation of liability (GCC Clause 30), Governing law (GCC Clause 9) and Taxes & Duties (GCC Clause 17) will be deemed to be a material deviation. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.
- 31.4 If a bid is not substantially responsive to the Bidding Documents, it shall be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the material deviation, reservation, or omission.

## **32 Qualification of the Bidders**

- 32.1 The Purchaser shall determine, to its satisfaction, whether all eligible Bidders, whose Bids have been determined to be substantially responsive to the bidding document, meet the Qualification Criteria specified in Section III, 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. The determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, subcontractors (other than specialized subcontractors if permitted in the bidding document), or any other firm(s) different from the Bidder.
- 32.3 If a Bidder does not meet the qualifying criteria specified in Section III, Evaluation and Qualification Criteria, its Bid shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.
- 32.4 Only Bids that are both substantially responsive to the bidding document, and meet all Qualification Criteria shall have the

Financial Parts of their Bids opened at the second public opening

### **H. Public Opening of Financial Parts of Bids**

- 33 Public Opening of Financial Parts**
- 33.1 Following the completion of the evaluation of the Technical Parts of the Bids, and the Bank has issued its no objection (if applicable), the Purchaser shall notify in writing those Bidders who have failed to meet the Qualification Criteria and/or whose Bids were considered non-responsive to the requirements in the bidding document, advising them of the following information:
- (a) their Technical Part of Bid failed to meet the requirements of the bidding document;
  - (b) their Financial Part of the Bid shall not be opened; and
  - (c) Notify them of the date and time for public opening of the Financial Parts of the Bids. Financial Parts of the bids shall not be opened earlier than seven (7) days from the communication of technical evaluation results to the bidders.
- 33.2 The Purchaser shall, simultaneously, notify in writing those Bidders whose Technical Parts have been evaluated as substantially responsive to the bidding document and met the Qualification Criteria, advising them of the following information:
- (a) their Bid has been evaluated as substantially responsive to the bidding document and met the Qualification Criteria;
  - (b) their Financial Part of Bid will be opened at the public opening of Financial Parts;
  - (c) Notify them of the date and time of the second public opening of the Financial Parts of the Bids, as **specified in the BDS**.
- 33.3 The opening date should allow Bidders sufficient time to make arrangements for attending the opening. The Financial Part of the Bid shall be opened publicly in the presence of Bidders' designated representatives and anyone who chooses to attend, and this could also be viewed by the bidders online. The bidder's names, the Bid prices, the total amount of each bid, including any discounts and Alternative Bid – Financial Part, and such other details as the Purchaser may consider appropriate will be notified online by the Purchaser at the time of bid opening.

In the event of the specified date of bid opening being declared a

holiday for the Purchaser, the bids will be opened at the appointed time and location on the next working day.

- 33.4 The electronic summary of the bid opening will be generated and uploaded online. The Purchaser will also prepare minutes of the Bid opening, including the information disclosed and upload the same for viewing online. Only Financial Part of Bids, Financial Parts of Alternative Bids and discounts that are opened and read out at Bid opening shall be considered further for evaluation.

## **I. Evaluation of Financial Parts of Bids**

### **34 Evaluation of Financial Parts**

- 34.1 To evaluate the Financial Part of each Bid, the Purchaser shall consider the following:
- (a) evaluation will be done for Items or Lots (contracts), as specified **in the BDS**; and the Bid Price as quoted in accordance with ITB 14;
  - (b) Not used;
  - (c) price adjustment due to discounts offered in accordance with ITB 14.4;
  - (d) Not used;
  - (e) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 29.3; and
  - (f) the additional evaluation factors specified in the BDS as per ITB 34.5 from amongst those set out in Section III, Evaluation and Qualification Criteria.
- 34.2 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.
- 34.3 If this bidding document allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated cost of the lot (contract) combinations, including any discounts offered in the Letter of Bid - Financial Part, is specified in Section III, Evaluation and Qualification Criteria.
- 34.4 The Purchaser's evaluation of a Bid shall include (i) price quoted EXW including GST as applicable on the finished goods; (ii) other taxes, if any, payable on finished goods; (iii) price for inland transportation, insurance, and other local services required to convey the Goods to their Final Destination; and (iv) price for

Related Services, if any.

- 34.5 The Purchaser's evaluation of a Bid may require the consideration of other factors, in addition to the Bid price quoted in accordance with ITB 14. These factors may be related to the characteristics, performance, and terms and conditions of purchase of the Goods and Related Services. The effect of the factors selected, if any, shall be expressed in monetary terms to facilitate comparison of Bids, unless otherwise specified **in the BDS** from amongst those set out in Section III, Evaluation and Qualification Criteria. The criteria and methodologies to be used shall be as specified in ITB 34.1 (f).
- 35 Correction of Arithmetical Errors** 35.1 The e-procurement system automatically calculates the total amount from unit rates and quantities and the system also automatically populates the amount in words from the amount in figures and therefore there is no scope of discrepancy and need for arithmetic correction.
- 36 Conversion to Single Currency** 36.1 Not applicable.
- 37 Margin of Domestic Preference** 37.1 Not applicable.
- 38 Comparison of Financial Parts** 38.1 The Purchaser shall compare the evaluated prices of all substantially responsive bids to determine the lowest-evaluated bid, in accordance with ITB Clause 34.
- 39 Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids** 39.1 The Purchaser 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 documents submitted and specifically, bid securities, shall be promptly returned to the Bidders.

## **J. Award of Contract**

- 40 Award Criteria** 40.1 Subject to ITB 39.1, the Purchaser shall award the Contract to the Bidder whose bid has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Documents, provided further that the Bidder is determined to be qualified to perform the Contract satisfactorily.
- 41 Purchaser's Right to Vary Quantities at** 41.1 At the time the Contract is awarded, the Purchaser reserves the right to increase or decrease the quantity of Goods and Related Services originally specified in Section VII, Schedule of

- Time of Award** Requirements, provided this does not exceed the percentages **specified in the BDS**, and without any change in the unit prices or other terms and conditions of the bid and the Bidding Documents.
- 42 Notification of Award** 42.1 Prior to the expiration of the period of bid validity, the Purchaser shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification letter (hereinafter called “Letter of Acceptance”) shall specify the sum that the purchaser will pay in consideration of the supply of Goods (hereinafter called “the Contract Price”).
- Publication of Award** 42.2 At the same time the Purchaser shall publish in a National website (GOI web site- <http://tenders.gov.in> or GoI Central Public Procurement Portal <https://eprocure.gov.in/cppp/>) or on the Purchaser’s website with free access if available, or in the official gazette, 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 successful Bidder, and the price it offered, as well as the duration and summary scope of the contract awarded.
- 42.3 The Purchaser shall promptly respond in writing to any unsuccessful Bidder who, after Publication of contract award, requests in writing the grounds on which its bid was not selected.
- Recourse to Unsuccessful Bidders** 42.4 Until a formal Contract is prepared and executed, the notification of award shall constitute a binding Contract.
- 42.5 Upon the successful Bidder’s furnishing of the performance security and signing the Contract Form pursuant to ITB Clause 43, the Purchaser will promptly notify each unsuccessful Bidder and will discharge its bid security, pursuant to ITB Clause 19.5
- 43 Signing of Contract** 43.1 Promptly after notification, the Purchaser shall send the successful Bidder the Contract Agreement.
- 43.2 Within twenty-one (21) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Purchaser.
- 44 Performance Security** 44.1 Within twenty-one (21) days of the receipt of notification of award from the Purchaser, the successful Bidder, if required, shall furnish the Performance Security in accordance with the GCC, using for that purpose the Performance Security Form included in Section X Contract forms, or another Form

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



## SECTION II - BIDDING DATA SHEET

The following specific data for the goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Clause Reference	A. General
ITB 1.1	<p>The Purchaser is: <i>The Executive Engineer, Burdwan Investigation &amp; Planning Division, I&amp;WD, Govt. of WB, NH-2, Purta Bhawan, 3<sup>rd</sup> Floor, Purba Burdwan-713103</i></p> <p><b><i>The Engineer In-Charge is: Executive Engineer, Mayurakshi Electrical &amp; Mechanical Division, I &amp; WD, Suri, Birbhum.</i></b></p>
ITB 1.1	<p>The name and identification number of the NCB is: <b><i>“Supply, installation, testing, commissioning, operation and maintenance of Real Time Monitoring for Mayurakshi Project Canal System of Irrigation &amp; Waterways Department, West Bengal under National Hydrology Project (NHP).”</i></b></p> <p><i>Identification no of NCB: “WBIW/NHP/IFB-07/2020-21”</i></p> <p>Package ID :<b>NHP-2021-2022-WBSW-890757</b></p>
ITB 1.2(a)	The Purchaser shall use the electronic-procurement system specified in BDS 7.1 to manage this Bidding process.
ITB 2.1	<p>The Borrower is Government of India</p> <p>Loan Agreement Amount: <i>USD 175 Millions</i></p>
ITB 2.1	The name of the Project is: <i>National Hydrology Project</i>
ITB 4.1	Bidder may be a firm that is a private entity, a government- owned entity—subject to ITB 4.5—or any combination of such entities in the form of a joint venture (JV) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a Representative

	<p>who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the bidding process and, in the event the JV is awarded the Contract, during Contract execution.</p> <p><b>Numbers of members/ firming joint venture shall not be more than two including the lead partner.</b></p>
<b>ITB 4.4</b>	<p>A list of firms debarred from participating in World Bank projects is available at <a href="http://www.worldbank.org/debarr">http://www.worldbank.org/debarr</a></p>

	<b>B. Contents of Bidding Documents</b>
<b>ITB 7.1</b>	<p><b>Electronic –Procurement System</b></p> <p>The Purchaser shall use the following electronic-procurement system to manage this Bidding process: Tenders West Bengal ((The West Bengal Government e-procurement System) -<a href="https://wbtenders.gov.in">https://wbtenders.gov.in</a></p> <p>(Intending bidders may also visit website <a href="http://www.wbiwd.gov.in">www.wbiwd.gov.in</a> ( the official website of Irrigation &amp; Waterways Department) and click the“ e-procurement” link provided therein)</p>
<b>ITB 7.1a</b>	<p><b>A pre-bid meeting will be held: Yes</b></p> <p>Date of pre-bid meeting: <b>17-09-2021</b>  <b>Time: 11:30 AM</b>  <b>Address: Office of Superintending Engineer, Investigation and Planning Circle No. II, Jalsampad Bhawan, 5th Floor, Salt Lake, Kolkata-700091</b>  Telephone: 0342-2646799  Facsimile number: Electronic mail address: seip2iwd@gmail.com  <b>Contact Persons: Executive Engineer, Burdwan Investigation and Planning Division.</b></p> <p>For <b><u>Clarification of bid purposes</u></b> only, the Purchaser’s address is:</p> <p><i>The Executive Engineer,</i>  <i>Burdwan Investigation &amp; Planning Division, I&amp;WD,</i>  <i>Govt. of WB, NH-2, Purta Bhawan, 3<sup>rd</sup> Floor, Purba Burdwan-713103</i>  <i>Telephone: 0342-2646799</i>  <i>Email: <a href="mailto:eebipd2012@gmail.com">eebipd2012@gmail.com</a></i></p> <p><b><u>The bidders are allowed to request for clarifications through the on-line portal also.</u></b></p>
<b>ITB 8.1</b>	<p>The addendum will appear on the e-procurement system under <a href="https://wbtenders.gov.in">https://wbtenders.gov.in</a>,“e-procurement” linkin <a href="http://www.wbiwd.gov.in">www.wbiwd.gov.in</a>and shall not be available elsewhere.</p>

### C. Preparation of Bids

**ITB 11.2(j)**

The Bidder shall submit the following additional documents in its bid – technical part:

1. The following details shall also be provided by Bidders [to be submitted under ‘My Documents (OID)’ Folder]:

SL. No.	Folder Name	File Description	Details	
I	Certificates	Certificates.pdf	1	PAN Card
			2	GST Registration Certificate
			3	Latest Income Tax Return and I.T Dept. Return Acknowledgement / Receipt.
II	Company Details	Companydetails.pdf 1 Companydetails.pdf 2	1	For Proprietorship Firms (Trade Licence)
			2	For Partnership Firms (Partnership Deed, Trade Licence, From-VIII/Memorandum of Registration)
				For all Companies
			3	(Incorporation Certificate, Trade License, Memorandum of Articles of ROC, List of owners/ Directors/ Board Members)
III	Credential of Work	Credential.pdf 1 Credential.pdf 2	1	Works completion Certificates
IV	Financial Credential	P/L and audited Balance Sheet for year-1 pdf1	Profit & Loss account audited Balance Sheets With annexure containing the appropriate designated Forms 3CA/ 3CD/3CB, as applicable with Annual Turn- Over with I.T Return for last 3 years within the zone of preceding 5 years from date of IFB	

[to be submitted under ‘Others’ Folder of the ‘Technical Cover’]

1. Certification of incorporation of the Bidder.
2. The scanned copy of original bid securing declaration, power of attorney and affidavit for correctness of information shall be uploaded along with Technical Part of the bid.
3. The Bidder shall clearly confirm that all facilities exist with him (or manufacturer, as applicable) in his factory for inspection and testing and these can be accessed by the Purchaser or his representative for inspection.
4. Technical schedules of goods as required by technical specifications.
5. Descriptive Documents, drawings, notes and references of operating and assembly of mechanical parts.

	<ol style="list-style-type: none"> <li>6. A detailed description of the Goods essential technical and performance characteristics.</li> <li>7. A clause-by-clause commentary on the Purchaser's technical specifications demonstrating substantial responsiveness of the Goods and Services to those specifications &amp; a statement of deviations and exceptions to the provisions of the Technical Specifications.</li> <li>8. For purposes of the commentary to be furnished pursuant to Paragraph 6 above, the Bidder shall note that standards for workmanship, material and goods, and references to brand names, model no. &amp; catalogue designated by the Purchaser in its Technical Specifications are intended to be descriptive only and not restrictive. The Bidder may substitute alternative standards, brand names and / or catalogue numbers in its Bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the technical specifications.</li> <li>9. The documentary evidence of the goods and services eligibility shall consist of a statement in the Price Schedule on the country of origin of the goods and services offered which shall be confirmed by a certificate of origin at the time of shipment.</li> <li>10. Non-manufacturer Bidders will submit the manufacturer's authorization Form as per Proforma in Section IV.</li> <li>11. The Bidder shall disclose instance of previous past performance that may have resulted into adverse actions taken against the Bidder during the last 5 years.</li> <li>12. All document related to Section III Qualification Criteria.</li> <li>13. <b>Agreement document</b> between JV partners if bidding with Joint Venture or letter of intent to form Joint Venture.</li> <li>14. <b>ALL DOCUMENT REQUIRED IN SECTION 3: EVALUATION &amp; QUALIFICATION CRITERIA.</b></li> </ol>
ITB 11.2 (k)	<p>In addition to the requirements under ITB 11.1, bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.</p>
11.3(a)	<p><b>Note for Bidders:</b> Bidders have to submit filled up format of 'Letter of Bid – Financial Part' in 'Financial Folder' only.</p>
ITB 11.3(d)	<p>The Bidder shall complete the <i>Excel sheet of Price Bid</i> or <i>BOQ</i> as per format given for download under 'Financial Cover'.</p> <p><b>Note:</b> The blank BOQ should be downloaded and saved on Bidder's computer without changing file-name otherwise BOQ will not get uploaded. The Bidder</p>

	should fill in the details in the same file and upload the same back to the website in the 'BOQ' Folder under 'Financial Cover'.
<b>ITB 12</b>	<b>Note for Bidders:</b> Bidders have to submit the bids on the e-procurement portal along with the relevant required documents. For this purpose, the bidders shall fill up online, the forms that are available for online filling on the e-portal. The rest of the forms shall be downloaded by the bidders and filled up. The filled up pages shall then be scanned and uploaded on the e-procurement portal along with the scanned copies of the supporting documents.
<b>ITB 12.3</b>	For submission of original documents, the Purchaser's address is:  Office of the Executive Engineer, Burdwan Investigation & Planning Division Purta Bhawan (3rd floor), Burdwan-713103 Country: INDIA Telephone number: 0342-2646799 E-mail address: eebipd2012@gmail.com  <b>No original documents are required to be submitted.</b> <b>However, the scanned copies of the Bid Securing Declaration, Power of Attorney and Affidavit vouching for the correctness of the information shall be uploaded along with the Technical Part of the Bid.</b>
<b>ITB 13.1</b>	Alternative Bids " <i>shall not be</i> " considered.
<b>ITB 14.5</b>	The prices quoted by the Bidder " <i>shall not</i> " be subject to adjustment during the performance of the Contract.
<b>ITB 14.7</b>	The Incoterms edition is Incoterms 2010.
<b>14.8 (a) (i)</b>	(i) the price of the Goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable), excluding GST as applicable payable on the finished Goods;
<b>ITB 14.8 (a) (iii)</b>	"Final destinations (Project Site)": (i) <i>Office of the Executive Engineer, Mayurakshi Electrical &amp; Mechanical Division, I &amp; WD, Suri, Birbhum</i> (ii) <i>Mayurakshi Project Canal System sites at Birbhum District.</i>
<b>ITB 14.9</b>	<i>As per latest instructions from Government of India.</i>
<b>ITB 16.4</b>	Manufacturer has to ensure that all equipment would be supported for a minimum period of 10 years after commissioning
<b>ITB 17.2 (b) (i)</b>	Manufacturer's authorization is: <i>required as per proforma in Section IV.</i>
<b>ITB 17.2 (b)iii</b>	After Sales service is " <i>required</i> " which shall be provided by the Supplier or

	alternatively by its Agent in case of a foreign bidder.
<b>ITB 17.2 ©</b>	<p>This clause is replaced with the following:  Bids from Joint Ventures are acceptable.  Bids submitted by a joint venture of two firms as partners shall comply with the following requirements:</p> <ul style="list-style-type: none"> <li>(a) the Bid shall include all the information listed in ITB Sub-Clause 17.2 for each joint venture partner;</li> <li>(b) the Bid shall be signed so as to be legally binding on all partners;</li> <li>(c) the Bid shall include a copy of the agreement entered into by the joint venture partners defining the division of assignments to each partner and establishing that all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms; 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;</li> <li>(d) one of the partners shall be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all partners of the joint venture; and</li> <li>(e) the execution of the entire Contract, including payment, shall be done exclusively with the partner in charge.</li> </ul>
<b>ITB 18.1</b>	The <b>bid validity</b> period shall be <b>90days</b> .
<b>ITB 18.3(a)</b>	The factor will be 1.0007692 per week ( multiplicative)
<b>ITB 19.1</b>	Bid security not required however, a Bid-Securing Declaration shall be required.
ITB 19.2	A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.
<b>ITB 19.3</b>	Not Applicable
<b>ITB 19.3 (a)</b>	<p>Other types of acceptable securities are:</p> <p>Not Applicable</p>
<b>ITB 19.8</b>	The Bid Securing Declaration of a JV must be in the name of the JV that submits the bid. If the JV has not been legally constituted into a legally enforceable JV at the time of bidding, the Bid Securing Declaration shall be in the names of all future members, as named in the letter of intent referred to in ITB 4.1 and ITB

	11.2
<b>ITB 19.9</b>	If the Bidder incurs any of the actions prescribed in subparagraphs (a) or (b) of this provision, the Borrower will declare the Bidder ineligible to be awarded contracts by the Purchaser for a period of Three years
<b>ITB 20.2</b>	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: The written confirmation of authorization to sign on behalf of the Bidder shall consist of: A board resolution or its equivalent, or power of attorney specifying the representative's authority to sign the Bid on behalf of, and to legally binding, the Bidder.
<b>ITB 20.3</b>	In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.
	<b>D. Online Submission and Opening of Bids</b>
<b>ITB 21.1</b>	Class of DSC required is: <i>A suitable Class 2 Digital Signature Certificate For further details please refer wbtenders.gov.in</i>
<b>ITB 22.1</b>	The deadline for uploading of Bids is: <b>Date: 01-10-2021 Time: 15:00 HRS (System Server Time)</b>
<b>ITB 24.1</b>	Re-submission of the bid is <b>"not allowed"</b> , if withdrawn.
	<b>E. Public Opening of Technical Parts of Bids</b>
<b>ITB 25.1</b>	The online opening of the Technical Parts of Bids shall take place at:  Address: <b>Office of The Executive Engineer, Burdwan Investigation &amp; Planning Division, Irrigation &amp; Waterways Directorate, Govt. of West Bengal, Purta Bhawan, 3<sup>rd</sup> Floor Purba Burdwan-713103</b> <b>Date: 01-10-2021</b> <b>Time: 15:30 HRS (System Server Time)</b>
	<b>F. Evaluation of Bids – General Provisions</b>
<b>ITB 29.3</b>	The adjustment shall be based on the highest price of the item or component as quoted in other substantially responsive Bids, subject to a maximum of the estimated price of the item. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Purchaser shall use its best estimate.



<b>H. Public Opening of Financial Parts of Bids</b>	
<b>ITB 33.2 (c)</b>	<p>Following the completion of the evaluation of the Technical Parts of the Bids, the Purchaser will notify all Bidders of the date and time of the public opening of Financial Parts.</p> <p>Date: <i>To be notified later.</i></p> <p>Time: <i>To be notified later.</i></p> <p>The online opening of the Financial Parts of Bids (for Technically Qualified Bidders) shall take place at:</p> <p><i>As specified in ITB 25.1 above.</i></p>
<b>I. Evaluation and Comparison of Bids</b>	
<b>ITB 34.1(a)</b>	<p><i>Evaluation will be done for all items together.</i></p> <p><i>Bids will not be evaluated for each item separately and single Contract will be concluded with the successful bidder.</i></p>
<b>ITB 34.1(f)</b>	<p>The evaluation will take into account the cost of <i>system including</i> warranty period of 5 years.</p>
<b>ITB 34.3</b>	<p>Not Applicable</p>
<b>ITB 34.4</b>	<p>Replace with following:</p> <p>The Purchaser's evaluation of a bid will exclude and not take into account:</p> <ul style="list-style-type: none"> <li>(a) In the case of Goods manufactured in India or goods of foreign origin already located in India, GST and other similar taxes, which will be payable on the goods if a contract is awarded to the Bidder;</li> <li>(b) Not Used.</li> <li>(c) any allowance for price adjustment during the period of execution of the contract, if provided in the bid.</li> </ul> <p>But, the purchaser's evaluation of a bid will include i) price for inland transportation, insurance, and other local services required to convey the Goods to their Final Destination; and (ii) price for Related Services, if any.</p>
	<p>The adjustments shall be determined using the following criteria, from amongst those set out in Section III, Evaluation and Qualification Criteria:</p>

<b>ITB 34.5</b>	<ul style="list-style-type: none"> <li>(a) Deviation in Delivery schedule: NA</li> <li>(b) Deviation in payment schedule: NA</li> <li>(c) the cost of major replacement components, mandatory spare parts, and service: <i>'Not Applicable'</i></li> <li>(d) the availability in the Purchaser's Country of spare parts and after-sales services for the equipment offered in the bid <i>'Not Applicable'</i></li> <li>(e) the projected operating and maintenance costs during the life of the equipment is <i>'Not Applicable'</i></li> <li>(f) the performance and productivity of the equipment offered <i>'Not Applicable'</i></li> </ul>
	<b>J. Award of Contract</b>
<b>ITB 41.1</b>	<p>The maximum percentage by which quantities may be increased is: <i>15%</i></p> <p>The maximum percentage by which quantities may be decreased is: <i>15%</i></p>

## **SECTION III. EVALUATION AND QUALIFICATION CRITERIA**

*This Section complements the Instructions to Bidders. It contains the criteria that the Purchaser shall use to evaluate a bid and determine whether a Bidder qualifies in accordance with ITB 32 & 34. No other criteria shall be used.*

## TECHNICAL PART

### 1 Qualification (ITB 32)

#### 1.1 Qualification Criteria (ITB 32.1)

The Purchaser shall assess each Bid against the following Qualification Criteria. Requirements not included in the text below shall not be used in the evaluation of the Bidder's qualifications.

#### I. Financial Capability

The Bidder shall furnish documentary evidence that it meets the following financial requirement(s):

##### A) In case of individual Bidder

- i) Capacity to have a cash flow - The Bidder must provide a letter from a reputed bank stating the availability of liquid assets and/or credit facilities exclusively for this Contract only, of not less than **INR 125 lakhs or its equivalent amount in a freely convertible currency**. *(The availability of liquid assets and/or credit facilities should be clearly certified by Bank (Nationalized or Scheduled Bank In India) in Form-9 provided in Section IV- Bidding forms )*

Or

In case the bidder does not prefer to have support from a Bank and does not require credit facilities from the Bank exclusively for the contract, the bidder shall have to submit the cash resources certificate amounting to Rs. 125 lakh taking into consideration existing projects being executed by him from its Statutory Chartered Accountant.

- ii) The Minimum required annual turnover in respect of business operations for the successful Bidder in any two of the last five (5) years shall be of **INR 500 Lakhs or its equivalent amount in a freely convertible currency**. Period of 5 years shall be reckoned from 31st march of financial year preceding the year in which bid is published.
- iii) Bidder should be in continuous business of supplying and/or after sale services of products real-time telemetry hydro-meteorological instruments & systems for surface and/or ground water during the last 3 years prior to date of bid submission.
- iv) Bidder shall furnish the legal status, place of registration and principal place of business of the company or firm or partnership, etc.;
- v) Details of experience and past performance on equipment offered and on those of similar nature within the past five years (Prior to the date of bid submission) and details of current contracts in hand and other commitments (suggested Performa given in Section IV).
- vi) The bidder should furnish a brief write-up, backed with adequate data, explaining his available capacity and experience (both technical and commercial) for the supply of the required equipment within the specified time of completion after the meeting all their current commitments.
- vii) Reports on financial standing of the bidder such as profit and loss statements, balance sheets and auditor's report for the past three years, banker's certificate, etc.

- viii) A firm can submit only one bid in the same bidding process either individually as a bidder or as a partner of a Joint Venture. A bidder who submits or participates in more than one bid will cause all the bids in which the bidder has participated to be disqualified.
- ix) Should possess GST Registration. In case of foreign bidder, if presently bidder is not having any office(s) in India, he has to provide the GST registration certificate within one month of award of contract.

**B) In case of Joint Venture (JV)**

- i) Capacity to have a cash flow: The Bidders must provide a letter from a reputed bank stating the availability of liquid assets and/or credit facilities exclusively for this Contract only, of no less than **INR 125 Lakhs** or equivalent amount in a freely convertible currency collectively. *(The availability of liquid assets and/or credit facilities should be clearly certified by Bank (Nationalized or Scheduled Bank In India) in Form-9 provided in Section IV-Bidding forms )*

Or

In case the bidder/JV does not prefer to have support from a Bank and does not require credit facilities from the Bank exclusively for the contract, the bidder shall have to submit the cash resources certificate amounting to Rs. 125 lakh taking into consideration existing projects being executed by him from its Statutory Chartered Accountant.

- ii) In case of JV, the Minimum required annual turnover in respect of business operations for the successful Bidder in any two of the last five (5) years shall be of **INR 500 Lakh** or its equivalent amount in a freely convertible currency collectively. Period of 5 years shall be reckoned from 31st march of financial year preceding the year in which bid is published. The lead partner must have minimum annual turnover of **INR 350 Lakh** or its equivalent amount in a freely convertible currency any two of the last five (5) years while other partner must have minimum annual turnover of **INR 150 Lakh** or its equivalent amount in a freely convertible currency in any two of the last five (5) years
- iii) Further, one member of Joint Venture should be in continuous business of supplying and/or after sales services of real-time telemetry hydro-meteorological instruments & systems for surface and/or ground water during the last 3 years prior to date of bid submission while other member should be in continuous business of supplying and/or after sale services of real-time telemetry hydro-meteorological instruments & systems for surface and/or ground water at least 1 year prior to date of bid submission.
- iv) All members of Joint Venture shall furnish the legal status, place of registration and principal place of business of the company or firm or partnership, etc.;
- v) Details of experience and past performance of all members of Joint Venture on equipment offered and on those of similar nature within the past seven years (Prior to the date of bid submission) and details of current contracts in hand and other commitments (suggested Proforma given in Section IV).

- vi) The lead member of Joint Venture should furnish a brief write-up, backed with adequate data, explaining his available capacity and experience (both technical and commercial) for the supply of the required equipment within the specified time of completion after the meeting all their current commitments.
- vii) Responsibilities in respect of lead firm as well as each of the Joint Venture members shall be clearly indicated in the JV agreement;
- viii) The Joint Venture agreement shall not be cancelled or amended unilaterally without consent of the Purchaser and a statement to this effect should appear in the JV agreement;
- ix) Reports on financial standing of the each JV members such as profit and loss statements, balance sheets and auditor's report for the past three years, banker's certificate, etc.

At least one member of Joint Venture should possess GST Registration..In case of foreign bidder, if presently bidder is not having any office(s) in India, he has to provide the GST registration certificate within one month of award of contract.

## **II- Experience and Technical Capacity of Bidder**

### **A) In case of Individual Bidder**

The Bidder shall furnish documentary evidence to demonstrate that it meets the following experience requirement(s):

#### **i) Hydrological, Meteorological stations experience**

The bidder must have supplied, installed, tested and commissioned & successfully completed Hydro-Met Stations with Satellite/GSM/GPRS telemetry system to the extent of at least 26 stations (comprising of minimum 1 data logger and sensor at each station) total in any two year during a period of last 7 years from the last date of submission of bid document and should be in use satisfactorily with no adverse report for at least one year preceding the date of bid opening.

### **B) In case of Joint Venture (JV)**

The JV partners must have supplied, tested and commissioned the Hydro-Met stations with Satellite /GSM /GPRS based telemetry using equipment /sensors similar to the type specified in the “Section – VII Schedule of Requirements” to the extent of at least 26 stations (comprising of minimum 1 data logger and sensor at each station) collectively in any two of the year during a period of last 7 years from the last date of submission of bid document. Out of which the one partner should have supplied, installed, commissioned and provided after sales service satisfactorily to the extent of at least minimum 19 stations (comprising of minimum 1 data logger and sensor at each station) in any two of the year during a period of last 7 years from the last date of submission of bid document and other partner should have operated and maintained satisfactorily to the extent of at least minimum 8 stations (comprising of minimum 1 data logger and sensor at each station) in any two of the year during a period of last 7 years from the last date of submission of bid document .

#### IV- Manufacturer Authorization for equipment's

If the bidder/JV partner is not the manufacturer of the equipment (i.e. listed in Table-1 below), the bidder/JV partner furnish a legally enforceable authorization from manufacturer in the prescribed Form [Section-IV] assuring full guarantee and warranty obligations as per GCC and SCC for the goods offered;

If the bidder/JV, himself is a manufacturer of the equipment's (listed in Table-1 below), then a self-authorization suffices.

Further, bidder/JV partner should furnish the documentary evidence from the manufacturer of the respective hydro-meteorological equipment proposed for this bid (listed in table -1) to establish that the manufacturer has manufactured and supplied the quantity of the equipment per table 1 below, total in any two year during a period of last 7 years from the last date of submission of bid document.

**Table-1 Compliance for equipment manufacturer**

Sl. No.	Item	Total quantity to be supplied as per schedule of requirement	Minimum number of required total quantity in any two of the last Seven years
1	Gate Position Sensor (Shaft Encoder Type)	85	43
2	Automatic Water Level Sensors (Non-Contact Ultrasonic Type) as offered under this bid complying with technical specifications	35	18
3	Side Looking Acoustic Doppler based Velocity Meter (ADVVM) as offered under this bid complying with technical specifications	4	2
4	Data Loggers/RTU with 8 Channel (Remote Terminal Unit) as offered under this bid complying with technical specifications	17	9
5	Data Loggers/RTU with 16 Channel (Remote Terminal Unit) as offered under this bid complying with technical	2	1

	specifications		
6	Solar Panel System (with Regulator, Batteries, Lighting arrestor with all connectors as per Technical Specification)	19	10

- V. The bidder/JV should have after sales support in the region (within a radius of 500 km from the State Capital). If bidder does not have any after sales support office within 500 km from state Capital at the time of bidding, he shall require establishing the same within one month after successful award of contract.
- VI. Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or record of poor performance such as, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.



## **FINANCIAL PART**

### **2. Margin of Preference (ITB 37) – Not Applicable**

### **3. Evaluation (ITB 30, 31, and 34)**

#### **3.1. Evaluation Criteria (ITB 34.5)**

The Purchaser shall use the criteria and methodologies listed in this Section to evaluate Bids. By applying the criteria and methodologies, the Purchaser shall determine the substantially responsive lowest-evaluated bid.

The Purchaser's evaluation of a bid will take into account, in addition to the Bid Price quoted in accordance with ITB Clause 14.8.

The evaluation will take into account the cost of Five years warranty period & operation and Maintenance period.

(a) The Purchaser's evaluation of a bid will take into account, in addition to the Bid Price quoted in accordance with ITB Clause 14.8 including 5 years warranty & Operation and Maintenance period.

#### **3.2. Multiple Contracts (ITB 34.3)-Deleted**

## **SECTION IV – BIDDING FORMS**

## 1A. LETTER OF BID– TECHNICAL PART

*The Bidder must prepare the Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and address.*

***Note: All italicized text is for use in preparing these forms and shall be deleted from the final products.***

*No alterations to the text except as provided in ITB20.2 shall be permitted and no substitutions shall be accepted except as provided in ITB 12.]*

Date: *[insert date (as day, month and year) of Bid Submission]*

NCB No.: *[insert number of bidding process]*

Invitation for Bid No.: *[insert No of IFB]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of Purchaser]*

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda No. issued in accordance with ITB 8: *[insert the number and issuing date of each Addenda]*;
- (b) We meet the eligibility requirements and have no conflict of interest in accordance with ITB 4;
- (c) We have not been suspended nor declared ineligible by the Purchaser based on execution of a Bid Securing Declaration in the Purchaser's country in accordance with ITB 4.6;
- (d) We offer to supply in conformity with the Bidding Documents and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Goods and Related Services ***[insert a brief description of the Goods and Related Services]***;
- (e) Our bid shall be valid for the period of time specified in ITB Sub-Clause 18.1, from the date fixed for the bid submission deadline in accordance with ITB Sub-Clause 22, 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 are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITB 4.2(e), other than alternative bids submitted in accordance with ITB 13;

- (h) We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Purchaser's Country laws or official regulations or pursuant to a decision of the United Nations Security Council;
- (i) We are not a government owned entity/ We are a government owned entity but meet the requirements of ITB 4.5;<sup>1</sup>
- (j) 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;
- (k) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive;
- (l) We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption; and
- (m) We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely, "Prevention of Corruption Act 1988."

Name of the Bidder *[insert complete name of person signing the Bid]*

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* *[insert complete name of person duly authorized to sign the Bid]*

Title of the person signing the Bid *[insert complete title of the person signing the Bid]*

Signature of the person named above *[insert signature of person whose name and capacity are shown above]*

Date signed *[insert date of signing]* day of *[insert month]*, *[insert year]*

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid Schedules.

---

<sup>1</sup>*Bidder to use as appropriate*

## **1B. LETTER OF BID- FINANCIAL PART- TO BE SUBMITTED IN FINANCIAL BID ONLY**

*The Bidder must prepare the Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and address.*

**Note:** *All italicized text is for use in preparing these forms and shall be deleted from the final products.*

*No alterations to the text except as provided in ITB 20.2, shall be permitted and no substitutions shall be accepted except as provided in ITB 12.]*

Date: *[insert date (as day, month and year) of Bid Submission]*

NCB No.: *[insert number of bidding process]*

Invitation for Bid No.: *[insert No of IFB]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[insert complete name of Purchaser]*

We, the undersigned Bidder, hereby submit the second part of our Bid, the Financial Part. In submitting our Financial Part we make the following additional declarations:

(a) Our bid shall be valid for the period of time specified in ITB Sub-Clause 18.1, from the date fixed for the bid submission deadline in accordance with ITB Sub-Clause 22, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(b) The total price of our Bid, excluding any discounts offered in item (c) below, is:

In case of only one lot, total price of the Bid **[insert the total price of the bid in words and figures];**

In case of multiple lots, total price of each lot **[insert the total price of each lot in words and figures];**

In case of multiple lots, total price of all lots (sum of all lots) **[insert the total price of all lots in words and figures];**

(c) The discounts offered and the methodology for their application are:

(i) The discounts offered are: [Specify in detail each discount offered.]

(ii) The exact method of calculations to determine the net price after application of discounts is shown below:[Specify in detail the method that shall be used to apply the discounts];Discounts.

(d) The following commissions, gratuities, or fees have been paid or are to be paid with respect to the bidding process or execution of the Contract: *[insert complete name of each*

*Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

(If none has been paid or is to be paid, indicate “none.”)

- (e) 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.

Name of the Bidder ***[insert complete name of person signing the Bid]***

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* ***[insert complete name of person duly authorized to sign the Bid]***

Title of the person signing the Bid ***[insert complete title of the person signing the Bid]***

Signature of the person named above ***[insert signature of person whose name and capacity are shown above]***

Date signed ***[insert date of signing]*** day of ***[insert month]***, ***[insert year]***

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid Schedules.

## 2. BIDDER INFORMATION FORM

*[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]*

Date: *[insert date (as day, month and year) of Bid Submission]*

NCB No.: *[insert number of bidding process]*

Page \_\_\_\_\_ of \_\_\_\_\_ pages

1. Bidder's Legal Name <i>[insert Bidder's legal name]</i>
2. Bidder's actual or intended Country of Registration: <i>[insert actual or intended Country of Registration]</i>
3. Bidder's Year of Registration: <i>[insert Bidder's year of registration]</i>
4. Bidder's Legal Address in Country of Registration: <i>[insert Bidder's legal address in country of registration]</i>
5. Bidder's Authorized Representative Information Name: <i>[insert Authorized Representative's name]</i> Address: <i>[insert Authorized Representative's Address]</i> Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i> Email Address: <i>[insert Authorized Representative's email address]</i>
6. Attached are copies of original documents of: <i>[check the box(es) of the attached original documents]</i>  <input type="checkbox"/> Articles of Incorporation or Registration of firm named in 1, above, in accordance with ITB Sub-Clauses 4.3.  <input type="checkbox"/> In case of government owned entity from the Purchaser's country, documents establishing legal and financial autonomy and compliance with commercial law and not dependent agency of borrower or sub-borrower or purchaser, in accordance with ITB Sub-Clause 4.5.  <input type="checkbox"/> Included are the organizational chart ,a list of Board of Directors, and the beneficial ownership

**3. FORM OF AFFIDAVIT FOR CORRECTNESS OF INFORMATION AND DOCUMENTS SUBMITTED WITH BID**

*[Reference ITB 20.2]*

*[This affidavit should be on a non-judicial stamp paper of Rs.10/- and shall be attested by Magistrate/ Sub-Judge/ Notary Public]*

I, ..... *(name of the authorised representative of the Bidder)* solemnly affirm and state as under:

1. I hereby certify that all the information and documents furnished with the Bid submitted online in response to IFB number ..... date ..... issued by ..... *(authority inviting bids)* for ..... *(name and identification of Goods & Related Services)* are true and correct.
2. \*I hereby certify that I have been authorised by ..... *(the Bidder)* to sign on their behalf, the Bid mentioned in paragraph 1 above.

Deponent

Place: .....

Date: .....

*\*This sub-paragraph is not applicable if the Bidder is an individual and is signing the Bid on his own behalf.*



## Joint Venture Partner Information Form

*[The Bidder shall fill in this Form in accordance with the instructions indicated below].*

Date: *[insert date (as day, month and year) of Bid Submission]*

NCB No.: *[insert number of bidding process]*

Page \_\_\_\_\_ of \_\_\_\_\_ pages

1. Bidder's Legal Name: <i>[insert Bidder's legal name]</i>
2. JV's Party legal name: <i>[insert JV's Party legal name]</i>
3. JV's Party Country of Registration: <i>[insert JV's Party country of registration]</i>
4. JV's Party Year of Registration: <i>[insert JV's Part year of registration]</i>
5. JV's Party Legal Address in Country of Registration: <i>[insert JV's Party legal address in country of registration]</i>
6. JV's Party Authorized Representative Information Name: <i>[insert name of JV's Party authorized representative]</i> Address: <i>[insert address of JV's Party authorized representative]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers of JV's Party authorized representative]</i> Email Address: <i>[insert email address of JV's Party authorized representative]</i>
7. Attached are copies of original documents of: <i>[check the box(es) of the attached original documents]</i> <input type="checkbox"/> Articles of Incorporation or Registration of firm named in 2, above, in accordance with ITB Sub-Clauses 4.1 and 4.2. <input type="checkbox"/> In case of government owned entity from the Purchaser's country, documents establishing legal and financial autonomy and compliance with commercial law, in accordance with ITB Sub-Clause 4.5.

## 4. Price Schedule Forms

*[The Bidder shall fill in these Price Schedule Forms in accordance with the instructions indicated. The list of line items in column 1 of the **Price Schedules** shall coincide with the List of Goods and Related Services specified by the Purchaser in the Schedule of Requirements.]*

***Note: Bidders are required to populate the Excel file containing the BOQ (uploaded along with the NIQ) and upload it in the requisite financial folder for submission of the bid***

### A. Price Schedule for Supply as per Schedule of Requirements

Tender Inviting Authority: The Executive Engineer, Burdwan Investigation & Planning Division, 3rd floor, Purta Bhawan, Purba Burdwan									
Name of Work: “Supply, installation, testing, commissioning, operation and maintenance of Real Time Monitoring for Mayurakshi Project Canal System of Irrigation & Waterways Department, West Bengal under National Hydrology Project (NHP).”									
Contract No: WBIW/NHP/IFB-07/2020-21									
Name of the Bidder/ Bidding Firm / Company :									
<b>PRICE SCHEDULE</b> <b>(DOMESTIC TENDERS - RATES ARE TO GIVEN IN RUPEES (INR) ONLY)</b> <b>(This BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only )</b>									
1	2	3	4	5	6	7	8	9	10
Line Item No.	Description of Goods	Country of Origin	Delivery Date	Quantity and physical unit	Unit price EXW (excluding GST)	Total EXW price (excluding GST)per line item (Col. 5×6)	Price per line item for inland transportation, insurance and other services required to convey the Goods to their final destination (ITB 14.8 (a)(iii))	Total *GST and other taxes payable per item if Contract is awarded (in accordance with ITB 14.8(a)(ii))	Total Price per line item (excluding GST) (Col. 7+8)
<b>1.0</b>	<b>Real Time Monitoring for Mayurakshi Project Canal System of Irrigation &amp; Waterways Department, West Bengal</b>								
1.1	Supply of Shaft Encoder based Rotary position sensor type gate sensor for indication and monitoring of Canal gate structures, including cabling and integration with Datalogger /RTU as per technical specifications.		<i>4 months from date of signing of contract</i>	85 Nos.					
1.2	Supply of Automated Water Level Transmitter non-contact Ultrasonic/RADAR sensor type having 0-6m range for measuring Upstream & downstream level of Head/Cross regulators of canal system, including all necessary hardware, cabling with suitable conduits, electrical fittings and accessories as per technical specifications.		<i>4 months from date of signing of contract</i>	35 Nos.					

1.3	Supply of Side looking Acoustic Doppler based Velocity Meter (ADV M) for direct discharge measurement in main Canal systems with bed width 0-40m, including cabling, installation accessories & integration with datalogger /RTU as per technical specifications		<i>4 months from date of signing of contract</i>	04 Nos.					
1.4	Supply of Datalogger /RTU with 8 channel input type with GPRS/GSM based telemetry & Enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.		<i>4 months from date of signing of contract</i>	17 Nos.					
1.5	Supply of Datalogger /RTU with 16 channel input type with GPRS/GSM based telemetry & Enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.		<i>4 months from date of signing of contract</i>	02 Nos.					
1.6	Supply of solar panel, charger regulator, batteries, lightening arrestor with all connectors, cables and conduit for cables for providing un interrupted power supply to remote monitoring stations technical specifications.		<i>4 months from date of signing of contract</i>	19 Nos.					
2.0	<b>Set of Data Center Equipment to collect and Store the data received from proposed DCPs established across the Mayurakshi Project Canal System , I &amp; W. Dte., West Bengal at data center located at Suri Irrigation Office Complex &amp; other two monitoring room located at Bolepur &amp; Rampurhat Irrigation Office Complex in Birbhum District.</b>								
2.1	Supply of Master server which includes Server with server Rack and industrial grade monitor with USB, RS232/RS485, Ethernet Ports, OS Windows 8 or higher compatible to Real time Monitoring System complete for Mayurakshi Project Canal System, as per technical specifications.		<i>4 months from date of signing of contract</i>	1 No.					

2.2	Supply of Customized Canal Monitoring software which shall include Data acquisition for monitoring of Canal operations, water scheduling, Real time data logging for complete Canal system with life time licensed version. As per technical specifications.		<i>4 months from date of signing of contract</i>	<i>1 No.</i>					
2.3	Supply of 110" LED Display/ Video wall/ (70", 2X1) DLP based System for Real time Monitoring System & at Control Room as per technical specifications		<i>4 months from date of signing of contract</i>	<i>1 No.</i>					
2.4	Supply of online 3 KVA UPS with Battery system for power back up of barrage control room equipment's including all necessary cabling & electrical fittings complete as per the technical specifications		<i>4 months from date of signing of contract</i>	<i>3 Nos.</i>					
2.5	Supply of Computer Node (Workstation) along with Monitor at the office of Executive Engineer & SE office of Canal With necessary accessories as per technical specifications		<i>4 months from date of signing of contract</i>	<i>3 Nos.</i>					
2.6	Supply of 55 inch LED display at the office of Executive engineer & SE office of canal as per technical specification.		<i>4 months from date of signing of contract</i>	<i>3 Nos.</i>					
2.7	Supply of IT Hardware which includes required Static IP, Router, Switch, firewall system and A3 size color printer as per technical specifications		<i>4 months from date of signing of contract</i>	<i>1 Lot.</i>					
2.8	Supply of High speed synchronous internet connection (min. 8 mbps upload and 8 mbps download) for five years.		<i>4 months from date of signing of contract</i>	<i>1 No.</i>					

2.9	Supply of GSM & GPRS data receiving system with all ancillary equipment, as per technical specifications.		<i>4 months from date of signing of contract</i>	<i>1 No.</i>					
			<i>SUM (A) Rs.</i>						
			<i>GST</i>						

\*GST to be quoted item wise as per HSN Code.

Name of Bidder *[insert complete name of Bidder]*

Signature of Bidder *[signature of person signing the Bid]*

Date *[insert date]*

**B. Price and Completion Schedule - Related Services**

	<b>Tender Inviting Authority: The Executive Engineer, Burdwan Investigation &amp; Planning Division, 3rd floor, Purta Bhawan, Purba Burdwan</b>							
	<b>Name of Work: “Supply, installation, testing, commissioning, operation and maintenance of Real Time Monitoring for Mayurakshi Project Canal System of Irrigation &amp; Waterways Department, West Bengal under National Hydrology Project (NHP).”</b>							
	<b>Contract No: WBIW/NHP/IFB-07/2020-21</b>							
	<b>Name of the Bidder/ Bidding Firm / Company :</b>							
	<b><u>PRICE SCHEDULE</u></b>							
	<b>(DOMESTIC TENDERS - RATES ARE TO GIVEN IN RUPEES (INR) ONLY)</b>							
	<b>(This BOQ template must not be modified/ replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for this tender. Bidders are allowed to enter the Bidder Name and Values only )</b>							
1	2	3	4	5	6	7	8	9
<b>Service no.</b>	<b>Description of services (excludes inland transportation and other services required in India to convey the goods to their final destination)</b>	<b>Country of origin</b>	<b>Delivery date at place of final destination</b>	<b>Quantity and physical unit</b>	<b>Unit price (excluding GST)</b>	<b>Total Price (excluding GST) (Col. 5×6)</b>	<b>*GST Amount</b>	<b>Total price per service (including GST) (col. 7+8)</b>
	Installation of the systems including associated civil works which also include Performance and supervision of the on-site assembly and/or start-up of the supplied Goods							
<b>1.0</b>	<b>Real Time Monitoring System for Mayurakshi Project Canal System of Irrigation &amp; Waterways Department, West Bengal</b>							

1.1	Installation, testing & Commissioning of Shaft Encoder based Rotary position sensor type gate sensor for indication and monitoring of Canal gate structures, including mounting hardware, necessary enclosure, cabling and integration with Data logger/RTU, as per technical specifications.		9 months from date of signing of contract	85 Nos.				
1.2	Installation, testing & Commissioning of Water Level transmitter non-contact Ultrasonic/RADAR type having 6 m range for measuring upstream & downstream discharge of cross regulator. Including all necessary cabling with suitable conduits & electrical fittings & mast complete as per technical specifications.		9 months from date of signing of contract	35 Nos.				
1.3	Installation, testing and Commissioning of Side looking Acoustic Doppler based Velocity Meter (ADV) for direct discharge measurement in main Canal systems with bed width of 0-40m, including retractable Mounting frame, cabling, integration with datalogger & associated Civil works as per technical specifications		9 months from date of signing of contract	04 Nos.				
1.4	Installation testing and commissioning of Datalogger /RTU with 8 channel input type with GPRS/GSM based telemetry & enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.		9 months from date of signing of contract	17 Nos.				



1.5	Installation testing and commissioning of Datalogger/RTU with 16 channel input type with GPRS/GSM based telemetry & enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.		9 months from date of signing of contract	02 Nos.				
1.6	Installation testing and commissioning of solar panel, charger regulator, batteries, lightening arrestor with all connectors, cables and conduit for cables for providing un interrupted power supply to remote monitoring stations technical specifications.		9 months from date of signing of contract	19 Nos.				
2.0	<b>Set of Data Center Equipment to collect and Store the data received from proposed DCPs established across the Mayurakshi Project Canal System , I &amp; W. Dte., West Bengal at data center located at Suri Irrigation Office Complex &amp; other two monitoring room located at Bolepur &amp; Rampurhat Irrigation Office Complex in Birbhum District.</b>							
2.1	Installation, Testing & Commissioning of Master server which includes Server with server Rack and industrial grade monitor with USB, RS232/RS485, Ethernet Ports, OS Windows 8 or higher compatible to Real time Monitoring System complete for Mayurakshi Project Canal System, as per technical specifications.		9 months from date of signing of contract	01 No.				
2.2	Development & testing of Customized Canal Monitoring software which shall include Data acquisition for monitoring of Canal operations, water scheduling, Real time data logging for complete Canal system with life time licensed version. As per technical specifications.		9 months from date of signing of contract	01 No.				

2.3	Installation, Testing & Commissioning of 110” LED Display/ Video wall/ (70”, 2X1) DLP based System for Real time Monitoring System &at Control Room as per technical specifications		9 months from date of signing of contract	01 No.				
2.4	Installation, Testing & Commissioning of online 3 KVA UPS with Battery system for power back up of barrage control room equipment’s including all necessary cabling & electrical fittings complete as per the technical specifications		9 months from date of signing of contract	03 Nos.				
2.5	Installation, Testing & Commissioning of Computer Node (Workstation) along with Monitor at the office of Executive Engineer & SE office of Canal With necessary accessories as per technical specifications		9 months from date of signing of contract	03 Nos.				
2.6	Installation, Testing & Commissioning of 55 inch LED display at the office of Executive engineer & SE office of canal as per technical specification.		9 months from date of signing of contract	03 Nos.				
2.7	Installation, Testing & Commissioning of IT Hardware which includes required , Router, Switch, firewall system and A3 size color printer as per technical specifications		9 months from date of signing of contract	01 Lot.				
2.8	Installation, testing & Commissioning of GSM & GPRS data receiving system with all ancillary equipment, as per technical specifications.		9 months from date of signing of contract	01 No.				

3.0	Operation & Maintenance for Mayurakshi Project Canal System							
3.1	Five Years Operation & Maintenance and Comprehensive Warranty for Canal monitoring system with Telemetry along with accessories, installed at designated locations within Mayurakshi Canal System, West Bengal after final acceptance of Canal monitoring systems. This includes replacement of material & consumable as & when required at bidders' cost. The cost of Communication for GSM & GPRS (SIM charges) telemetry for data transmission shall be borne by bidder.		Continuous activity for five years after successful commissioning and Final acceptance certificate	01 Lot.				
3.2	Training of the purchaser's personnel at the supplier's plant and/or/onsite in assembly, start up, operation, maintenance and/or repair of the supplied goods. Course topics will include sensor calibration, data logger /RTU configuration, data downloading, data retrieval, collection, Trouble shooting, processing maintenance requirements and procedure for equipment configuration, installation, site testing and commissioning including training kit containing course material in soft and hard copies as per technical specification.		Continuous activity For 5 years	8 trainings.				
3.3	Charges for high speed synchronous internet connection (min. 8 mbps upload and download speed) & Static IP for Five years.		Continuous activity	01 Lot.				
						(B) Rs.		
						GST		

				Total Bid Price Rs (A+B)	
	<p>*GST to be quoted item wise as per HSN Code.</p> <p>Name of Bidder [<i>insert complete name of Bidder</i>]</p> <p>Signature of Bidder [<i>signature of person signing the Bid</i>]</p> <p>Date [<i>insert date</i>]</p>				

**(e) Form of Bid-Securing Declaration**

[The Bidder shall fill in this Form in accordance with the instructions indicated.]

Date: [date (as day, month and year)]

Bid No.: [number of bidding process]

Alternative No.: [insert identification No if this is a Bid for an alternative]

To: [complete name of Purchaser]

We, the undersigned, declare that:

We understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration.

We accept that we will automatically be suspended from being eligible for bidding in any contract with the Purchaser for the period of time of **three years** starting from the date of such notification by the purchaser, if we are in breach of our obligation(s) under the bid conditions, because we:

- (f) have withdrawn our Bid during the period of bid validity specified in the Letter of Bid; or
- (g) having been notified of the acceptance of our Bid by the Purchaser during the period of bid validity, (i) fail or refuse to execute the Contract; or (ii) fail or refuse to furnish the Performance Security, if required, in accordance with the ITB.

We understand this Bid Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) forty-five days after the expiration of our Bid.

Name of the Bidder\*

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* \_\_\_\_\_

Title of the person signing the Bid \_\_\_\_\_

Signature of the person named above \_\_\_\_\_

Date signed \_\_\_\_\_ day of \_\_\_\_\_,

\*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

\*\* : Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the bid.]

## 6. MANUFACTURER'S AUTHORIZATION

*[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that are legally binding on the Manufacturer shall include it in its bid.]*

Date: *[insert date (as day, month and year) of Bid Submission]*  
 NCB No.: *[insert number of bidding process]*

To: *[insert complete name of Purchaser]*

### WHEREAS

We *[insert complete name of Manufacturer]*, who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a bid the purpose of which is to provide the following Goods, manufactured by us *[insert name and or brief description of the Goods]*, and to subsequently negotiate and sign the Contract against the above IFB.

We hereby extend our full guarantee and warranty in accordance with Clause 28 of the General Conditions of Contract, with respect to the Goods offered by the above firm against this IFB.

We as a manufacturer of *[insert type of goods manufactured]* confirm to provide the spare & **service support for a minimum period of 10 years after commissioning.**

Signed: *[insert signature(s) of authorized representative(s) of the Manufacturer]*

Name: *[insert complete name(s) of authorized representative(s) of the Manufacturer]*

Title: *[insert title]*

Duly authorized to sign this Authorization on behalf of: *[insert complete name of Bidder]*

Dated on \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ *[insert date of signing]*

*Note – Modify this format suitably in cases where manufacturer's warranty and guarantee are not applicable for the items for which bids are invited. If the supply consists of number of items, indicate the specific item (s) for which alone the above authorization is required.*

*[The Bidder shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer and should be signed by a person with the proper authority to sign documents that are legally binding on the Manufacturer. The Bidder shall include it in its bid, if so indicated in the **BDS.**]*

## 7. DECLARATION FOR CLAIMING TAX/DUTY EXEMPTION<sup>2</sup>

### (Name of the Project)

Bid No. ....

Description of item to be supplied .....

(Information for issue of certificate for claiming exemption of Tax/ Duty in terms of Government of India's relevant notification)

**(Bidder's Name and Address):**

**To  
(Name of Purchaser)**

.....

Dear Sir:

1. We confirm that we are solely responsible for obtaining deemed export benefits which we have considered in our bid and in case of failure to receive such benefits for reasons whatsoever, Purchaser will not compensate us.
2. We are furnishing below the information required by the Purchaser for issue of necessary certificate in terms of Government of India's relevant notification.

(i) Ex-factory price per unit on which the tax/duty is payable: \*Rs.

\_\_\_\_\_

(ii) No of Units to be supplied:

\_\_\_\_\_

\_\_\_\_\_

(iii) Total cost on which the tax/duty is payable

(Rs.) \_\_\_\_\_

*(The requirements listed above are as per  
Current notifications. These may be modified,  
as necessary, in terms of the rules in force)*

(Signature) \_\_\_\_\_

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

(Designation) \_\_\_\_\_

(Common Seal) \_\_\_\_\_

*\* Please attach details item-wise with cost, if there are more than one items. The figures indicated should tally with what is given in the price schedule.*

<sup>2</sup> This declaration refers to ITB 14.9 and shall be retained only if ITB 14.9 is retained. The format may be modified as per the latest instructions of Government of India.

## 8. FORMAT FOR EVIDENCE OF ACCESS TO OR AVAILABILITY OF CASH FLOW

(To be provided on the letter head of the Bank)

### AVAILABILITY OF CASH FLOW (WORKING CAPITAL)

*(This should be given in this form only by a nationalized or scheduled bank in India. No other substitute will be acceptable)*

This is to certify that M/s. \_\_\_\_\_ is a reputed company with a good financial standing.

If the contract for the works, namely \_\_\_\_\_ [funded by the World Bank] is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of INR \_\_\_\_\_ to meet their capital requirements for executing the above contract.

-- Sd. --

Name of Bank Manager

Senior Bank Manager

Address of the Bank

**\* Change the text as follows for Joint venture:**

*This is to certify that M/s. .... Who has formed a JV with M/s. .... and M/s. .... for participating in this bid, is a reputed company with a good financial standing.*

*If the contract for the work, namely ..... [funded by the World Bank] is awarded to the above Joint Venture, we shall be able to provide overdraft/credit facilities to the extent of Rs. .... to meet the working capital requirements for executing the above contract.*

*[This should be given by the JV members in proportion to their financial participation.]*



## 9. PROFORMA FOR PERFORMANCE STATEMENT

[Please see ITB Clause 36.2 and Section III-  
Evaluation and Qualification Criteria]

Proforma for Performance Statement (for a period of last three/five years)

Bid No. \_\_\_\_\_ Date of opening \_\_\_\_\_ Time \_\_\_\_\_ Hours

Name of the Firm \_\_\_\_\_

<u>Order placed by (full address of Purchaser)</u>	<u>Order No. and date</u>	<u>Description and quantity of ordered equipment</u>	<u>Value of order</u>	<u>Date of completion of delivery</u>		<u>Remarks indicating reasons for late delivery, if any</u>	<u>Has the equipment been satisfactorily functioning? (Attach a certificate from the Purchaser/Consignee)</u>
				As per contract	Actual		
1	2	3	4	5	6	7	8

Signature and seal of the Bidder \_\_\_\_\_  
\_\_\_\_\_

## **SECTION V. – ELIGIBLE COUNTRIES**

### **Public Information Center**

#### **Eligibility for the Provision of Goods, Works and Non Consulting Services in Bank-Financed Procurement**

In reference to ITB 4.7 and 5.1, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this bidding process:

Under ITB 4.7(a) and 5.1: *None*

Under ITB 4.7(b) and 5.1: *None*

## SECTION VI. BANK POLICY – CORRUPT AND FRAUDULENT PRACTICES

Guidelines for Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, dated January 2011.

### “Fraud and Corruption:

1.16 It is the Bank’s policy to require that Borrowers (including beneficiaries of Bank loans), bidders, suppliers, contractors and their agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed contracts.<sup>3</sup> In pursuance of this policy, the Bank:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
  - (i) “corrupt practice” is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;<sup>4</sup>
  - ii) “fraudulent practice” is 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;<sup>5</sup>
  - (h) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;<sup>6</sup>
  - (iv) “coercive practice” is 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;<sup>7</sup>
  - (i) “obstructive practice” is:

(aa) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank

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<sup>3</sup> In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

<sup>4</sup> For the purpose of this sub-paragraph, “*another party*” refers to a public official acting in relation to the procurement process or contract execution. In this context, “*public official*” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

<sup>5</sup> For the purpose of this sub-paragraph, “party” refers to a public official; the terms “benefit” and “obligation” relate to the procurement process or contract execution; and the “act or omission” is intended to influence the procurement process or contract execution.

<sup>6</sup> For the purpose of this sub-paragraph, “parties” refers to participants in the procurement process (including public officials) attempting either themselves, or through another person or entity not participating in the procurement or selection process, to simulate competition or to establish bid prices at artificial, non-competitive levels, or are privy to each other’s bid prices or other conditions.

<sup>7</sup> For the purpose of this sub-paragraph, “party” refers to a participant in the procurement process or contract execution.

investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or 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

- (bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 1.16(e) below.
  - (j) will reject a proposal for award if it determines that the bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
  
- I will declare misprocurement and cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
  
- (d) will sanction a firm or individual, at any time, in accordance with the prevailing Bank's sanctions procedures,<sup>8</sup> including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated<sup>9</sup>;
  
- (e) will require that a clause be included in bidding documents and in contracts financed by a Bank loan, requiring bidders, suppliers and contractors, and their sub-contractors, agents, personnel, consultants, service providers, or suppliers, to permit the Bank to inspect all accounts, records, and other documents relating to the submission of bids and contract performance, and to have them audited by auditors appointed by the Bank.”

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<sup>8</sup> A firm or individual may be declared ineligible to be awarded a Bank financed contract upon: (i) completion of the Bank's sanctions proceedings as per its sanctions procedures, including, inter alia, cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks, and through the application the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption; and (ii) as a result of temporary suspension or early temporary suspension in connection with an ongoing sanctions proceeding. See footnote 14 and paragraph 8 of Appendix 1 of these Guidelines.

<sup>9</sup> A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which has either been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

## **PART-2 - SUPPLY REQUIREMENTS**

## **SECTION VII – SCHEDULE OF REQUIREMENTS**

## 1(A). LIST OF GOODS AND DELIVERY SCHEDULE

Line Item No	Description of Goods	Quantity	Physical Unit	Final (Site Destination) as per technical specifications	Delivery (As per Incoterm) date		
					Earliest Delivery Date	Latest Delivery Date	Bidder's offered Delivery date
1.0	<b>Real Time Monitoring for Mayurakshi Project Canal System of Irrigation &amp; Waterways Department, West Bengal</b>						
1.1	Supply of Shaft Encoder based Rotary position sensor type gate sensor for indication and monitoring of Canal gate structures, including cabling and integration with Datalogger /RTU as per technical specifications.	85	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
1.2	Supply of Automated Water Level Transmitter non-contact Ultrasonic/RADAR sensor type having 0-6m range for measuring Upstream & downstream level of Head/Cross regulators of canal system, including all necessary hardware, cabling with suitable conduits, electrical fittings and accessories as per technical specifications.	35	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
1.3	Supply of Side looking Acoustic Doppler based Velocity Meter (ADVM) for direct discharge measurement in main Canal systems with bed width 0-40m, including cabling, installation accessories & integration with datalogger /RTU as per technical specifications	04	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
1.4	Supply of Datalogger /RTU with 8 channel input type with GPRS/GSM based telemetry & Enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.	17	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	

1.5	Supply of Datalogger /RTU with 16 channel input type with GPRS/GSM based telemetry & Enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.	02	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
1.6	Supply of solar panel, charger regulator, batteries, lightening arrestor with all connectors, cables and conduit for cables for providing un interrupted power supply to remote monitoring stations technical specifications.	19	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
2.0	<b>Set of Data Center Equipment to collect and Store the data received from proposed DCPs established across the Mayurakshi Project Canal System , I &amp; W. Dte., West Bengal at data center located at Suri Irrigation Office Complex &amp; other two monitoring room located at Bolepur &amp; Rampurhat Irrigation Office Complex in Birbhum District.</b>						
2.1	Supply of Master server which includes Server with server Rack and industrial grade monitor with USB, RS232/RS485, Ethernet Ports, OS Windows 8 or higher compatible to Real time Monitoring System complete for Mayurakshi Project Canal System, as per technical specifications.	01	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
2.2	Supply of Customized Canal Monitoring software which shall include Data acquisition for monitoring of Canal operations, water scheduling, Real time data logging for complete Canal system with life time licensed version. As per technical specifications.	01	No.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
2.3	Supply of 110" LED Display/ Video wall/ (70", 2X1) DLP based System for Real time Monitoring System & at Control Room as per technical specifications	01	Nos.	Suri, Birbhum District.	4 months from date of signing of contract	4 months from date of signing of contract	
2.4	Supply of online 3 KVA UPS with Battery system for	03	Nos.	One set for	4 months	4 months	



	power back up of barrage control room equipment's including all necessary cabling & electrical fittings complete as per the technical specifications			monitoring room located at Suri Irrigation Office Complex & other two sets for monitoring room located at Bolepur & Rampurhat Irrigation office Complex in Birbhum District.	<i>from date of signing of contract</i>	<i>from date of signing of contract</i>	
2.5	Supply of Computer Node (Workstation) along with Monitor at the office of Executive Engineer & SE office of Canal With necessary accessories as per technical specifications	03	<i>Nos.</i>	One set for monitoring room located at Suri Irrigation Office Complex & other two sets for monitoring room located at Bolepur & Rampurhat Irrigation office Complex in Birbhum District.	<i>4 months from date of signing of contract</i>	<i>4 months from date of signing of contract</i>	
2.6	Supply of 55 inch LED display at the office of Executive engineer & SE office of canal as per technical specification.	03	<i>Nos.</i>	One set for monitoring room located at Suri Irrigation Office Complex & other two sets for monitoring room located at Bolepur & Rampurhat Irrigation office Complex in Birbhum District.	<i>4 months from date of signing of contract</i>	<i>4 months from date of signing of contract</i>	
2.7	Supply of IT Hardware which includes required Static IP, Router, Switch, firewall system and A3 size color printer as per technical specifications	01	<i>01 Lot.</i>	<i>Suri, Birbhum District.</i>	<i>4 months from date of signing of</i>	<i>4 months from date of signing of</i>	

					<i>contract</i>	<i>contract</i>	
2.8	Supply of High speed synchronous internet connection (min. 8 mbps upload and 8 mbps download) for five years.	01	No.	<i>Suri, Birbhum District.</i>	<i>4 months from date of signing of contract</i>	<i>4 months from date of signing of contract</i>	
2.9	Supply of GSM & GPRS data receiving system with all ancillary equipment, as per technical specifications.	01	No.	<i>Suri, Birbhum District.</i>	<i>4 months from date of signing of contract</i>	<i>4 months from date of signing of contract</i>	

***[The Purchaser shall fill in this table, with the exception of the column “Bidder’s offered Delivery date” to be filled by the Bidder]***

## 1(B). List of Related Services [ITB Clause 14.8(b)] and Completion Schedule

1	2	3	4	5	6
Service No.	Description of Services (excludes inland transportation and other services required in India to convey the goods to their final destination)	Quantity	Physical Unit	Place where Services shall be performed	Final Completion Date of Services
1.0	<b>Real Time Monitoring for Mayurakshi Project Canal System of Irrigation &amp; Waterways Department, West Bengal</b>				
1.1	Installation, testing & Commissioning of Shaft Encoder based Rotary position sensor type gate sensor for indication and monitoring of Canal gate structures, including mounting hardware, necessary enclosure, cabling and integration with Data logger/RTU, as per technical specifications.	85	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
1.2	Installation, testing & Commissioning of Water Level transmitter non-contact Ultrasonic/RADAR type having 6 m range for measuring upstream & downstream discharge of cross regulator. Including all necessary cabling with suitable conduits & electrical fittings & mast complete as per technical specifications.	35	No.	Suri, Birbhum District.	9 months from the date of signing of Contract

1.3	Installation, testing and Commissioning of Side looking Acoustic Doppler based Velocity Meter (ADVM) for direct discharge measurement in main Canal systems with bed width of 0-40 m, including retractable Mounting frame, cabling, integration with datalogger & associated Civil works as per technical specifications	04	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
1.4	Installation testing and commissioning of Datalogger /RTU with 8 channel input type with GPRS/GSM based telemetry & enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.	17	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
1.5	Installation testing and commissioning of Datalogger/RTU with 16 channel input type with GPRS/GSM based telemetry & enclosure including antenna and all necessary equipment for data transmission for remote monitoring stations, as per technical specifications.	02	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
1.6	Installation testing and commissioning of solar panel, charger regulator, batteries, lightening arrestor with all connectors, cables and conduit for cables for providing un interrupted power supply to remote monitoring stations technical specifications.	19	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
2.0	<b>Set of Data Center Equipment to collect and Store the data received from proposed DCPs established across the Mayurakshi Project Canal System , I &amp; W. Dte., West Bengal at data center located at Suri Irrigation Office Complex &amp; other two monitoring room located at Bolepur &amp; Rampurhat Irrigation Office Complex in Birbhum District.</b>				

2.1	Installation, Testing & Commissioning of Master server which includes Server with server Rack and industrial grade monitor with USB, RS232/RS485, Ethernet Ports, OS Windows 8 or higher compatible to Real time Monitoring System complete for Mayurakshi Project Canal System, as per technical specifications.	01	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
2.2	Development & testing of Customized Canal Monitoring software which shall include Data acquisition for monitoring of Canal operations, water scheduling, Real time data logging for complete Canal system with life time licensed version. As per technical specifications.	01	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
2.3	Installation, Testing & Commissioning of 110" LED Display/ Video wall/ (70", 2X1) DLP based System for Real time Monitoring System & at Control Room as per technical specifications	01	Nos.	Suri, Birbhum District.	9 months from the date of signing of Contract
2.4	Installation, Testing & Commissioning of online 3 KVA UPS with Battery system for power back up of barrage control room equipment's including all necessary cabling & electrical fittings complete as per the technical specifications	03	Nos.	One set for monitoring room located at Suri Irrigation Office Complex & other two sets for monitoring room located at Bolepur & Rampurhat Irrigation office Complex in Birbhum District.	9 months from the date of signing of Contract

2.5	Installation, Testing & Commissioning of Computer Node (Workstation) along with Monitor at the office of Executive Engineer & SE office of Canal With necessary accessories as per technical specifications	03	Nos.	One set for monitoring room located at Suri Irrigation Office Complex & other two sets for monitoring room located at Bolepur & Rampurhat Irrigation office Complex in Birbhum District.	9 months from the date of signing of Contract
2.6	Installation, Testing & Commissioning of 55 inch LED display at the office of Executive engineer & SE office of canal as per technical specification.	03	Nos.	One set for monitoring room located at Suri Irrigation Office Complex & other two sets for monitoring room located at Bolepur & Rampurhat Irrigation office Complex in Birbhum District.	9 months from the date of signing of Contract
2.7	Installation, Testing & Commissioning of IT Hardware which includes required , Router, Switch, firewall system and A3 size color printer as per technical specifications	01	Lot.	Suri, Birbhum District.	9 months from the date of signing of Contract
2.8	Installation, testing & Commissioning of GSM & GPRS data receiving system with all ancillary equipment, as per technical specifications.	01	No.	Suri, Birbhum District.	9 months from the date of signing of Contract
3.0	<b>Operation &amp; Maintenance for Mayurakshi Project Canal System</b>				

3.1	Five Years Operation & Maintenance and Comprehensive Warranty for Canal monitoring system with Telemetry along with accessories, installed at designated locations within Mayurakshi Canal System, West Bengal after final acceptance of Canal monitoring systems. This includes replacement of material & consumable as & when required at bidders' cost. The cost of Communication for GSM & GPRS (SIM charges) telemetry for data transmission shall be borne by bidder.	01	Lot.	Suri, Birbhum District.	Continuous activity for five years after successful commissioning and Final acceptance certificate
3.2	Training of the purchaser's personnel at the supplier's plant and/or/onsite in assembly, startup, operation, maintenance and/or repair of the supplied goods. Course topics will include sensor calibration, data logger /RTU configuration, data downloading, data retrieval, collection, Trouble shooting, processing maintenance requirements and procedure for equipment configuration, installation, site testing and commissioning including training kit containing course material in soft and hard copies as per technical specification.	08	Trainings.	Suri, Birbhum District.	Continuous activity for Five years after successful commissioning
3.3	Charges for high speed synchronous internet connection (min. 8 mbps upload and download speed) & Static IP for Five years.	01	Lot.	Suri, Birbhum District.	Continuous activity

### ❖ Grouping of Instruments

Instruments proposed to be installed under NHP CANAL Data acquisition system for Mayurakshi Irrigation system												
Sl. No.	Barrage / Canal Name	Str.	Ch.	No of Gates	Discharge (in Cusec)	Gate sensor	UL T u/s	UL T d/s	ADV M	Data logger	Channel Type	solar power
1	Kandishala Wier	--	---	3	---	3	1	1	1	1	8 AI	1
2	Mayurakshi Bakreswar Main Canal	X Reg	733.07	6	2590	6	1		1	1	8 AI	1
3	Mayurakshi Dwarka Main Canal	X Reg	223.45	4	3201	4	1		1	1	8 AI	1
4	Dwarka Brahamoni Main Canal	H Reg	0	2	1695	2	1	1		1	8 AI	1
		X Reg	903	8	1370	8	1	1		1	16 AI	1
5	Brahamoni North Main Canal (South)	H Reg	0	2	850	2	1	1		1	8 AI	1
		X Reg	431	6	760	6	1	1		1	8 AI	1
6	Bakreswar Irrigation Main Canal	H Reg	0	4	150	4	1	1		1	8 AI	1
7	Bakreswar Kopai Main Canal	H Reg	0	4	2410	4	1		1	1	8 AI	1
		X Reg	351.0	4	570	4	1	1		1	8 AI	1
8	Kopai South Main Canal	H Reg	0	4	1850	4	1	1		1	8 AI	1
		X Reg	1128	8	1250	8	1	1		1	16 AI	1
		X Reg	1679.2	6	792	6	1	1		1	8 AI	1
		X Reg	1779.2	6	775	6	1	1		1	8 AI	1
9	Mayurakshi Bakreswar Branch Canal	H Reg	0	4	770	4	1	1		1	8 AI	1
10	Mayurakshi Dwarka Branch Canal	H Reg	0	4	1330	4	1	1		1	8 AI	1
		X Reg	565	4	1200	4	1	1		1	8 AI	1
		X Reg	1270	2	285	2	1	1		1	8 AI	1
11	Dwarka Brahamoni Branch Canal	H Reg	0	4	480	4	1	1		1	8 AI	1
<b>TOTAL</b>						<b>85</b>	<b>19</b>	<b>16</b>	<b>4</b>	<b>19</b>	<b>---</b>	<b>19</b>



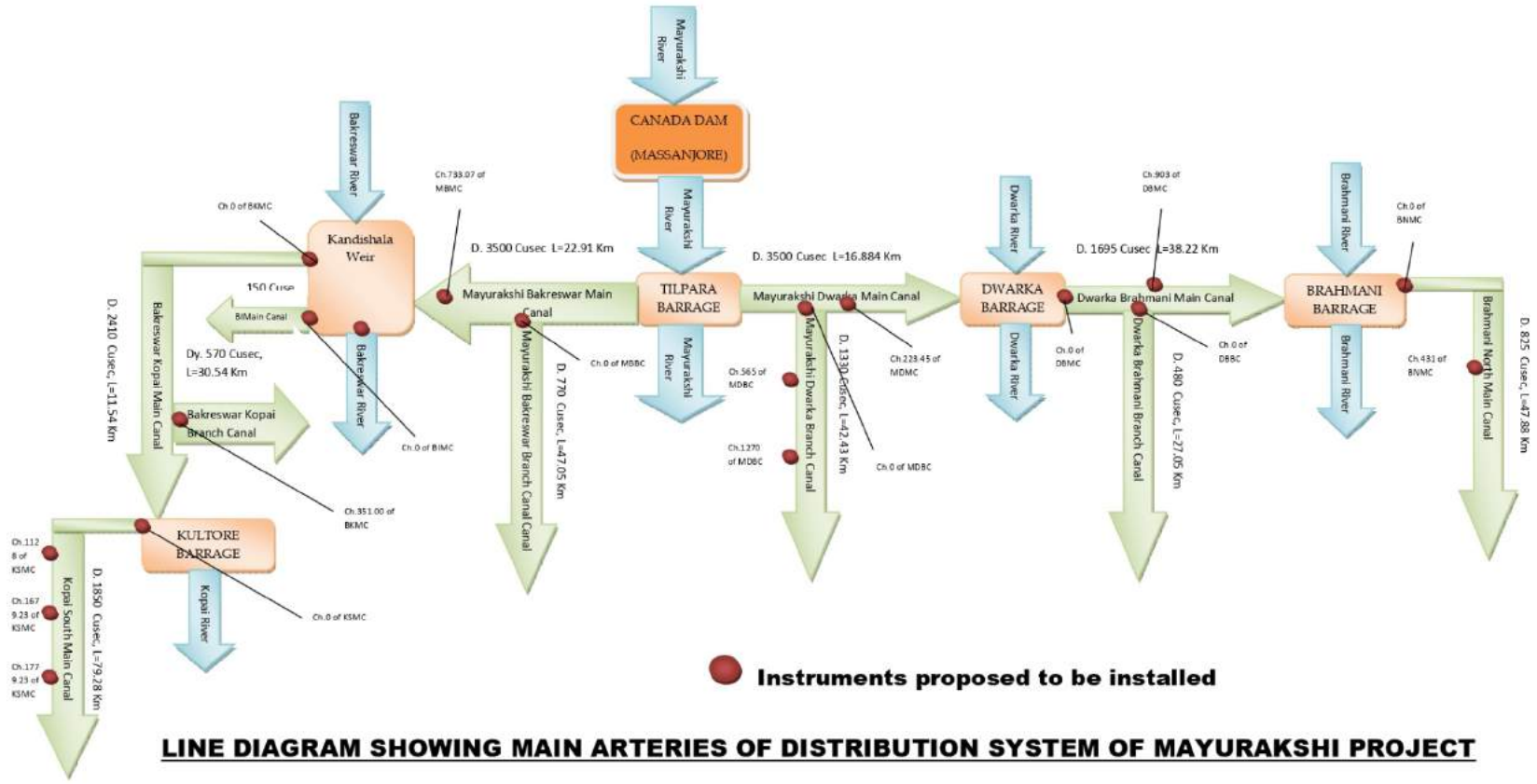
• **Details of Canal-Gate Data of Mayurakshi Project Canal System**

Details of Canal-Gate Data of Mayurakshi Project Canal System																		
Sl No	Main Canal	Off-taking channel	Chainage	Lat	Long	Bank	Discharge (Cusec)	Bed width (m)	Depth (m)	No. of gates	Size of gates 'm x m'	Type of gate operation	Weight of gate	Power supply availability	Motor Rating of each gate	Availability of Room near Canal Head	Network availability	Remarks
1	KADIS ALA WEIR	River Discharge	Ch. 0.0	23°79'30 7" N	87°45'24 7" E	River Gate	3000	22.5	2.8	3	7.31 x 2.13 (2 nos) & 5.18 x 2.74 (1 nos)	Manual	N/A	No	Nil	NO	YES	River Gate
2	MBMC	Cross Regulator of MBMC	Ch. 733.07 of MBMC	23°47'47 .0"N	87°27'08 .1"E	Cross	2590	24.5 4	2.75	6	2.85m x 2.25 m	Manual	Not Available	Available	Not Available	Yes	Yes	Cross Regulator Gate
3	MDMC	Cross Regulator	223.45 of MDMC	23°59'02 "N	87°33'44 "E	Cross	3210	18	2.43	4	3.05 X 1.25	Manual	Not Available	Not Available	Not Available	No	YES	Cross Regulator Gate
4	Dwarka Brahmani Main Canal (DBMC)	head Regulator DBMC	Ch. 0.00 of DBMC	24.25191 8	87.7390 07	Head Regulator	1695	10.8 7	1.97 6	2	4.575 x 1.525	Manual	N.A.	NO supply	N.A.	No	Yes	Head Regulator Gate
5	DBMC	C/R Gate	903 of DBMC	24.16562 4	87.7283 02	Center	1370	15.0 5	2.3	8	1.5250" x 2.135	Manual	N.A.	NO supply	N.A.	No	Yes	Cross Regulator Gate
6	Brahmani North Main Canals (BNMC)	Head Regulator BNMC	Ch. 0 of BNMC	24.25196 8	87.7390 18	Head Regulator	850	11.2 4	2.05	2	4.50x1.50	Manual	N.A.	Available	N.A.	Yes	Yes	Head Regulator Gate
7	BNMC	C/R Gate	431 BNMC	24.25198 2	87.7390 15	C/R	760	11.2 4	2.05	6	2.50 x1.85	Manual	N.A.	NO supply	N.A.	No	Yes	Cross Regulator Gate

8	Bakreswar Irrigation Main Canal (BIMC)	Head Regulator	Ch.0.00 of BIMC	23°79'30 7" N	87°45'24 7" E	R/BA NK	150	4.26	1.3	4	1.82 x 1.50	Manual	N/A	No	Nil	NO	YES	Head Regulator Gate
9	Bakreswar Kopai Main Canal (BKMC)	Head Regulator BKMC	Ch.0.0 of BKMC	23°79'30 7" N	87°45'24 7" E	R/BA NK	2410	19.5	2.8	4	7.31 x1.18	Manual	N/A	No	Nil	NO	YES	Head Regulator Gate
10	BKMC	Head Regulator of Bakreswar Kopai Branch Canal	Ch. 351.00 of BKMC & Ch. 0.00 of BKBC	23°79'30 7" N	87°45'24 7" E	R/BA NK	570	19.5	2.8	4	7.31 x 1.14	Manual	N/A	No	Nil	NO	YES	Head Regulator Gate
11	KOPAI SOUTH MAIN CANAL (K.S.M.C)	Head Regulator KSMC	Ch.0.00 of KSMC	23°72'93 " N	87°50'63 " E	Head Regulator	1850	4.26	2.44 m	4	7.32 m x 1.45m	Manual	N/A	yes	N/A	Yes	Yes	Head Regulator Gate (No of bays 2 Nos. Type and no of Gate Vertical 2Nos)
12	KSMC	Cross Regulator	1128.35 of KSMC	23.71153	87.7788 1	Cross Regulator	1250.0 0	16.3 1	2.13	8	1.275 X 1.70	Manual	N/A	No	N/A	Yes	YES	Cross Regulator Gate
13	KSMC	Cross Regulator	1679.23 of KSMC	23.75112	87.9268 9	Cross Regulator	792	9.98	2.04	6	1.50x1.61 0	Manual	N/A	No supply	N/A	No	Yes	Cross Regulator Gate
14	KSMC	Cross Regulator	1779.23 of KSMC	23.76407	87.9308 7	Cross Regulator	775.00	9.81	1.98	6	1.23x1.60	Manual	N/A	No supply	N/A	No	Yes	Cross Regulator Gate
15	Mayurakshi Bakreswar Branch Canal (MBBC)	Head Regulator	Ch. 0 of MBBC	23.90708 8° N	87.5448 18° E	Head Regulator	770	9.98	1.98	4	1.52 x 1.96	Manual	N/A	No power supply	N/A	Yes, Khala shi shed available	Yes	Head Regulator Gate
16	Mayurakshi Dwarka Branch Canal (MDBC)	Head Regulator	Ch. 0.00 of MDBC	23°58'53 "N	87°33'49 "E	R	1330	15.7 0	2.13	4	2.50 x1.85	Manual	426 kg	No supply	N/A	no	Yes	Head Regulator Gate

17	MDBC	Cross Regulator gate at MDBC	565.00 of MDBC	23°59'59.8"N	87°42'09.4"E	Cross	1200	13.87	2.13	4	2.50 x1.86	Manual	Not Available	No power supply	Not Available	No	Yes	Cross Regulator Gate
18	MDBC	Cross Regulator gate at MDBC	1270.00 of MDBC	24°02'39.2"N	87°53'16.9"E	Cross	285	7.5	2.4	2	1.80 x 1.50	Manual	Not Available	No power supply	Not Available	No	Yes	Cross Regulator Gate
19	Dwarka Brahmani Branch Canal (DBBC)	Head Regulator of DBBC	Ch. 0.00 Of DBBC	24.229787	87.741135	R/B	480	8.892	1.672	4	1.575 x 1.753'	Manual	N.A.	NO supply	N.A	No	Yes	Head Regulator Gate

• Canal Line Diagram of Mayurakshi Project Canal System



### 3. TECHNICAL SPECIFICATIONS

#### 1.0 GENERAL

Real Time data acquisition system for Canal network will be implemented under this project which will provide the key data required for Canal Monitoring System. A Real Time Data Acquisition System will consist of a telemetry network of water levels and discharges along Canal system which will be installed to provide inputs to the Canal monitoring software to be developed by the bidder. The concept of implementation on which the present technical specifications and special conditions are based intends to combine the advantages of latest technologies of data storage, processing and data communication with the requirements of high availability and sustainability required by such an important project. Preference will be given to robust, reliable technology. The real-time data acquisition systems for Canal network have the greatest possible reliability, thus minimizing the maintenance to the extent possible.

The Technical Specifications consists of the installation & commissioning of the real time data acquisition for mayurakshi Canal system which includes the design, manufacture, factory testing, deliver to site, installation (including the associated interface wiring/termination as required), knowledge transfers and other accessories, commissioning and site acceptance testing, supply of mandatory spares, training and documentation.

To minimize corrective maintenance and to increase the performance of the monitoring network, a well-organized preventative maintenance plan is highly recommended. The preventative maintenance is required for all system components as well as the infrastructure in place to house the electronic data collection components. A strong maintenance plan will be the foundation for sustaining the State of Canal monitoring network operation over the expected lifetime of the technology, which is considered to be at least 10 years.

#### 2.0 DESIGN PRINCIPLES

The following basic principles have been applied to design the real time Canal monitoring system.

- Installation of Side looking Acoustic Doppler velocity meter (ADVDM) for canal head/ cross regulators in combination with gate monitoring & upstream level measurement system at significant locations (above 2000 Cusec discharge capacity) & where water is supplied from different states into canal system or one division to other division. The primary function of the system is to measure discharge in downstream of Canal network, monitor the gate openings. Also, using Upstream Level & Gate monitoring a redundant discharge measurement methodology has to be opted for cross verification of discharges which via. Datalogger/RTU with GPRS/GSM telemetry is being transmitted to Centralized Canal Monitoring software installed at Control/ Monitoring room in Birbhum District. The variation between two different discharge measurement methods shall not be more than 3%.
- Installation of Upstream level transmitter, gate sensors & Downstream level transmitters to measure the discharge using the discharge equation for sluice gates (depending upon the pool characteristics) at the Head /Cross regulators with discharge capacity between 100 to 200 Cusec.

- Installation of Upstream level transmitter & gate sensors to measure the discharge using the discharge equation for sluice gate (free flow condition) at the Head /Cross regulators with discharge capacity between 100 to 200 Cusec.
- The Telemetry system shall be based on GPRS & GSM type wireless technology which can be provided internal/external to the Ultrasonic/RADAR type Water Level transmitter. GPRS/GSM telemetry is being implemented & data will be transmitted to Canal monitoring System.
- The data is collected using Datalogger/RTU at remote sites (ex. water Level, Gate opening and Discharge etc.) will be transmitted to Canal monitoring software via. GPRS/GSM telemetry & stored in backup server located at Data center of Suri Irrigation Office Complex, Birbhum, West Bengal. The data from remote station should be in standard CSV format (as specified in technical Specifications).

## 2.1 COMPONENTS OF CANAL MONITORING SYSTEM

The main items required for implementation of Real Time Canal monitoring system comprises of the following:

- i. **Side looking ADVN** (Acoustic Doppler Velocity meter) for measurement and display of total discharge through head and cross regulator gates at specified locations within Canal network of Mayurakshi Canal System.
- ii. **Gate position Sensors** for indication and monitoring of gate position in Mayurakshi Canal system.
- iii. **Ultrasonic water level sensors** for Level indication and computed discharge measurement function at specified locations in Mayurakshi Canal system.
- iv. **Datalogger/Remote Terminal Unit (RTU)**for data collection/storage & transmission of data via. GPRS/GSM communication to Canal monitoring software which shall be installed at State Data Center for Mayurakshi Canal system.
- v. **Centralized Canal Monitoring Software-** The Canal monitoring software will receive all the data transmitted from the various sensors installed along the Canal system. The real time data at SDC is monitored, logged and displayed in complete explicit way and can be extracted in different formats and based on comparison with the water demand an analytics is generated for operators to operate the gates for corrective measures. The Canal Monitoring system shall have GIS, Water demand and scheduling modules which will form a robust Management information and Decision Support tool.

## 3.0 Scope of Work

The scope of work for Canal Monitoring system can be categorized as follows.

- i. Remote Monitoring System Hardware
- ii. Irrigation Management and Decision Support System/Canal Monitoring Software
- iii. Operation& maintenance
- iv. Capacity Building/Training

Scope of work shall include supply, installation, testing, commissioning and Operation and Maintenance of all components necessary for implementation of the functional requirements described for Canal Monitoring system for Mayurakshi Project. This will include but will not be limited to Hardware, System Software and Utilities, Application Software, remote Monitoring Devices (e.g. Datalogger/RTU), Data Communication Devices, Field Instruments and Sensors, Device drivers, Power and Signal Cabling including necessary trenching and junction boxes, Power Supplies, and all structures and fittings necessary for installation of all subsystems and Instruments and Sensors in Field. The following are included in the scope of work:

- i. Survey and study of the main canal system network
- ii. Submission of design, drawings and technical specifications for all the components of Canal Monitoring system.
- iii. Supply, installation, testing and commissioning of hardware and software's necessary for the implementation of Canal monitoring system in Specified Canal Network.
- iv. Complete supply, installation, testing & commissioning of side looking ADVM, Ultrasonic level transmitters, Battery-operated Ultrasonic /RADAR Water Level transmitters, Gate sensor & Datalogger within Mayurakshi canal system including GPRS/GSM based telemetry system, associated civil works for installation of sensors and ancillaries like mounting poles, masts/cantilever, cables, lightening arrestors etc. complete.
- v. Technical design, supply, installation, testing, commissioning of field instrumentation system for mayurakshi Canal network and establish data communications using GSM/GPRS between the remote stations to Centralized Canal Monitoring Software. This includes, but is not limited to acquiring service, and maintaining all aspects of the service during the warranty period.
- vi. To obtain Real time remote monitoring of discharge measurement at specified locations in Canal systems based on water Level/ direct discharge from Head and cross Regulators at Control Room.
- vii. Supply, installation and commissioning of lifetime licensed Canal Monitoring Software to be provided by the bidders at Suri Irrigation Office Complex, Birbhum. The Server facility, 3 KVA UPS and 110" LED display also to be provided by the bidders. Also in an addition to that 55" LED display unit with Laptop or Desktop to be provided at two other monitoring rooms located at Bolepur & Rampurhat in Birbhum District, West Bengal.
- viii. Developing, troubleshooting and customization of Canal Monitoring Software which shall include Water demand and scheduling and GIS interfacing modules.
- ix. Data entry of the details of command area, integration of rating curves in Canal Monitoring software.
- x. An overall synchronized trial of all the installed hardware and software so as to check for proper interfacing, alarm generation and monitoring methodology.
- xi. Real time monitoring and reporting of various parameters of canal systems through web server using latest technology of GPRS and GSM.
- xii. Electrical grounding for all electronic and electrical equipment shall be done by following standard PWD, WB procedure and all equipment's (Sensor, Controllers etc.) shall be protected using lightening arrestors.

- xiii. Perform on-site assembly, start-up of the supplied goods.
- xiv. Complete commissioning integration, testing & organization of the whole system.
- xv. Provide operational services during Five (5) years warranty period of Mayurakshi Project Canal Monitoring System. The warranty must be comprehensive without any exclusion except from physical damage or force majeure will be permitted.
- xvi. Provide installation and maintenance reports as required by the Purchaser and any delay is not acceptable in time schedule provided by supplier.
- xvii. Supply detailed operation and maintenance manual for each component in the system and compile Knowledge and working supply type manuals for training purpose (including multimedia training kits).
- xviii. Supply on-site spares to repair any part of the remote stations upon determination of malfunction or failure. This includes, but is not limited to, sensors, batteries, GPRS/GSM modem and other accessories etc. required for seamless operation of the real time data acquisition system. Contractor shall supply all the critical spares at the commencement of operation & Maintenance Period. The list of mandatory & recommended Spares shall be approved by Engineer- in charge based on which contractor shall supply the same during acceptance of the system
- xix. Provide classroom and field training to the personnel of Irrigation & Waterways Department, on the Canal monitoring system. This includes operation and maintenance procedures. Training will also occur at selected field locations as selected by the Purchaser. This includes startup, operation, maintenance and/or repair of the supplied goods. Course topics will include sensor calibration, configuration, data downloading, data retrieval, collection, Trouble shooting, processing maintenance requirements and procedure for equipment configuration, installation, site testing and commissioning including training kit containing course material in soft and hard copies.
- xx. Onsite Calibration and validation of the installed system shall be performed on half yearly basis which shall be continuous process during the entire warranty period.
- xxi. A guarantee by the manufacturer that equipment being provided will have maintenance & Spare support for a minimum of ten years from the date of issuance of final acceptance certificate by engineer in charge including Warranty and Operation period.
- xxii. The Work shall be complete with all necessary auxiliaries such as primary elements (sensors, Position transmitters, limit switches etc.), cabling, conducting etc., as well as frames, cantilever (as required), cable trays including all spare parts and special tools required. All the Equipment shall be standard-type from well-known manufacturers.

### **3.1 General Features/ Specifications**

- i. It is imperative that all instrumentation, other equipment shall operate effectively with the Data collection platform (DCP) and the DCP's in turn shall operate effectively with Centralized Canal Monitoring system. In addition, the input/output protocols of individual items of equipment (Sensors, DCP's, ARG, solar power arrangements, etc.) shall interface accurately. For this purpose, the interfaces between the sensors and the DCP, DCP and transmission system and State Data center are ensured to be compatible and trouble free.



- ii. The specific electrical, electronic and mechanical design parameters mentioned in case of individual sensors are indicative of a typical design and variations therein can be considered provided a full technical justification shall be provided. The Purchaser is not bound to accept such justification.
- iii. It shall be the Suppliers responsibility to ensure that the installation is robust and shall continue to work in extreme weather conditions. Reliability of operation during normal and extreme weather conditions is imperative.
- iv. The sensors and all accessories and facilities shall be fully compatible with the data acquisition and transmission system. The sensors and DCP shall form a complete automated data acquisition storage and transmission system.
- v. The Bidder shall enclose technical literature with photograph in respect of all the sensors being quoted. The features which are mentioned in the literature but are not being quoted as a part of the current system shall be clearly brought out in the bid. In the event of failure of the Bidder to explicitly mention any such exclusion, it shall be taken as inclusion of all features mentioned in the bid as a part of the supply and the Bidder shall have to provide all such features/ accessories without claim of extra cost to the purchaser.
- vi. Although all accessories and fixtures required for installation of the equipment & their specifications have been specified in technical specifications however, bidder shall ensure the satisfactory performance & functioning of Canal monitoring system complete, for this if any accessory or items are required that shall be provided by bidder, the cost towards that is deemed to be included in the cost tendered by the bidder, no extra cost shall be paid to the bidder on this account.
- vii. Bidders shall give general layout of all the installations including all civil works for types of stations and materials including that for the equipment at the time of bidding. Afterwards, the successful Bidder shall furnish the details of all the mounting arrangements, including associated civil works. Indian Standard codes of practice shall be followed for all civil works and mounting arrangements.
- viii. Security of installed equipment including theft and vandalism will be the responsibility of the Bidder till successful installation, commissioning, two stages of site acceptance testing.
- ix. The Bidder has to specify how the calibration will be carried out and has to use his own calibration equipment during the period of warranty.
- x. Ensure that all software licenses and maintenance agreements are in the name of Purchaser and should seek full support and updates for such software for the duration of the **Warranty** Period. Also, all the software licenses should be valid for the design life of the system that is 10 years from date of commissioning.

### 3.2 Discharge measurement methods

In main canal network of Mayurakshi Project Canal System flow measurement shall be done using the following methodology

Sl. No.	Section (Mayurakshi Project Canal System)	Discharge Method	Locations
1	Head and Cross Regulators with discharge range of 2000 Cusec and above in canal system.	Side looking ADVN in downstream and upstream Level sensor with gate sensor combination for redundant flow measurement	Refer site data “Grouping of instruments”
2	Head and Cross Regulators with discharge range of 100 - 2000 Cusec in Canal system.	Upstream and downstream level sensors in combination with gate sensor.	Refer site data “Grouping of instruments”

### 3.3 Equipment arrangement at remote stations

**i. Acoustic Doppler Velocity Meter (ADVN)** – A side looking ADVN is proposed at downstream of Head and Cross regulators within Canal Systems to measure the significant direct discharge more than 2000 Cusec.

This instrument measures the average velocity over the entire canal area, by subdividing in separate segments along the length of the canal with all as built construction parameter like bed width, side slope, along with installation parameters, like height of instrument from bottom, programmed Doppler calculators calculates the average velocity of the complete cross section. The instrument also has the ability of storing the total discharge data.

The Side looking ADVN shall be installed in all specified locations with all fittings, steel structure type skid, accessories and cables and conduits to measure discharge downstream of Head/cross regulators

**ii. Gate Monitoring sensors** – A rotary type Absolute/incremental type shaft encoder shall be used for Real time monitoring of gates position at Cross & Head regulators of Mayurakshi Canal System in with discharges more than 100 Cusec with all fittings, accessories, cables and conduits to monitor the gate opening. The bidder shall do the necessary retrofitting of all manual gates to make them compatible for installation of gate sensor.

**iii. Water Level Sensors-** The Ultrasonic level sensors are used for level/discharge measurement at various locations across the head/cross regulators of Canal Systems in different combinations as follows:

**a. Discharge more than 2000 Cusec with ADVN installation-** A side looking ADVN is to be installed at locations with discharges more than 2000 Cusec in downstream of Head/Cross regulator to provide direct discharge measurement with better precision. Considering 2000 Cusec as a significant discharge in main Canal systems the redundant method of discharge measurement is suggested using Ultrasonic level sensors in combination with Gate sensors.

At such locations the Ultrasonic level sensor shall be installed at the upstream side to measure the upstream head and using the real time data from Level and gate position a discharge shall be evaluated in Datalogger/RTU system using discharge equation for free flow condition.

- b. **Discharge between 100 – 2000 Cusec** At such locations in the main Canal systems, upstream and downstream Ultrasonic level sensor and gate sensors at head/ cross regulators shall be installed (as per site data) to measure the discharge downstream of the regulator structure using suitable discharge equation based on pool characteristics. The discharge equation shall be integrated in Datalogger/RTU system for Local & Centralized monitoring of discharges.
- iv. **Datalogger/RTU** – The Remote monitoring stations shall be installed at Head/cross Regulators (as per site data) in main Canal Systems. The Datalogger/RTU of suitable input handling capacity shall be provided. The Datalogger/RTU is a Data collection platform to which sensors and equipment's are connected and it transmit the real-time data to Centralized Canal Monitoring Software for Real time monitoring and data logging. The transmission of data shall be through GPRS/GSM network. The Datalogger/RTU shall have a mathematical functions/algorithm feature to evaluate the real time discharge at field based on the instrument data. Datalogger/RTU's shall be mounted on the same mast of Solar panel/Separate mast in such a manner to avoid theft and vandalism.
- v. **Power Supply System** - At Remote monitoring stations (DCP) all gates are being operated manually. A Solar Power Backup of minimum 5 days shall be provided by Contractor for powering up the instrumentation system for 24X7 basis. A suitable mast / tower height shall be provided for installation of solar panel system in order to avoid theft and vandalism.
- Cabling for all the remote locations shall be through GI Flexible/ HDPE pipe conduits. All remote stations shall have proper grounding and lightning protection.
- vi. **Telemetry** - The data communications employed on mayurakshi Canal network will use GPRS& GSM communications. It will be the responsibility of the bidder to confirm mobile network coverage. The bidder will be ultimately responsible for establishing data communication at all sites. The bidder will provide all associated civil works related to the installation of the GSM&GPRS system, including cabling, wiring and other such infrastructure.
- vii. **Room at Remote Stations-** Datalogger/RTU Panel, batteries for solar power system shall be placed in control/operator rooms located near the cross/ head regulators this will secure the instruments against theft and vandalism. The operator rooms at site will be provided by I & WD, WB at main Canal systems.

### 3.4 Centralized Canal Monitoring Software

The software used for the monitoring of the mayurakshi canal supply is an integral component of the Real Time Data Acquisition system, as it collects the measured data and allows analysis of the data for the operation of the system through the software. The software used shall be a customized software, which may be based on an existing base-software but is tailored to the requirements of the canal systems. Minimal capabilities of the software shall be:

- **Decision support system:** allow analysis of data to give a recommendation for canal operation and water distribution in manual mode.
- **Prediction of water demand:** based on the available data and current and past trends to predict water demand in different areas of the canal system.
- **Scheduling of water supply:** Provide a schedule for water distribution.
- **Analysis of data for trends and output for reports:** as input for Decision support system and scheduling and for reports to all stakeholders as defined.
- **Alarm:** Alert operator in case of an emergency based on the available data

- **Determination of general water balance in the canal systems:** Account for all water in the canal systems.
- **DAS (Data Acquisition System): operation of system to**
  - Display of collected data on customized screen as decided by contractor in consultation with I &WD, WB.
  - Development and implementation of algorithms for validation of various discharge methodologies.
  - Record of all collected data.

### **3.5 Equipment Arrangement at Control & Monitoring Room at Suri Irrigation Office Complex in Birbhum District.**

Bidder will provide the following equipment's and accessories at Control & Monitoring Room in Birbhum district for functioning of Canal Monitoring system.

- a. Main Server and Server as Workstation (operator Station)
- b. Canal Monitoring software with life time licenced version.
- c. Necessary data switch, router with modem, Static IP, and fire wall for System
- d. 3KVA online UPS with 4 hours' backup time
- e. External memory for data storage of 8TB for 5 years.
- f. A3 size Color printer
- g. 110" LED display/video wall/(70",2X1) DLP based system
- h. Network Video Recorder

The bidder shall provide a PC as workstation which shall be operated by bidders' representative responsible for operation and supervision of the proposed Canal monitoring system.

The Bidder shall provide all other accessories if any required by bidder for proper functioning of the Canal Monitoring software, the cost of which shall be considered by the bidder in their bid price.

#### **GSM & GPRS DATA COLLECTION STATION**

- The GSM &GPRS data collection station shall be established at Suri Irrigation Office Complex in Birbhum District.
- The GSM & GPRS data collection station will be able to interrogate the DCPs based on a schedule of the State's choice and as implemented by the bidder.
- The GSM & GPRS Data Collection Station will also be able to receive data sent by the RTDAS stations whether the data is sent via SMS text or over GPRS internet connectivity.
- The bidder will provide all civil works related to the installation of the antenna, including cabling, wiring and other such infrastructure required to operate the GSM & GPRS Data Collection Station.

## INSTALLATION GUIDELINES FOR RTDAS

### (a) INSTALLATION GUIDELINES FOR RTDAS

#### (i) SITE PREPARATION AND INSTALLATION

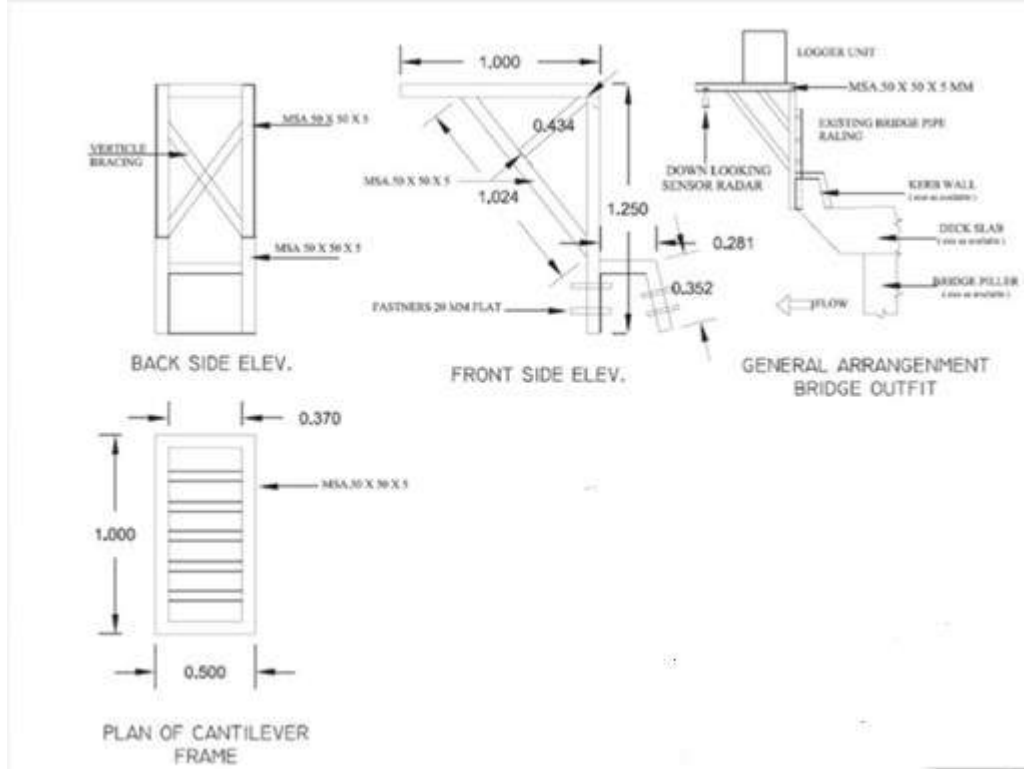
1. The purchaser will provide details of the installation sites before the scheduled installation date to allow the Bidder to perform site inspection and construction of suitable structures before the installation of the hardware.
2. The location of antenna, sensors and related civil work will be decided in consultation with respective Engineer-in-charge depending on the site and river flow conditions
3. The Bidder should complete the required works at the site for proper installation of the equipment before receipt of the equipment.
4. These are the basic guidelines for installation of RTDAS system however it may vary as per site conditions, in case of variation from installation guidelines stated below drawings shall be approved by engineer-in charge prior to the start of installation work

#### (ii) SPECIFICATIONS FOR INSTALLATION

#### (iii) SAFETY REQUIREMENTS

- The sensor and its accessories should be protected from theft. The bidder is encouraged for minor modifications in installation of sensor and its accessories so as to minimize the chances of theft. Mortise lock is proposed to avoid theft. Due care must be taken while modifying the installations. In no case the basic principle and working of sensor is allowed to disturb.
- Radar sensors should be mounted such that they have a direct vertical shot to the water surface with no obstruction of their beams. Beam spread must be determined based on manufacturer's specification and the maximum expected distance to be measured at low flows. Consideration should be made in designing the mounting structure to allow for easy access to the instrument for maintenance
- Framework support to attach Radar sensor to Bridge Tower:-
- Framework support made of fabrication of M.S. Angle 50mm x 50mm x 5mm with gusset plate 8mm thick (0.85m x 0.3m) including welding, riveting,

anticorrosive paint, colour etc. complete as per Fig



(iv) Specifications for Civil Works Common Enclosure for Site

Area of the AWLR station should be ideally 5m x 5m x 2m height. If a rare condition demands then even lesser area (4m x 4m) can be demarcated in consultation with officials.

The approach to the site should be made free of obstacles like bushes; trees etc. and a suitable cement path must be laid to approach the platform.

Following are the common specification for civil works for all the Telemetry sites.

(v) Fencing for site

- The height of the fencing for the site must be 2 meters from the ground level.
- The fencing must be made over a cement foundation which is 300mm above ground level.

- Fencing angle should be of size 40mm x 40mm x 6mm and pre coated with red-oxide.
- The total length of the fencing angle should be 2.8 meters i.e. (2.0m above ground level + 0.8 m below ground level)
- Two MS angles must be used diagonally at each of the four corner angles of the site. The angles can be attached (with welding or the other appropriate means) from the middle of the existing corner angle to the ground. The depth of the support will remain the same as of main angle.
- The dimensions of the fencing angle foundation should be 450mm x 450mm (length X width) and at a depth of 800mm. The foundation should be square shaped. Distance between each fencing angle should be 1.5 to 2meter.

(vi) Chain-link

- Dimensions of GI Chain-link:3 inches x 3 inches and of Gauge: 10 (3 mm diameter)
- GI chain-link mesh must be stretched and welded/fixed properly on the fencing angles.
- A pipe or angle must be fixed on the upper part of the fencing to have a neat finishing and at the same time to avoid loosening of the fencing over a period of time.
- The chain-link fencing should be fastened with the help of screws fitted on the fencing angles. Alternately it may be welded neatly at four equidistant positions of 0.5 m each.

**Gate**

- Dimensions: 1 m X 2 m (Width x Height) with locking facility
- The gate must be fabricated by MS Angle whose dimensions should be minimum 40mm x 40mm x 6mm.
- Suitable locking facility with 3 keys for safety purposes is mandatory. Standard locks should be used.
- Gate and MS Angle must be well painted with white / silver colour.
- Gate should have proper support of MS angles with additional support of crossed MS angles. Alternately gate should be fixed with the support of RCC pillars.

## (vii) Mast Foundation

- Foundation Dimensions: 750mm X 750mm (length x width) and 1.2m deep. The raised platform of the foundation must be 300mm. above the ground level.
- The height of the mast should be minimum 3 meters above raised platform.

**Mast and Supports**

These shall satisfy the following specifications:

**Mast:**

- Height: as per need (3-5 m)
- Can be manufactured locally, according to the Bidder's instructions, if good (corrosion resistant) quality is available
- Including guys and all accessories/ tools for mast mounting must be able to resist a wind speed of 110 km/hour
- Bidder can propose alternative mounting according to site conditions but meet the strength conditions for wind.

**Sensor Supports and Brackets:**

- Aluminum or stainless steel
- Sensor mounting supports and other accessories as required

**Proportions for concrete foundations**

- Concrete pillar foundations for the RTDAS mast /tripod /tower, fencing angle should be made in the volumetric mixing proportions as follows:
- Concrete foundation : 1 (Cement) : 2 (Sand) : 4 (Metal)
- Fine plastering : 1 (Cement) : 4 (Sand)
- Concrete Pillar must be cemented to achieve smooth finish above the ground level.
- After 8 hours, these foundations should be cured with water at least 3 times a day for four days.

## (viii) Local Earthing

- Material required: Salt: 20 Kg; Charcoal: 20 Kg; Sand 100 Kg
- The lightning arrestor rod is made of copper which is mounted on the top most part of the RTDAS mast /tripod /tower.



- It should be of thickness 12 mm and of one meter length with a connected copper wire of 6mm thickness (gauge). At the other end of copper wire is the Earthing rod of dimensions 15mm thickness and 1.8 meter length, which is buried into the ground.
- On the bottom of earthing rod, one copper plate of dimensions 300mm x 300mm should be connected. RTDAS data logger enclosure should also be grounded with local earthing.
- A pit of 4-5 feet depth, 2' X 2' wide at bottom (like a cone shaped pit) has to be dug.
- After leveling the bottom of the pit, uniform layer in the sequence of 6 inches of Salt + 6 inches Charcoal + 6 inches Sand is filled. Such sequence is repeated 3 times till the earth pit is filled to the top. The copper Earthing rod is placed in the center of the pit. The pit is closed and leveled.

### **Painting**

- The tower, fencing angles, chain-link fencing and gate should be properly painted every year to avoid rusting.
  - All concrete foundations shall be painted using white cement paint every year.

## 4. Technical Specifications

### 4.0 Technical Specifications of Real Time Canal Monitoring System of Mayurakshi Project.

#### 4.1 Ultrasonic Level Measuring Systems

The bidder shall design, supply and install best quality Level transmitters considering at the following points.

- i. Ultrasonic type level measuring system shall comprise of level transmitter, and any accessories required completing the level measurement loop.
- ii. Ultrasonic level transmitters shall be installed on Head and cross regulators for Upstream and downstream water level measurement in Mayurakshi Canal Systems in gauge wells (wherever existing & feasible) with level marking/staff gauges or using cantilever type mechanism. These points are to be selected so that most accurate measurement level is obtained.
- iii. The point of installations is to be selected so that most accurate measurement level is obtained. All accessories along-with cage to avoid theft and Monkey Menace and also proper mounting arrangement (cantilever etc.) of these instruments shall be supplied by the bidder.
- iv. The level sensors shall be suitable for flange or thread mounting as required. The installation shall avoid any degradation of instrument performance due to spurious reflections, absorption and condensation. Facilities shall be provided for rejection of spurious reflection.
- v. The level instrument shall have the facility for dampening/ averaging the effect of waves, undulations on the water surface and discriminate the rate of change of levels to provide steady readings.
- vi. All necessary instruments, interconnecting wiring, HDPE/GI conduit work, housing, cabling, panel, etc., shall be provided according to the type of equipment proposed to supply. Adequate safety measures shall be included in the design of these sensors to negate the effects of disturbances due to turbulence of water levels, strong air currents & electromagnetic waves etc.

These are the minimum technical specification required are as follows:

#### Specifications of Ultrasonic Level Transmitters

Feature	Value
<b>Site Conditions</b>	
Ambient Temperature	From 0°C to + 55°C
Humidity	5 to 95 % (non-condensing)
<b>Sensor</b>	

Sensor Type	Ultrasonic non-contact sensor
Range	0- 6 meters
Resolution	5 mm or better
Accuracy	0.3 % of FSO
Output Interface	SDI-12 / RS 485 / 4-20 mA/compatible to Datalogger/RTU
Power Supply	to be powered from solar power supply provided by bidder
Protection	IP67 or better
Enclosure	Die cast aluminum or any corrosion resistant metallic enclosure
Isolation	Circuits shall be galvanically isolated from each other.
Manufacturer Calibration Certificate	Required
Beam angle	Less than 12 degrees.
<b>General Features</b>	
Sensor Material	Corrosion Resistance (Stainless steel / die cast Aluminum / PVDF/ PV stabilized ABS with metal casing)
Enclosure	The Sensor shall be easy to dismount and replace in the event of malfunction.
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Accessories	Sensor Mounting support with proper HDPE/ GI conduiting, cables and other accessories as required
Mounting Arrangement	To be installed in Gauge wells with level marking/Staff gauges or cantilever type assemble as per site requirement.

## 4.2 Gate Position Measuring System

Suitable sensors shall be provided for exact measurement & indication of position of Barrage Gates & Head regulator gates of LBMC & RBMC of main canal system. These sensors shall be equipped with suitable shaft couplings and electronic circuits to transmit the signals to the Mayurakshi canal monitoring system via local datalogger/RTU for indication in Barrage Control Room & for further processing. All sensors & display units are to be mounted in the outdoor locations. Hence, suitable protection class of the enclosures shall be ensured for sensor and field mounted display. Minimum IP65 protection class shall be provided. Suitable safe & reliable arrangements of coupling with the motors of gates shall be provided. It shall be ensured that there is no slippage between the motor shaft & the transducers.

In case of head regulator gates are being manually operated so necessary retrofitting required for mounting of gate sensors shall be executed by bidder. The gate sensor shall be connected to the nearest datalogger/RTU located at barrage top through hard wire.

Feature	Value
<b>Site Conditions</b>	
Ambient Temperature	0 to 55 Degree Celsius
Humidity	5 to 95% (non-condensing)
<b>Sensor</b>	
Sensor Type	Shaft Encoder based rotary position sensor
Range	0-20 meters
Resolution	3 mm or better for gate position
Accuracy	5 mm or better
Output Interface	SDI-12 / RS 485 / 4-20 mA or as compatible to datalogger/RTU
Power Supply	2 wire type, to be powered by RTU/datalogger
<b>General Features</b>	
Material	Corrosion Resistance Metal (Stainless steel or Aluminium)
Enclosure	Lockable (key) box provided by the supplier to be mounted on sensor, with IP65 or better protection
Tools	Complete tool kit for operation and routine maintenance
Manuals	Full Documentation and maintenance manual in English
Mounting	Wiring from sensor to RTU/datalogger must be through HDPE/ GI Pipe Conduiting and flexible metallic conduiting wherever applicable
Display	Read out LCD / LED field mounted Display
Process connections	through suitable coupling
Manufacturer's Calibration Certificate	Required

### 4.3 Side Looking Acoustic Doppler Velocity Meter

A side looking ADVDM is used to measure the discharge based of Doppler principle & shall be installed at sides of the canal, near the bottom end at the downstream. The height from the bottom of installation shall be such as not to affect the reflected wave from the canal bed. Shut-off shall not be needed for maintenance for that an aluminum/SS mounting frame for retraction of the sensor shall be provided.

The instrument measures the average velocity over the canal area, by subdividing in separate segments along the length of the canal with all as built construction parameter like bed width, side slope, along with installation parameters, like height of instrument from bottom, programmed

Doppler calculators calculates the average velocity of the complete cross section. The instrument shall have the ability of storing the total discharge data. A built-in temperature sensor shall be provided to take care of any changes in water properties due to temperature variations.

The associated Civil works to install the side looking ADVN in Canal system shall be in scope of bidder.

#### **Side Looking ADVN (Acoustic Doppler Velocity Meter) Specifications:**

<b>Feature</b>	<b>Value</b>
<b>Site Conditions</b>	
Ambient Temperature	0 to 55 Degree C
Humidity	5-100 % (Non-Condensing)
mode of operation	Real time velocity and discharge measurement from a side wall of Canal (Side looking)
<b>Side Looking ADVN Sensor</b>	
Sensor Type	Side looking ADVN sensor for measurement of discharge in Canals /open channel environment
Acoustic Frequency	1500 KHz to 3000 KHz
Velocity measurement	2D water velocity
Bed Width of Canal	0 - 40 m
Range	+/- 0.00 to 6.00 m/s
Accuracy	+/- 2 % of measured velocity or better
Resolution	2 mm/s
Overall Discharge measurement accuracy	Better than 3 %
<b>Acoustic/pressure water level measurement</b>	
Range	0.1 to 10m
Accuracy	+/- 0.3%
<b>Temperature</b>	
Resolution	+/- 0.1 <sup>0</sup> C
Accuracy	+/- 0.5 <sup>0</sup> C
Internal Memory capacity	2 MB or Better

Serial Data Communication	RS 485/ RS 232/SDI 12 or as compatible to Datalogger/RTU
<b>Power</b>	
Input	From solar power system provided by bidder/Datalogger/RTU
<b>Discharge calculation</b>	
Method	In-built Index-velocity rating
Discharge	Must be calculated internally in the system with user setting of rating coefficient and channel geometry.
Data Output	Real-time Discharge rate, total volume, Level, Pressure, and Temp.
<b>Physical Parameters</b>	
Protection	IP68 or equivalent
Cable Length	As per site requirement
Software Technical Specification	Windows based
Accessories	AStainless steel (SS grade) mounting frame assembly for installation of side looking ADVN, and the Sensor shall be easy to dismount and replace in the event of maintenance /malfunction.

#### 4.4 Datalogger/RTU with minimum 8/16 channel input

The Datalogger/RTU shall automatically collect the observations from interconnected sensors, process and store them into its memory and transmit through GSM &GPRS communication link to Central Canal Monitoring system installed at SDC as per the pre-programmed measurement interval. The Datalogger/RTU shall also continuously monitor the status of sensors, power supply and communication. In the event of failure of any instrument or disruption of any of the power sources, an alarm shall be sent back to the State Data Center.

The number of input channels in the Datalogger/RTU must be compatible to the sensors being supplied. Datalogger/RTU shall provide necessary electrical power to the sensors and conversion of electrical output signals from the sensors into engineering value based on calibration information stored in the memory. Full compatibility with all types of sensors provided in the package is mandatory. The power supply to Datalogger/RTU shall be made available from Solar Power system.

Feature	Value
<b>Site Conditions</b>	
Ambient Temperature	From 0 to +55 Degree C

Humidity	5 to 95 % (non-Condensing)
<b>Sensor Interface</b>	
Input type	2/8/16channels(as per the schedule of requirements)compatible with outputs of sensors
<b>Input - Output Interfaces</b>	
Data Transfer	USB stick option for Data transfer
Port for Configuration	One Serial Port (RS232) for communication with Laptop for programming
Port for Telemetry	1 Ports for Communication with Telemetry (GPRS&GSM) device
<b>Computer Software</b>	
Operating System	Windows or compatible software for system configuration & communication
Version	English language version
Licenses	All required licenses shall be included
<b>Analog to Digital Converter</b>	
Resolution	16 bit or better
Conversion Accuracy	$\pm 1$ LSB
Sample intervals	1 Sec to 24 hours (user scalable)
<b>General Features</b>	
Data Storage memory	Minimum 1GB memory that can store one year of data and shall be expandable
Mathematical Function	For integration of discharge equations & discharge coefficient
Firmware Operating System	Multi-tasking operating system - must log data and transmit at same time
Display	Digital Display/HMI for viewing current data and setting values
Power Supply	Shall be powered by solar Power supply to be provided by bidder
Battery Voltage	Monitoring of battery voltage level
Internal battery	Internal battery backup for clock, lithium battery, storage 2 years
Charge Controller	Internal or External
User Permissions	Different user levels, system of user rights / passwords, access restricted to authorized personnel
Internal clock	Internal clock with drift less than 10 seconds per year or using GPS
Keypad	For displaying or transferring data to memory stick, configuration of data logger and sensors
Real time clock	GPS synchronized, Time should be in IST format

Enclosure	for wall-mounting in a shelter / enclosure with IP65 protection or better
Accessories	Serial cable + adaptor (if required). All accessories (fixing units, etc.) as required
Tools	complete tool kit for installation and routine maintenance giving full detail (number of pieces and type)
Manuals	Full documentation and maintenance instructions in English (1 copy per station).
<b>GPRS MODEM</b>	
<b>Ambient Site Conditions</b>	
Operating Temperature	From 0 to +55
Performance	Data Reception availability of 95% or better
Form factor	The GSM /GPRS modem should either be integral part of data logger/RTU specified above, or it should be supplied as independent unit compatible with supplied data logger/RTU
<b>Specific Features</b>	
Communication Direction	Utilize network for two-way TCP/IP (INTERNET) connection and SMS
Transmission trigger	Data collection to be triggered by interrogation from Data Center, or by event-based transmission triggered by remote site
Power Saving	Ability to disable interrogation system in order to save power at remote site
Communication Protocol	Data transmission to execute HTTP Post, FTP, SMS to transmit and receiving data to the Data Center
Accessories	All associated equipment, including Antenna all cables and mounting hardware
<b>Antenna features</b>	
Frequency range	900 MHz: 824-960 MHz/1800MHz:1710-1880 MHz, 4G and better
Radiation	Omni-directional
Connector	SMA or suitable RF connector adaptable to GSM/GPRS modem
Cable length	As required at site

#### 4.5 Solar Power System

The solar power system has to be provided as a power system for instrumentation system located at inflow & outflow gauging site. It shall have following minimum features:

- i. Supply, Erection and commissioning of Solar power system with all allied ancillaries for providing un-interrupted power supply at inflow & outflow gauging site as per the schedule



of requirement and shall provide power backup for minimum 48 hours without sunshine/charge. The Solar Panels shall be provided in anodized aluminum frame with tubular batteries with conformance to IEC- 61730, 61215 and 61701.

- ii. The Solar power system shall be mounted on the roof of site buildings wherever existing else the mast-based installation shall be adopted. The Contractor shall also supply a pole – mounted arrangement including a standard pole and necessary foundation and fixing arrangements. The location of solar power system installation shall be indicated by the concerned engineer – in –charge.
- iii. The batteries required for the equipment above shall be maintenance free, rechargeable sealed batteries with Overcharge and deep discharge protection Leak-proof Easy handling, Excellent recharge ability.
- iv. The battery pack shall also include arrangements of charging through a standard AC power supply available nearby and also from solar panels established as above.
- v. The solar power system unit shall have audio or visual alarms for overcharging and deep discharging conditions. The sealed construction shall allow trouble-free, safe operation in any position. The battery case shall be high impact, with sufficient resistance to shock, vibration, chemicals and heat.
- vi. The necessary housing and configuration of the batteries shall be furnished in detail by the Contractor.
- vii. The battery case shall be high impact, with sufficient resistance to shock, vibration, chemicals and heat.
- viii. The disposal of batteries during 5 years’ comprehensive warranty period is in the scope of bidder.

**The solar panel offered shall confirm the following technical specifications:**

Feature	Requirement
<b>Battery</b>	
Voltage	As required for instrumentation system
Type	Sealed maintenance free
Capacity	power supply system shall provide 48 hour of backup to all equipment ‘s being powered up by the solar panel
<b>Solar Panel</b>	
Size	power supply system shall provide 48 hours of backup to all equipment ‘s being powered up by the solar panel
Mounts	The mounts shall be detachable but shall not move or rotate with wind. It shall have a provision to adjust direction and elevation during installation for optimal solar power generation
Charger	Smart solar charger shall be provided by the bidder
<b>General</b>	

Feature	Requirement
	The supplier shall determine optimal size of solar panels and batteries such that the system will be operational for at least 48 hours in absence of charging/ without sunshine. The supplier shall also provide the calculation of power consumption of Solar power system.

### 1.1 GSM/ GPRS Communication Format

Table below gives the indicative GSM / GPRS data parameters and their identification code format which is required to transmit the data from datalogger to FTP server at Centralized Canal Monitoring software and e-SWIS / WIMS server. The format is indicative & bidder may propose their own format for data transmission from field instruments to Centralized Canal Monitoring software.

#### FORMAT:

**&Station ID, Date and Time, Mobile Number, Battery, Water Level, Flow rate, Gate opening**

#### **Example Data Spring:**

& 738D1E76, 07/01/18 10:00, 9849556430, 13.5, 26.347

S. No.	Channel no.	Parameter
1	Station ID	Start of String should be '&' and Eight Characters Station ID provider by bidder
2	Date and Time	Measurement date and Time in DD/MM/YY HH:MM
3	Mobile Number	Mobile no of remote station SIM
4	Battery	Battery voltage at end of every full hour in Volts with 1 right digit
5	Water Level	Water level at end of every full hour in Mts. with 3 right digit
6	Flow Rate	Flow rate at end of every full hour in cusec with 3 right digit
7	Gate opening	Gate opening at end of every full hour in mm with 3 right digit

#### Note:

- If any sensor is not connected, then it should transmit '--' characters in place of the sensor value.
- Attached format is indicative, recommended for standardised data acquisition for development of unified Water Information System.
- Transmission for per hour is not applicable for battery operated level sensors.

### GSM & GPRS Data File Naming Format

NHP projects the GPRS data shall be transmitter to the FTP server at respective State Data Centre (SDC). For standard the file name format shall be as follows:

**SSWD\_Yymmdd\_HHMMSS\_StationID.csv**

SS	State initial (mostly as per RTO norms)
WD	Water Resource Department (WR) / Surface water (SW) or ground water (GW)
YY	Year of latest record it contains
MM	Month of latest record it contains
DD	Date of latest record it contains
HH	Hour of latest record it contains
Mm	Minute of latest record it contains
SS	Second of latest record it contains
StationID	INSAT & GSM/GPRS telemetry -- Station ID allocated by IMD In GSM / GPRS telemetry – IA to allocate unique 8 Character Station ID
_	separator
.csv	file format extension

For Example.

NHP-Karnataka-RTDAS: KA2SW\_200511\_120000\_7D8FD640.csv

#### 4.6 Equipment's at Canal Control Room

Equipment at Barrage Control Room shall be provided by bidder which will mainly comprise of following major item:

- a) Main Server and Server as Workstation (operator Station)
- b) Canal Monitoring software with life time licenced version.
- c) Necessary data switch, router with modem, Static IP, and fire wall for System
- d) 3KVA online UPS with 4 hours' backup time
- e) External memory for data storage of 8TB for 5 years.
- f) A3 size Color printer
- g) 110" LED display/video wall/(70",2X1) DLP based system
- h) Network Video Recorder

#### 4.7 Computer Servers

Server shall be industrial grade PC with USB, RS232/RS485, Ethernet Ports, OS Windows 8 or higher compatible to Canal Monitoring software System. Canal Control Room (CCR) shall have Master server with Canal MonitoringSoftware. 110" LED display/ (70", 2X1) DLP based System/video wall Unit to be connected to server with separate USB Port/ Ethernet Port.

There will be two servers with monitors required (one as work station) placed at the Barrage Control Room. These Computer servers are expected to operate the Canal Monitoring software as well as all software required for the project. The computer servers will be managed and operated by the

successful bidder and his skilled trained experienced operators/engineers till the end of 5 years' warranty period. The minimum specifications for the servers are given in Table below:

1.	Form Factor	Rack Mounted or equivalent Server mounting
2.	Processor	Intel XEON E5-2440 or higher compatible configuration
3.	DIMM Memory	Speed: 1600MT/s RDIMMS or higher compatible configuration 8GB RDIMM, 1600MT/s, Low Volt, Dual Rank or higher compatible configuration
4.	Hard Drive	RAID 5 Software or Hardware Controller compatible 5-1TB 7.2K RPM Near-Line SAS 6Gbps 2.5in Hot-plug Hard Drive or higher compatible configuration
5.	Network Adapter	2 GB or higher compatible
6.	Power Supply	Dual, Hot-plug, Redundant Power Supply/Solar Power and battery backup as compatible configuration
7.	Electrical Supply	220V AC and supply from AC distribution, DC of DG Set
8.	Connecting Devices	Soft touch Keyboard, Optical Mouse, Monitor (23" TFT) 110" LED screen (combination of more than one permitted) monitors/Video Wall/ (70", 2X1) DLP based in Barrage control room
9.	Software	Canal Monitoring compatible as per specification and OS Windows 8 or higher compatible.
10	Additional Memory Rack	Additional memory Rack of minimum 8TB that shall be suitable for data logging for a period of at least 5 years.
11	Accessories	Power Cord Rack Rail with cable management system Power Points as needed

#### **Computer Rack and related parts**

The bidder is required to procure full height computer racks or equivalent that will hold the computer servers and UPS system.

### **4.8 Centralized Canal Monitoring Software**

The Canal Monitoring software shall be provided as a combination of following major software modules

1. **Data Acquisition Module**—This will provide a network schematic for visual representation of the irrigation canal network & its real time data that can be used for by the operators & administration to remotely monitor the data & discharges in canal network.
2. **Water Scheduling and Demand Prediction/Decision Support Module** – This module based on the available data and current and past trends shall predict water demand in different areas of the canal system & based on the real time data from field instruments and ARG data it shall evaluate a schedule for water distribution. It shall also compute volumes provided to each part of the command area, and estimate shortfall/ over-supply.

#### **4.14.1 Data Acquisition Module**

##### **i) General**

The Centralized Canal Monitoring software shall be installed in Server existing at SDC with internet connection with static IP and firewall system in combination with router. The Customized software will accept information sent by all the remote DCP (RTU/Dataloggers) of canal system, store the information in a data base, display the information in appropriate mimic displays, analyses past data and trends, will have the authentication feature by way of user name and password for operating the software for various levels. Updating of parameters of the DCP (RTU/ Dataloggers) along with instrumentation shall be done interactively from this software. The development of the software has to be customized for the end-user, WRD.

The information available at remote stations shall also be available on any other PC/Laptop and on mobiles located at any place through the web. The Data provided Centralized software shall be displayed in complete explicit way and can be extracted in different formats.

The DCP (RTU/ Dataloggers) based monitoring stations and computing systems shall be able to calculate the actual discharge for each monitored location, based on water levels alone using ADCP rating curves, on water levels and gate openings for gated structures, using the appropriate hydraulic flow equations for the structures based on the pool characteristics.

The remote Monitoring systems shall be interconnected with the Centralized Canal Monitoring system via GPRS/GSM telemetry, and software shall analyze and display the required discharge as per predicted water demand and scheduling based on which regulator gates shall be operated manually by the operators.

A software shall define the required total gate opening at a structure based on the required discharge for that structure.

The software shall compare the required value with the total actual opening found by adding up the individual gate openings; if the deviation of one or more gates from the required value is large enough, an alarm shall be sent to the respective gate operator.

In a software the 'open'- instruction/alarm shall be sent to that gate operator with gate no. specified, who at the time of the comparison controls the smallest opening manually. Similarly, a 'close' instruction/alarm shall be given to the gate operator for the largest opening.

The software must continuously provide notifications/alarm for head and cross regulators operator to adjust gate position and flows to maintain water levels in each pool within the stipulated band while also ensuring that the flow rates released match the demand spatially and temporally based on availability of water in canal network. There must be minimum operational spills in the canal system. Electronic attenuation is to be included to provide against unsteady level signals.

## **ii) Functions/ Features of Data Acquisition Software Module**

The remote DCP (RTU/Data logger) shall be able to communicate to Centralized software over GPRS wireless technology etc. It shall be possible to view and troubleshoot the DCP stations without requiring any additional software apart from the stated software. Data logs shall be stored in the DAS system and be downloadable in CSV format using a web browser.

- Normally, Dynamic Gate Operation Scheduling Program/Roster preparation will decide position of each Gate depending on the Water Discharge requirement.

- Development of Dynamic Scheduling Program and integration with DAS system is included in the scope of work.
- Operator shall be able to Monitor the movement of individual gates & real time data from instruments via. software.
- The customized, with life-time license version Canal monitoring software shall be designed, developed, Supplied, installed and commissioned by Contractor based on the inputs provided by Engineer-in- Charge which shall have following minimum features:
  - i. It shall accept information send by all the remote locations /sites via. GPRS/GSM telemetry.
  - ii. Collection and validation of data regarding the irrigation water requirements and interfacing with GIS data.
  - iii. It stores and maintains a data in database for analysis purpose.
  - iv. Processing the data received from divisional offices to prepare water delivery schedules for Canal System.
  - v. Validation of the delivery schedules on the basis of water requirements and considering operational policies and simulation.
  - vi. Perform off-line canal simulation studies to determine the sequence of operation of gates for all possible changes in discharge for each head and cross regulator gate for initial filling of the canal and during normal and abnormal operating conditions.
  - vii. Maintain complete log of the events and alarms.
  - viii. Historical data storage of all the canal system operational data in server database/additional memory Racks.
  - ix. Provide an overview of the operational state of the Canal System using GIS mapping
  - x. Display the information in appropriate mimic displays analyze past data and trends
  - xi. The system shall be able to display connection status and network strength information of each monitoring station within Canal System.
  - xii. The software shall have the authentication feature by way of username and password for operating the software
  - xiii. Updating of parameters of the DCP along with instrument shall be done Interactively from this software.
  - xiv. Development of software to be customized with end userat Site.
  - xv. The software shall be of at least 50000 tags and screens shall be provided as per user requirement.
  - xvi. Automatic alarm and report generation facility
  - xvii. Auto e mail, SMS facility with web server facility
  - xviii. The software shall be supplied as a complete package. No additional software shall be required to configure or run all the features of the canal monitoring system.
  - xix. The Canal Monitoring software shall be audited by NIC and hosted on NIC webserver to minimize the cyber security issues.
  - xx. The DAS System software shall have the facility to track the non-functional instruments on daily basis and display on the web.

- xxi. The software shall have a capability to integrate the data from other various instruments/DCP of various Canal Monitoring stations being implemented in West Bengal to establish the common Canal Monitoring platform for various Canal systems. The bidder shall facilitate the necessary interfacing of such monitoring stations with the proposed Centralized Canal monitoring software.

### **iii) Features of Graphical User Interface from Main Menu:**

- i. Parameterization of monitoring stations
- ii. Real time data monitor on GUI and LED display.
- iii. File creation and Storage control.
- iv. External Data transmission control.
- v. Power status monitor and logging.
- vi. Instrument status monitor and logging.
- vii. Data import and exporting features
- viii. Integration of rating curves
- ix. Manual data entry and input programs
- x. Printing graphical and tabular data

### **iv) Trend Analysis**

The Software shall be provided for a real-time and a historical trend or plot capability. The plot function shall provide for pre-scaled display of selected process variables. The operator shall be able to select either subsets or supersets of the data presented. The plot function shall automatically scale the requested data to fit the time frame requested by the operator. The plot function shall display these data as a multiline chart with each variable easily determined by color, pattern or combination. For real-time data displays, the plot function shall scroll data as necessary to include newly acquired data on the display.

The DAS software will support trend data and displays as follows:

- Trend displays shall comprise line graphs with time on a linear, continuous horizontal or vertical axis and the trended variable on the vertical or horizontal axis.
- Trend graphs shall be capable of displaying required plots with adjustable time base with user specified time ranges.
- The capability to pan backward and forward within a selected time range to read the exact value of any displayed variable, by selecting a point on the graph or chart.
- The capability for each pan shall display individual ranges and units.
- Display of historical information as far back in time as desired shall be available on the history log.
- "Zoom" and "pan" facilities for both the trended variable range and the time axis range. The "zoom" facility shall allow an operator to compress or expand the axis range whilst the "pan" facility shall allow an operator to shift the origin of the axis. The software shall allow a user to define any zoom area by dragging a mouse across the trend.
- It shall be possible to define the section of the trend to be exported by clicking and dragging the mouse across the trend. Data shall be exported to CSV or TXT formatted files.
- Printing the trends or plots generated above by A3 Color printer.

**iv) Alarms/events management:**

- The DAS software shall support alarm and data logging, using description text and time stamp.
- The DAS software shall not limit the number of alarm occurrences logged to a database.
- The DAS software shall provide the ability for viewing alarms that are logged while the system is on line or off line without causing any interruption to data acquisition or alarm processing.
- The DAS software shall provide the capability for operator event logging with the logging of operator actions. The DAS software shall be capable of logging the following information: User Name, Action, Time, Date, Value, and Comment in free format.
- The DAS Software shall notify the contractors operator with graphical screen indication of the presence of an unacknowledged or new alarm. These indications will be organized in an alarm screen that can be made always visible, if customized so. The DAS shall have facility to provide for audible alarm notification. The DAS shall present alarms in an alarm screen in such a way as to allow easy identification of a new alarm, an unacknowledged alarm and acknowledged alarms. The DAS shall provide the operator with the ability to review all alarms.
- The DAS software shall be integrated such that an alarm acknowledged on one operator workstation will automatically appear as acknowledged on the other systems.
- The DAS software shall provide alarms viewing and processing as follows:
  - i. A standard alarm page with the facility for scrolling alarms up and down the page and for acknowledgment of individual alarms.
  - ii. Multiple levels of alarm priority or category.
  - iii. Color coding of various alarm priorities or category.
  - iv. Capability of audio interaction configurable for each alarm by category.
- DAS Software shall provide the following information for each alarm as it appears on an alarm display page:
  - i. Alarm Tag Name
  - ii. Alarm Description
  - iii. Value of the Variable
  - iv. Trip/set point
  - v. Alarm Status - Disabled, Acknowledged, Unacknowledged
  - vi. Alarm Category (if applicable)
  - vii. Alarm Priority (if applicable)
  - viii. Time & Date in International Formats
  - ix. Privilege (if applicable)
  - x. Operator Comments (if applicable)
- The capability to display each alarm category or alarm priority in a different color (including flashing colors) dependent on whether the alarm is Active Unacknowledged, Active Acknowledged, Acknowledged Cleared, Unacknowledged Cleared or Disabled.
- The capability to disable alarms on an individual basis, by page or by alarm category or all alarms.



- The capability to automatically display any graphic display when an alarm occurs or to dynamically change the appearance of any graphical object based on whether an alarm is On, Off, Acknowledged, Communications Error, and Disabled etc.
- The DAS software shall monitor analog and digital variables and calculated conditions, and determine if a variable is in an alarm condition.
- For each Analog variable, the DAS database software shall provide the ability to process an alarm for each of the following conditions: -
  - i. Variable LOW-LOW,
  - ii. Variable LOW,
  - iii. Variable HI,
  - iv. Variable HI-HI
  - v. Rate of Change
  - vi. Bad input from I/O
  - vii. Alarm disables
  - viii. Dead band
  - ix. Real time synchronization error >1 min
- For each Digital variable, an alarm for each of the following conditions shall be assignable:
  - i. Variable ON,
  - ii. Variable OFF
- The Customization of Canal monitoring system shall be done by the bidder as per engineer – in - charge inputs at site, which is a continuous activity till the end of comprehensive warrant & operation & Maintenance period.
- The alarms shall be categorized as Critical, High, Medium & Low category based on which alarm priority shall be set in DAS system.
- The following minimum alarms/events shall be configured in DAS system by the bidder apart from any other alarms to be configured during customization of DAS software.

Sl. no.	Alarm/Event	Alarm /Event Description
1.	Power Supply Faults	Solar power ON, battery Low etc.
1	Instruments	Hi, Hi- Hi, Lo, Lo-Lo, Rate of change, communication error, Transmitter Failure, Gate Open/Close/Stop/ Intermediate.
2	DCP System	communication loss/ signal loss, Delay of more than a specified time in transmission of data/events, software error, instrument error
3	Common Events	battery discharging, Pond Level decreasing, in accuracy in timing due to communication latency, operator log alarm, discharge mismatch (more than preset limits)

#### 4.8.1 Water demand and Scheduling Management/ Decision Support Software

The Decision Support System software shall be based on water demand, compared with water supply/availability, and facilitate operational decisions on where to supply water. Under normal conditions, equity of supply will be looked for. The DSS system will not however make operational decisions, but allow the WRD to make decisions based on improved and real time data.

The DSS software must provide the following capabilities.

- i. Based on data analysis of water demand during kharif and Rabi season, real time rainfall measurement in the command area, and availability of water in respective source/ barrage, flow demands will be estimated along the Main Canal system and their off taking distributaries.
- ii. The DSS software will be integrated with/ connected to the DAS software, which will provide information of flows through the canal system.
- iii. Data shall be displayed in tables and charts/ figures for better understanding. These shall show actual supply against demand, so that areas not receiving enough, or too much water, are known.
- iv. While, real time data will be used to adjust operations, “average” data (from assessment/ analysis of previous years) shall be used so that it is apparent how the year in question compares to the “average”.
- v. The output from the DSS software will facilitate operational decisions and preparation of water distribution schedules for feed back to the DAS software for manual gate operations.
- vi. The software module shall have ability to check that the operational decisions/ operational schedules do not violate constraints such as: max/ min flows and water levels for structures (canals), maximum rate of change of flows/ water levels, etc.
- vii. It shall be possible to import & export DAS data to Hydrological Information System (HIS) to be developed under National Hydrology Project in Future.

#### 4.8.2 Web Server

Canal Monitoring software shall have a web server facility. This will be used to allow display/data input in remote sites on any PC/mobile phone using user authentication system.

It shall have following minimum features.

- i. Web server shall be able to display real time process data from Canal Monitoring software, historical data from Process database server, or any third-party relational database servers into graphs, dashboards, table format.
- ii. shall be able to configure and integrate multiple data sources on a single window.
- iii. shall be able to personalize the information on the web server window depending upon various needs of the various users, with user-based information access configuration.
- iv. shall be able to view multi location information on single web server window either in graphical format or trend format.

### 4.8.3 System Security

- i. The Canal Monitoring system shall provide for security to allow access to any individual part of the system only to users with appropriate security levels. Application privileges shall be assigned to users or groups.
- ii. The Canal Monitoring system software shall support an unlimited number of users. For each user, it shall be possible to define a password and the privilege level(s) and areas that are available to that user.
- iii. The Canal Monitoring system software shall provide the capability to define a minimum of 4 privilege levels. The software shall check to ensure that the user logged on has the correct privilege level for all actions he wants to perform. If the user does not have the correct privilege for an action, the software shall display a message informing the operator of insufficient privilege.
- iv. The Canal Monitoring system shall provide the capability to prevent access to the operating system by unauthorized personnel.

The selected Contractor shall upgrade all such developed software during the O&M period on need basis and provide the latest versions of all such software including Source Codes, while handing over the facilities to Authority.

### 4.9 Discharge Measurement

Discharge profiling of cross & head regulators gates shall be carried out by the bidder to obtain data regarding width (m), Area (m<sup>2</sup>), Mean Speed (Mtr/s), Total Discharge (Cusec), Max Measured Depth (Mtr), Max Measured Speed (Mtr/s). For this purpose, ADCP will be provided by the department to the successful bidder. Profiling should be done minimum twice in a year & accordingly rating curves developed shall be integrated in Canal monitoring software by the bidder.

### 4.10 LAPTOP

Laptops (i7 8th Gen) with all allied software and hardware accessories, for programming & configuration & monitoring of Canal Monitoringsystem shall be provided by bidder with licensed version client Canal Monitoring software as per following specifications:

**Laptop** should be of standard brand and should have the following minimum specification:

- Intel Core i7 Processor (2.8GHz, 6MB L2 cache, 1066 MHz FSB)
- 15.6-inch LED Screen: Touch-enabled (optional)
- 8GB DDR4 RAM upgradeable to 8GB or More
- HDD 1 TB 7200rpm
- Integrated Stereo Speaker, Key Board with Touch Pad.
- Genuine Windows 10 Operating System and MS Office 2016 or higher Lifetime Licensed Software Preloaded and with Good Antivirus is preferred.
- Good quality Carry Bag will be part of delivery.
- 2 or more USB Ports, Bluetooth Connectivity with 200mts range
- USB to RS-232 converter for communication 1200 to 115,200 baud

#### 4.11 Color A3 size Printer

- i. Functions: Print, Copy, Scan
- ii. Printing Up to 20 page/minute
- iii. Black Print Speed (ppm) -12
- iv. Color Print Speed (ppm)-8
- v. Up to 8000 pages printing
- vi. Recommended monthly page volume: 250 to 2000
- vii. Processor speed: 600MHz
- viii. Connectivity: e print capability

##### x) Paper Handling: -

- ix. Paper handling input, standard: 100 sheet input trays
- x. Paper handling output, standard: 100-sheet face-down bin
- xi. Maximum output capacity (sheets): Up to 100 sheets
- xii. Duplex printing: Manual (Driver support provided)

#### 4.12 Uninterruptible Power Supply Systems (3 KVA UPS System)

##### i. General Design

- The UPS System shall be Single Phase LVAC 50Hz output with the charger and inverter normally supplying the load.
- The charger shall be of thyristor-controlled type. The battery shall be of Nickel Cadmium/ SMF type. The inverter shall be of the Pulse Width Modulated (PWM) type, providing a single-phase output. Configuration with galvanic isolation transformer at the mains supply shall be supported.
- UPS 3 KVA minimum capacity and all its consisting elements shall cover the required Station load, together with 20% spare for future use.

##### ii. Operation Requirements

- UPS charger shall continuously supply the load via the UPS inverter, while simultaneously maintaining the battery charge in the float charge mode. In the event of interruption or depression in the AC mains voltage to the charger, the battery shall supply the load requirements via inverter.
- Upon restoration of the AC mains voltage, the UPS charger shall take over the power supply of the load via the inverter, while simultaneously recharging the battery.
- UPS shall be capable of energizing the load within the permissible tolerances, without the battery connected.

##### iii. Charger and Battery

- The charger shall operate according to the constant voltage, current limiting principle, and shall incorporate a soft- start feature to gradually accept load on initial energizing.

- UPS charger output characteristic shall provide an output voltage regulation of + 1%, for load changes 0-100 % and mains voltage supply and frequency within the tolerance ranges. Automatic compensation feature related on battery temperature shall be provided in case if lead-acid battery is installed.

**iv. Inverter**

- The UPS inverter output voltage shall be maintained to + 1% of the nominal value for load changes 0-100 % and mains voltage supply and frequency within the tolerance ranges. The dynamic output voltage variations shall not exceed + 10% of the rated output voltage under any circumstances of instantaneous load changes

**v. Readings/Instrumentation and Alarms**

- The following readings /instrumentation/LED indication shall be supplied as a minimum:

Battery voltage  
UPS output voltage

- The following alarms/LED Indication shall be supplied as a minimum:

Charger fails  
Inverter input voltage high /low  
Inverter fails

**vi. UPS Distribution**

- The distribution system shall be designed for incoming and outgoing AC supplies. Double pole miniature or moulded case circuit breakers complying to IEC 60157 shall be supplied, fitted with auxiliary contacts that operate when the circuit breaker trips. MCBs shall be rated to meet the load requirements and shall be labelled with the destination of the load.

**4.13 Display Units**

The 110” industrial grade LED display/ video wall/ (70”, 2X1) DLP based to be provided by Bidder at Barrage Control Room for monitoring of canal monitoring system. The Workstation shall be connected to the screen LED /DLP display panel through communication bus.

All the required information from the canal monitoring shall be continuously updated in the screen LED/DLP display panel. The screen LED/DLP display panel shall map and display the vital information like, all reservoir levels, discharges, panel status, power availability, Motor data etc.

Specifications as below or better for 110” LED/ video wall/DLP based system shall be provided.

<b>Display Unit for 110” LED /Video Wall/DLP based/System</b>	
<b>Each Screen Size</b>	<b>55” class (54.64” diagonal)</b>
Native Resolution	1920 x 1080 (FHD)
Pixels (H x V x 3)	62,20,800

Viewing Angle	178°/178°
Running Time	24Hr
Orientation	Portrait & Landscape
<b>INPUT</b>	
HDMI	Yes
RS232C IN	Yes
IR Receiver	Yes
USB (USB3.0, USB2.0)	Yes
<b>OUTPUT</b>	
DP Out	Yes
Audio Output	Yes
RS232C Output	Yes
<b>SPECIAL FEATURES</b>	
Temperature Sensor	Yes
Check Screen	Yes
Set ID Setup	Manual, Auto
Password Change	Yes
Digital Audio Input	Yes
Local Time Auto Setting	Yes
Sync Mode	Time sync, Content sync
Internal Memory	8GB (System 4GB + Available 4GB)
Auto Configuration/Phase	Yes
<b>POWER</b>	
Power Supply	100–240V~, 50/60Hz
<b>ENVIRONMENT CONDITIONS</b>	
Operation Temperature	0 to 40 degree Celsius
Operational Humidity	10%~80%

#### 4.14 Internet Router and Firewall system

As per National institute of standards and technology combination of Router and firewall system is suggested as one of the Cyber security systems for Industrial Control systems. It shall ensure Intrusion detection and prevention, malware protection, Protection against network vulnerability, Router ensures basic packet filtering services.

The following minimum specifications shall be followed for implementation of the same

##### A. Router

- i. Backplane of minimum 2 Gbps
- ii. Packet throughput of minimum 3 Mbps with 64 bytes packet
- iii. have minimum 2 slots with two slots dedicated for Control Processor
- iv. have at least 2 slots for High speed WAN interfaces

- v. support USB storage and dual images
- vi. have redundant power Supply
- vii. Minimum one Console and one Aux interface

#### **B. Firewall Throughput**

- i. Firewall throughput – 4 Gbps
- ii. VPN throughput – 100 Mbps
- iii. Threat Protection – 260 Mbps
- iv. IPS throughput – 450 Mbps
- v. Interfaces RJ 45 GE (Minimum 8 No)
- vi. I/O interfaces – 1 USB, 1 Console
- vii. Authenticated users limit- Unrestricted

#### **C. VPN Tunnels**

- i. SSL VPN 100
- ii. IPSec VPN 100

#### **D. Security Features**

- i. Firewall - State full packet inspection, deep packet inspection, proxy firewall
- ii. Application proxies - HTTP, HTTPS, SMTP, FTP, DNS, TCP, POP3
- iii. Threat protection - DoS attacks, fragmented packets, blended threats and more

### **4.15 Tele-metering and Supervisory Control**

The Contractor shall provide synchronous internet connection with minimum internet speed of 8mbps for uploading and downloading along with necessary router, static IP & switches for GPRS&GSM communication. The Contractor shall also provide the digital transmitters and indications, and terminal strips via the bus system. The canal monitoring System software should have the facility to track the non-functional sensors on daily basis and display on the web.

The successful bidder shall upgrade all such developed software during the O & M period on need basis and provide the latest versions of all such software including Source Codes, while handing over the facilities to Authority.

In addition, it shall be possible to import/export data to/from Hydrological Information System (HIS) to be developed under National Hydrology.

#### **a) Tele-metering Items**

- Digital type gate position indications.
- Digital type water level indication.
- Digital type discharge indication of spillway.

### **4.16 Installation Requirements**

#### **A. General**

The installation of Datalogger/RTU, Side looking ADVN, battery operated level transmitter, Water level transmitters, Gate sensors, solar power system, Rainfall Stations etc. shall be done at respective locations stated in “grouping list of instruments” a proper care shall be taken at the time of installation to minimize the disturbance in the canal network supply. From maintenance point of view, a proper protection and easy access to the equipment shall be ensured at the time of installation. The general installation guideline for various instruments shall be as follows.

### **B. Site Preparation and Installation**

- i. The WRD will provide details of the installation sites before the scheduled installation date to allow the Contractor to perform site inspection and construction of suitable structures before the installation of the hardware.
- ii. The location of sensor/instruments installation will be decided by the respective Site Engineer-in-charge depending on the site.
- iii. The Contractor shall complete the required works at the site for proper installation of the equipment before receipt of the equipment.
- iv. These are the basic guidelines for installation of Canal monitoring system however it may vary as per site conditions.

### **C. Water Level Transmitter for Canal System**

- i. The Level Transmitter and its accessories shall be protected from theft. The Contractor shall install the ultrasonic level transmitters in existing gauge wells or using cantilever arrangement at canal. The gauge well shall have a level marking / staff gauge so that the level measurement by ultrasonic level transmitters can be verified in case of any error readings. The gauge well shall be provided with an enclosure to avoid theft.
- ii. Level sensors shall be mounted in such a way that they have a direct vertical shot to the water surface with no obstruction of their beams. Beam spread must be determined based on manufacturer’s specification and the maximum expected distance to be measured at low flows. Consideration shall be made in designing the mounting structure to allow for easy access to the instrument for maintenance.

### **D. Automatic Rainfall Station**

- i. ARG stations will require a hardened enclosure on a structure (pipes, mast, and tower) to make the enclosure stable. The enclosure will be mounted above the ground. The rain gauge will be placed away from objects such that the rain gauge orifice is no closer than the 2 times the difference in height (top of the rain gauge to the top of the nearby objects) to other objects.
- ii. Area of the Automatic rain fall station shall be ideally 5m \* 5m \* 2m height. If a rare condition demand, then even lesser area (4m \* 4m) can be demarcated in consultation with officials.
- iii. The approach to the site shall be made free of obstacles like bushes; trees etc. and a suitable cement path must be laid to approach the platform.

### **E. Fencing for the site**

Where provided, fencing shall comply with the following:

- i. The height of the fencing for the site enclosure must be 2 meters from the ground level.
- ii. The fencing must be made over a cement enclosure which is 300mm above ground level.
- iii. Fencing angle should be of size 40mm x 40mm x 6mm and pre coated with red oxide.
- iv. The total length of the fencing angle should be 2.8 meters i.e. (2.0m above ground level + 0.8 m below ground level)



- v. Two MS angles must be used diagonally at each of the four corner angles of the site.
- vi. The angles can be attached (with welding or the other appropriate means) from the middle of the existing corner angle to the ground. The depth of the support will remain the same as of main angle.
- vii. The dimensions of the fencing angle foundation should be 450mm x 450mm (length X width) and at a depth of 800mm. The foundation should be square shaped.

#### **Chain-link**

- i. Dimensions of GI Chain-link: 2 inches' x 2 inches and of Gauge: 10 (3 mm diameter)
- ii. GI chain-link mesh must be stretched and welded/fixe d properly on the fencing angles.
- iii. A pipe or angle must be fixed on the upper part of the fencing to have a neat finishing and at the same time to avoid loosening of the fencing over a period of time.
- iv. The chain-link fencing should be fastened with the help of screws fitted on the fencing angles. Alternately it may be welded neatly at four equidistant positions of 0.5 m each

#### **F. Local Earthing**

- i. Material required: Salt: 20 Kg; Charcoal: 20 Kg; Sand 100 Kg
- ii. The lightning arrestor rod shall be made of copper which is mounted on the top most part of the mast /tripod /tower.
- iii. It shall be of thickness 12 mm and of one-meter length with a connected copper wire of 6mm thickness (gauge). At the other end of copper wire is the Earthing rod of dimensions 15mm thickness and 1.8-meter length, which is buried into the ground.
- iv. On the bottom of earthing rod, one copper plate of dimensions 300mm x 300mm should be connected. Datalogger/RTU enclosure should also be grounded with local earthing.
- v. A pit of 4-5 feet depth, 2' X 2' wide at bottom (like a cone shaped pit) has to be dug.
- vi. After levelling the bottom of the pit, uniform layer in the sequence of 6 inches of Salt + 6 inches Charcoal + 6 inches Sand is filled. Such sequence is repeated 3 times till the earth pit is filled to the top. The copper Earthing rod is placed in the center of the pit. The pit is closed and levelled.

#### **G. Painting**

All ferrous metalwork (unless galvanized) associated with the equipment's and accessories shall be properly painted every year to avoid rusting.

#### **H. Electrical Wiring/Cabling requirements**

Shielded armored signal cables shall be used for external Cabling from the datalogger/RTU to instrumentation system to ensure the reliable operation of the Monitoring system with necessary conduiting/ cable trays as per site requirement.

Following are minimum cabling requirements. Contractor is free to propose improved cabling technology which shall be subjected to approval from Employer's Representative.

The cabling system design criteria shall be as follows.

- i. The term cable shall always include necessary type of connectors at both the ends for connecting between two equipment. The connectors shall be properly anchored with protective sheathing of the cable in such a way that the loads due to pulling and twisting shall be borne by the protective sheathing and the conductors shall not be subjected to any stress.

- ii. The connectors shall be so fixed on the individual components of the system that the metal/ plastic connector shall always transfer the loads due to pulling and twisting directly to the protective body of the component and the internal interface cards/ connections shall not be subjected to any load.
- iii. Laying of necessary data and power supply cables for connecting various components and embedding them or protecting them with necessary conduits shall be carried out as per directions of engineer-in-charge.
- iv. Wherever the cables are to be laid indoors and the length of the individual cable run exceeds 1 meter, the cable shall be housed in a protective conduit made of electrical supply grade conduit of appropriate diameter and the conduit shall be fixed with the wall at a height not less than 1 meter above the floor surface. Whenever the indoor cable is required to cross the floor, it shall be housed in a HDPE /GI flexible conduits pipe of 25 mm internal diameter and the pipe shall be fixed to the floor with suitable protective covering to avoid tripping of personnel using the area or disturbance to the pipe due to such movement.
- v. Wherever cables are to run through open ground including the public road and pathways, the cable shall be armored and shall be water ingress proof up to static water pressure of 5 kg/cm<sup>2</sup>. All joints made in cable shall also meet the water proofing criteria. In addition, the cable shall be protected by housing the same in 25 mm galvanized iron pipe embedded at a depth of not less than 1.0 meter below the ground surface with a warning brick on the same. A sketch of the cable layout with respect to the identifiable marks of the area shall be prepared and handed over to the Engineer-in-charge for each such cable run on completion of the work of cable laying operation.
- vi. The joints in the cable connecting between the sensor and data collection unit shall be avoided by measuring the appropriate length of the cable required and attaching the same in one piece. If the cable joints become necessary, prior permission of the Engineer-in-charge shall be obtained before executing the same. The joint fabricated through a splicing and jointing kit shall be stronger than the parent cable.
- vii. The cable carrying data and electrical power shall be housed separately in different conduits separated by adequate distance to prevent leakage currents. The data cables shall also be laid out in such a way that the data integrity is not compromised due to mutual interference.
- viii. Shielded (screened) cables shall be used for external Cabling, the power and control cables shall be generally as per IS 8130/34. For these cables, equivalent IEC/IS specifications are also acceptable.
- ix. All cables shall have standard copper conductor of suitable cross section depending on load.
- x. The Communication cable/power cable shall be of shielded, twisted pair type.

### **I. Cabling Types**

Following types of cables shall be supplied laid and terminated as per instructions provided.

- Copper armored Signal cables
- GSM cable between Dataloggers/RTU and modems
- Communication cable if used anywhere shall be twisted pair multi core 1.0 Sq mm, Braided and Aluminum foil shielded and screened as per Indian standards.
- Control cables shall be Tinned annealed electrolytic solid copper conductor, PVC insulated, extruded FRLC PVC inner sheathed, single galvanized steel armored, and overall FRLS PVC sheathed conforming to IS 1554-I/1988.

## **J. Civil Works**

All the civil works required for installation, commissioning and operation of the Canal monitoring system shall be provided by the Contractor and included in the cost. The associated civil works would include for erection and housing of instruments, lying of cables, mounting of instrumentation system and all other associated equipment's.

### **4.17 Spare Parts and tools**

Spares management is important for a complete strategic service management process, ensuring that the right spare parts and resources are available when and where needed.

All spare parts to be supplied shall be interchangeable with the corresponding parts of all the Works supplied under these Specifications and shall be of the same material and workmanship. They shall be replaceable without cutting or destruction of adjacent components. Acceptance of any spare parts will not take place before the bidder has submitted the complete final detailed list of all spare parts and tools which shall be approved by Engineer-in-charge. The spare parts shall be provided by Contractor before issuance of the commissioning Certificate for the installed system. These spare parts shall be checked and tested at the Site by Contractor in presence of the Engineer-in-charge or his representative and shall be stored in a storage facility at the Central and/ or Divisional Control Offices. The storage facility will be provided by WRD. All spare parts, tools and materials shall be delivered in marked boxes of sufficient sturdy construction to withstand long term storage cum maintenance.

Monitoring system involves spares for following critical hardware components such as:

1. Instrumentation system at Remote stations
2. SDC room Hardware

The following spare part list shall be provided by successful bidder

1. Mandatory Spare parts
2. Recommended Spare Parts

### **4.18 Submission of documents**

Bidder shall submit details of following on separate sheets for each of them, for evaluation of Bids along-with their offer: -

- i. Warranty Related Services
- ii. O&M Staff details
- iii. Training to the Departmental staff
- iv. Installation and Commissioning Services
- v. Detail Commentary against Technical Specifications
- vi. Deviation Sheet

The prices as to-be quoted in BOQ shall include all the prices of above services/Software/Staff.

### **4.19 Drawing & Document Submission**

The complete General Arrangement Drawing along-with each component drawing, data sheet & QAP/ITP shall be submitted within 30 days from the issue of letter of acceptance for its approval to

Engineer-in-Charge. Failure in submitting drawing in stipulated time shall amount to breach of the Contract.

#### **4.20. Technical Responsiveness:**

Bidders are requested to confirm that all requirements of technical specifications have been met without any material deviation or reservation by submitting a detailed clause by clause Commentary against technical specifications specified in Annexure 1 & in case of any deviation, it shall be clearly stated in deviation sheet failing which offer of the firm may be considered as non-responsive.

#### **4.21 Delivery and Completion Schedules**

The delivery and installation schedules are described in Schedule of Requirements. The maximum time period from the date of effectiveness of Contract to Final Acceptance is twelve (12) months followed by a Warranty and operation & maintenance period of 5 years. The bidder must comply with the milestones indicated in the delivery schedule and schedule for installation and commissioning.

#### **4.22 After Sales Service**

##### **A) Local partner**

The Bidder is required to be an Indian firm or Indian arm of an international firm so as to develop an in-country technical support base during and after the project implementation phase.

The bidder /manufacturer shall have after sales support centre in region (within a radius of 500km from state capital) or shall set the same within 30 days from the receipt of LOA.

##### **B) Operation Management Requirements**

The Contractor shall be responsible for Operation and Maintenance of all equipment/ components after completion of commissioning & site acceptance and operational test during the contract operations period. All associated costs shall be part of contract price and bid price for evaluation.

This operation and maintenance period tasks for the complete canal monitoring system shall be as per the schedule of requirement and to ensure proper functioning of the hardware and software components. Assistance and troubleshooting shall be provided for all necessary maintenance, servicing, testing and recalibration operations.

The Contractor will intervene with his personnel within the agreed dates/ periods, on site as necessary, in case of damages or malfunctioning of equipment or software and will proceed to the investigation of the cause and search a prompt solution(s) to ensure proper working of the system.

The Contractor shall provide a minimum of one no. full time Service Engineers/ technicians for operation and maintenance of the canal monitoring system under this contract from commissioning stage till completion of 5-year warranty, operation & maintenance period. The Service Engineer shall have experience of working on Instrumentation / Telemetry system for period of at least 3 years and shall be well versed with Operation and Maintenance aspects of Canal monitoring systems.

The Contractor's staff shall be based at Okhla. The Contractor shall maintain a complaint register as well as service/ maintenance log.

Operation and Maintenance shall include free of cost repairs/ replacement of hardware, Software and communication charges necessary to keep the system functional for the operation service period from Date of Issuance of completion of Commissioning Certificate from Employer's representative.

Routine maintenance and preventive maintenance will be carried out as per a Maintenance Manual to be prepared by the Contractor and as agreed by the Engineer for the Canal Monitoring system. The Contractor shall keep spare parts readily available so that repair time is minimal. If the repair of any instrument effects the calibration, then new calibration shall be done. All repairs and renewals are included in scope of maintenance to be carried out by the Contractor. The SIM and Communication cost for data transfer will be borne by the Contractor.

The Contractor shall do the calibration check of all instruments at least on half yearly basis each year until the completion of Operation period.

Contractor shall maintain records for all the repairs and submit the same at the end of every month and year in the sample formats given below:

Table: Maintenance Log of Repairs for the Month of-----

S No.	Equipment	Fault Report Date (From DAS)	Nature of Fault	Date of rectification (From DAS)	Signature of concerned EE/ DAS report as a proof of rectification

Table: Log of Faulty Equipment on Last day of Month

S No.	Equipment	Fault Report Date (From DAS)	Nature of Fault	Action Taken	Expected date of Rectification

Table: Annual Log for Faulty Equipment on Last day of year

S No.	Equipment	Fault Report Date (From DAS)	Nature of Fault	Date of rectification (From DAS)	Signature of concerned EE/ DAS report as a proof of rectification

After satisfactory completion of Operation Service period the Contractor will hand over the complete system to department in working condition along with all the material / spares required for rectification of defective equipment during Maintenance, including testing and calibration of the

instruments. The instruments repaired shall have accuracy as per new equipment stated in these specifications.

The operation chart including relevant information shall be permanently displayed near the equipment. The chart shall be prepared indicating block diagram and necessary operation and troubleshooting steps in multi-color and it shall be laminated for durability. Original parts shall be used for replacements and maintenance. Manufacturer's recommendations shall be followed for maintenance.

### C) Preventive Maintenance

The bidder shall be responsible for operation and maintenance of all stations /components of installations, commissioning, site acceptance and operation tests. All equipment maintenance cost, repairs, replacements and repairs to civil work shall be borne by the bidder during the warranty and Period. The scope of O&M support would include all materials and services including replacement of components including batteries, mandatory spare parts required to ensure smooth and sustainable operations of the entire system. The bidder shall supply a Manual specifying all the faults experienced by the system together with an account of how such faults have been rectified.

The bidders shall ensure the following visits at remote site for preventive maintenance. The bidder should take time stamped geo tagged photographs of the equipment during each maintenance visit (either scheduled or unscheduled visit). The photographs should show the condition of equipment before maintenance, during maintenance and after maintenance.

#### Schedule showing frequency of scheduled visits for routine and preventive maintenance

Sl. No.	Station Category	Minimum Preventive Visits Yearly	Remarks
1	Maintenance of Canal Monitoring software & Computer node and any other equipment supplied by contractor at SDC	4	Every Quarter (immediately after final acceptance) and also on need basis
2	Maintenance of Non-Contact Ultrasonic/Radar Water level transmitters, gate sensors, ADVN & Dataloggers/RTU at site	4	One pre-monsoon, two in monsoon period and one in post monsoon and also on need basis

### D) Hand back requirements

Prior to completion of 5 years Operation and maintenance period the contractor shall complete the following Hand back requirements in last quarter of 5<sup>th</sup> year of Operation & Maintenance.

- i. The Contractor shall upgrade all software (including instrument & DCP etc.) during the operation period and on need basis and provide the latest versions of all such software, while handing over the facilities to department.
- ii. The Contractor shall hand over spares in working condition to department at the end of O&M Period.

- iii. Contractor shall provide the Acceptance testing of canal monitoring system including data collection platforms & monitoring station as defined in the bid document under “Inspection & Tests” as per the satisfaction of Engineer- in- charge before completion of O&M period.
- iv. Contract shall reinstate all the associated civil works prior to acceptance testing which shall be inspected & approved by Engineer- in- charge.
- v. All documents as built drawings, User manuals, Training material & software licences shall be handed over to Engineer – In- charge prior to completion of Operation & Maintenance period.
- vi. The period of Operation & maintenance can be extended beyond the specified period of 5 years if mutually agreed by contractor and Department.

## 4.23 TRAININGS

### a) Training Program

The Bidder is required to provide an extensive training programme for the system. The training set forth in the following paragraphs is a minimum requirement and the bidder should propose any additional training that he considers critical for long term success of the system operations.

The Bidder is expected to provide an outline or table indicating the contents of each of the required courses. The table shall describe the specific topics to be covered for each day of the training period.

The Bidder is responsible for the salaries of the training instructors and all training materials. The costs of travel, transportation and daily allowances for the trainees shall be borne by the Purchaser.

### b) Training in General Operation

Training shall be provided by the bidder in several phases. The training shall include both classroom and field trainings and will be continued during all five years. The bidder is required to have instrumentation/ SCADA specialists. The training shall include:

**Table: Formal training courses**

S. No.	Description	Numbers of training	Number of Participants per session
1	User Training Course for senior management. Design, operation and maintenance back-up, recovery and web-services for officers. (2 days)	3 (1 before/during commissioning and 2 during five years warranty and operation)	15
2	Operation and Maintenance course onsite & class room (3 days). Course topics will include sensor calibration, DCP & Software operation & configuration, report generation & analysis, Trouble shooting of Canal monitoring system, maintenance requirements, and procedures for equipment configuration, installation, site testing and commissioning.	5 (1 before /during commissioning and 4 during 5 years warranty and operation)	30

The training course will take place at Birbhum, West Bengal of (*as decided by the Purchaser*). In case of formal training, the Purchaser will provide classroom and other logistics. The Bidder will facilitate the professional and the training material. On-the-job training will be provided by the Bidder in conjunction with the installation of Monitoring system and during the course of operation & maintenance as required.

The classroom training, hands on experience and troubleshooting will be prepared as video for easy access and will be posted on the web. All training modules will be also provided as a media file (Windows Media Player Compatible) on a USB Drive. Five copies on five separate media shall be required.

- TA/ DA of the trainees shall be borne by the purchaser.
- Training kit containing course material in soft as well as hard copy shall be provided by the Bidder.
- All logistical arrangement such as projector, training space etc. for training is to be made by purchaser.

#### **4.24 Schedule of work and progress reports**

##### **Schedule of Work**

The time and the date of completion of work as stipulated shall be deemed to be the essence of the contract. The bidder shall submit a detailed program for all the activities to perform the work as per the Contract. The schedule will be in the form of a detailed PERT network consisting of adequate number of activities covering various key phases of the works such as designs and drawings, procurement, manufacturing, shop assembly and painting. This network shall also indicate the interface facilities to be provided by the Purchaser, if any, and the dates by which such facilities are needed.

The Supplier shall so organize his resources and perform his work as to complete it not later than the date agreed to by him. The time for completion of the supplies contracted for, shall be reckoned from the date of award of supplies to the Supplier.

During the performance of the contract, if in the opinion of the Engineer-in-Charge proper progress is not maintained suitable changes shall be made in the schedule to ensure proper progress.

##### **Progress Reports**

The above PERT network shall be reviewed and periodic reports shall be submitted by the bidder as directed by the Engineer-in-Charge before initiating the procurement/manufacturing, the bidder shall submit a detailed list of items/materials to be bought out from outside agencies. The list should be exhaustive and should serve as a check list for reviewing the progress from time to time. It shall be obligatory on the part of the bidder to submit a detailed monthly report by 7th of every month (for the previous month) giving the progress of the following activities:

1. Data sheet, Drawings & QAP/ITP approval of complete assembly for its prior approval by Engineer in charge, within one month of issue of letter of acceptance.
2. Procurement of materials and bought out items
3. Fabrication of various assemblies and sub-assemblies indicating detailed status of fabrication of critical items involved and expected date of completion.
4. Dispatch of materials.



5. Stages of shop assembly.
6. Shop testing

## **4.25 OPERATION Manual and As-Built Drawings**

### **I. Operation Manual**

The Contractor has to submit an operation manual after the completion of commissioning of the system. This manual will be submitted as draft before commissioning completion and as final version before issuance of the Commissioning Certificate, including all the experiences made during the tests and the training given to the operators during the commissioning period. This manual will be established by the Contractor in cooperation with his suppliers and sub-Contractors and after consultation with the Engineer for the detailed contents. It shall contain at least:

- a. General description of the Canal Monitoring System and its functioning
- b. Step-by step procedures for all operation requirements and adjustments
- c. Architectural, mechanical, electrical, instrumentation, sections, details, charts
- d. Nomenclature and nomenclature schedule of all the equipment (mechanical, electrical, instrumentation, power and signal cables, electrical and fixtures)
- e. For each instrument of the system:
  - Drawings
  - Operation instructions for system
  - Calibration charts (if required)
  - fault identification and location guides and charts
  - repair instructions (if repair by operators is possible)
  - Maintenance instructions
  - Spare parts list with addresses and procedures for ordering
- f. Preventive maintenance schedules for all the equipment, showing the type and frequency of maintenance of different items.
- g. Type and quantity of the recommended consumables
- h. Emergency management for specimen emergency situations which might occur due to external or internal factors
- i. Logs for the operators of the system
- j. Salient indicators of the operation
- k. Maintenance operations
- l. Faults and actions taken
- m. Other events (if any)
- n. Address and telephone number (Hotline) to contact in case of operational problems

It is emphasized that a collection of standard literature of a general nature, unaccompanied by specific drawings and descriptive matter relating to the Work as commissioned, shall not be acceptable. The operation manual shall be bound in one binder designed to prevent loss and damage of the contents. The binders shall be numbered and have a table of contents of all information contained.

## II. As-Built Drawings

The Contractor shall submit to the Engineer “Completion” Drawings. These Drawings shall be accurate and correct in all respects and shall be shown to and approved by the Engineer. Completion Drawings on two prints shall be supplied by the Contractor, along with a soft copy in CD. These drawings shall be developed in latest version of Auto CAD.

### 4.26 DATA and Facilities Supplied by the Employer under the Contract

The Employer WRD will provide following data, facilities and support:

- i. The Employer will provide the necessary data for implementation of Canal Monitoring system as follows:
  - a. Canal discharge statements, with locations and access to site for installation.
  - b. Organization structure with details of authorized personnel for access to the web services.
  - c. Details of command areas with previous year demand and water scheduling documents for entry and integration in Canal Monitoring software.
- ii. The Employer will provide following facilities/ infrastructure:
  - a. For set up of Central Monitoring station at Suri Irrigation Office Complex in Birbhum District for Mayurakshi Canal System and space will be provided by I & W Dte., in their existing compounds.
  - b. On-site Room at regulator complexes along the Mayurakshi Canal System will be provided by the Employer, except cabling and connections and necessary infrastructure required for installation of instrumentation, batteries, etc.
  - c. Places for installation of Rainfall measurement at head & cross regulators, EE, SDO and Section offices will be provided by the Employer, except for necessary concrete platforms, fencing, etc. which shall be arranged by Contractor.
- iii. Employer will provide authorization letters to Contractor for the following:
  - a. Purchase of SIM cards etc.

### 4.27 Performance requirements

The Contractor is fully responsible to keep the Mayurakshi Canal Monitoring system functional during commission and Operation Service Period. The Contractor shall take action to repair any faulty instruments and shall not wait for a complaint from the Employer to initiate action.

Following are the key performance indicators (KPI) for the Canal Monitoring system which shall be strictly observed:

- i. The average uptime for the Canal Monitoring System shall not be less than 95% for 24x7 operations.
- ii. Any fault/ malfunctioning of any instrument or software affecting the functioning and operation of the canal system shall be rectified at earliest by service engineers of Contractor responsible for Canal Monitoring System. The MRTR (Maximum Response Time to Repair/Replace) in no case shall be later than 120 hours.

- iii. In the case of failure of the Contractor to rectify/ repair the defective equipment within 30 days period from the date of fault, WRD Officials may carry out the repair/ rectification work through other agency at risk and cost of the Contractor.
- iv. Performance of the Contractor's obligations shall not be considered to have been completed until the Engineer has issued the Performance Certificate to the Contractor, stating the date on which the Contractor completed his obligations under the Contract. or as soon thereafter as the Contractor has supplied all the Contractor's Documents and completed and tested all the Works, including remedying any defects. A copy of the Performance Certificate shall be issued to the Employer. Only the Performance Certificate shall be deemed to constitute acceptance of the System.
- v. The downtime for Canal Monitoring System considered here is referred as malfunctioning or any error in readings of instruments or in data receipt at SDC & Web server. The computation of down time shall be as per the table given below:

The System will be considered to be "down" under any of the following conditions:

1	If more than 5% (Qty as per schedule of Requirement) of <b>Monitoring station</b> (i.e. Datalogger/RTU) within the Canal network system is down from field or SDC for more than Six hours.
2	If more than 5% (Qty as per schedule of Requirement) of <b>Level Transmitters</b> within the Canal network system is down from field or SDC for more than Six hours.
3	If more than 5% (Qty as per schedule of Requirement) of <b>Gate sensors</b> within the Canal network system is down from field or SDC for more than Six hours.
4	If more than 1 no. of <b>ADV M</b> within the Canal network system is down from field or SDC for more than Six hours.
5	If <b>Remote Monitoring</b> from Server at SDC and workstations at EE office is down for more than Six hours due to failure of IT Hardware or Software at control rooms.
6	If more than 5% (Qty as per schedule of Requirement) in total of <b>Monitoring station</b> (i.e. Datalogger/RTU) & field instruments within the Canal network system is down from field or SDC for more than Six hours then this clause shall be applicable instead of (1 to 4) stated above.

- vi. These KPI indicators shall be integrated in Canal Monitoring software in order to identify the system down time and report for the same shall be generated at the end of the week, month & year.

#### 4.28. LAW, REGULATIONS, CODES AND STANDARDS

The materials incorporated in the works shall be suitable for the duty concerned and shall be new and of first-class of commercial quality, free from imperfections and selected for long life and minimum maintenance. The Indian/International Standards like relevant IEC publications/IEEE/IS standards and Codes of Practice in their latest addition shall be adhered to for the design, manufacturing,

inspection, calibration, field testing, packing, handling and transportation of materials and equipment required for this work. Shall any product be offered conforming to other standards; the equipment or products shall be equal to or superior to those specified and the documentary confirmation shall be submitted for the prior approval of the Engineer. This specification requires a reference to the following minimum standard specifications:

IEC 61730	testing sequence intended to verify the safety of PV modules of solar panel
IEC 61215	Standard for design qualification and type approval of photovoltaic (PV) modules
IEC 61701	Test sequence for corrosion resistance of PV modules
IS 8130/34	Specifications for conductors for insulated Electric cables

## Annexure-1

### Technical Responsiveness Form

**Bidder shall furnish clause-by-clause commentary against the laid down technical specification and standards as per the format given below:**

#### **(A) Summary of Instructions**

- i. Particulars of Manufacturer and local agent cum representative are to be given under rows Model and Address.
- ii. All entry boxes in column –Specification and Standards as offered in by Bidder| shall be filled-in accurately and comprehensively. Quantitative fields shall be filled in accurately. It is not acceptable to use Yes, No, Compliant or similar evading words. Following format is designed to help the Bidder to understand the requirements of the equipment being procured. The Bidder must describe in the format how his bid responds to the technical requirements of the equipment. Bidder to note that one- or two-word responses (e.g. –Yes, –No –will comply or similar evading words) are normally not sufficient to confirm the responsiveness with the technical requirements, hence elaborate responses are sought from the bidders. In case deviation on the following technical requirements of equipment is not as per the minimum criteria mentioned, the bids may be declared –non-responsive.
- iii. Requested materials and information shall be enclosed with the bid and be unambiguously associated with instruments as offered in the bid
- iv. Negligence to comply with the instructions and requirements as stated above makes the bid liable to be rejected.
- v. Abbreviations: OD-Outer Diameter; ID-Inner Diameter; FS-Full Scale; Pa-Pascal (unit of pressure), RTDAS-Real time data acquisition system; DCP- Data Collection Platform, ARG- Automatic Rain Gauge, ADVN- Acoustic Doppler Velocity Meter, ULT- Ultrasonic Level Transmitter.
- vi. Sample interval is the interval at which samples or sensor readings are taken. The recording / measurement interval defines the interval at which the data records are stored in memory. A data record can represent a single sample or the average of a number of samples. In particular, the result of the wave suppression filter is a single record representing the average value of a number of samples.

#### **Clause by Clause Commentary against laid down technical specifications:**

<b>Technical Specifications as per the Bid document</b>	<b>Technical Specifications as per Bidder</b>
<b>4.0 Technical Specifications of Canal Monitoring &amp; Instrumentation System</b>	
<b>4.1 Ultrasonic Level Measuring Systems</b>	
The bidder shall design, supply and install best quality Level transmitters considering at the following points.	

i. Ultrasonic type level measuring system shall comprise of level transmitter, and any accessories required completing the level measurement loop.	
ii. Ultrasonic level transmitters shall be installed on Head and cross regulators for Upstream and downstream water level measurement in Mayurakshi Canal Project System in gauge wells (wherever existing & feasible) with level marking/staff gauges or using cantilever type mechanism. These points are to be selected so that most accurate measurement level is obtained.	
iii. The point of installations is to be selected so that most accurate measurement level is obtained. All accessories along-with cage to avoid theft and Monkey Menace and also proper mounting arrangement (cantilever etc.) of these instruments shall be supplied by the bidder.	
iv. The level sensors shall be suitable for flange or thread mounting as required. The installation shall avoid any degradation of instrument performance due to spurious reflections, absorption and condensation. Facilities shall be provided for rejection of spurious reflection.	
v. The level instrument shall have the facility for dampening/ averaging the effect of waves, undulations on the water surface and discriminate the rate of change of levels to provide steady readings.	
vi. All necessary instruments, interconnecting wiring, HDPE/GI conduit work, housing, cabling, panel, etc., shall be provided according to the type of equipment proposed to supply. Adequate safety measures shall be included in the design of these sensors to negate the effects of disturbances due to turbulence of water levels, strong air currents & electromagnetic waves etc.	
These are the minimum technical specification required are as follows:	
<b>Feature</b>	<b>Value</b>
Make	
Model No.	
<b>Site Conditions</b>	
Ambient Temperature	From 0°C to + 55°C
Humidity	5 to 95% (non-condensing)
<b>Sensor</b>	
Sensor Type	Ultrasonic non-contact sensor
Ranges	0- 6 meters
Resolution	5 mm or better
Accuracy	0.3 % of FSO
Output Interface	SDI-12 / RS 485 / 4-20 mA/ compatible to Datalogger/RTU
Power Supply	to be powered from solar power supply provided by bidder
Protection	IP67 or better
Enclosure	Die cast aluminum or any corrosion resistant metallic enclosure
Isolation	Circuits shall be galvanic ally

	isolated from each other.	
Manufacturer Calibration Certificate	Required	
Beam angle	Less than 12 degrees.	
<b>General Features</b>		
Sensor Material	Corrosion Resistance (Stainless steel / die cast Aluminum / PVDF/ PV stabilized ABS with metal casing)	
Enclosure	The Sensor shall be easy to dismount and replace in the event of malfunction.	
Tools	Complete tool kit for operation and routine maintenance	
Manuals	Full Documentation and maintenance manual in English	
Accessories	Sensor Mounting support with proper HDPE/ GI conduiting, cables and other accessories as required	
Mounting/Installation Arrangements	To be installed in Gauge wells with level marking/Staff gauges or cantilever type assemble as per site requirement.	
<b>4.2 Gate Position Measuring System</b>		
<p>Suitable sensors shall be provided for exact measurement &amp; indication of position of Barrage Gates &amp; Head regulator gates of LBMC &amp; RBMC of main canal system. These sensors shall be equipped with suitable shaft couplings and electronic circuits to transmit the signals to the Canal Monitoring System via local datalogger/RTU for indication in Barrage Control Room &amp; for further processing. All sensors &amp; display units are to be mounted in the outdoor locations. Hence, suitable protection class of the enclosures shall be ensured for sensor and field mounted display. Minimum IP65 protection class shall be provided. Suitable safe &amp; reliable arrangements of coupling with the motors of gates shall be provided. It shall be ensured that there is no slippage between the motor shaft &amp; the transducers.</p> <p>In case of head regulator gates are being manually operated so necessary retrofitting required for mounting of gate sensors shall be executed by bidder. The gate sensor shall be connected to the nearest datalogger/RTU located at barrage top through hard wire.</p>		
<b>Feature</b>	<b>Value</b>	
Make		

Model No.		
<b>Site Conditions</b>		
Ambient Temperature	0 to 55 Degree Celsius	
Humidity	5 to 95% (non-condensing)	
<b>Sensor</b>		
Sensor Type	Shaft Encoder based rotary position sensor	
Range	0-20 meters	
Resolution	3 mm or better for gate position	
Accuracy	0.05 % FSO	
Output Interface	SDI-12 / RS 485 / 4-20 mA or compatible to datalogger/RTU's	
Power Supply	2 wire type, to be powered by RTU/ datalogger	
<b>General Features</b>		
Material	Corrosion Resistance Metal (Stainless steel or Aluminium)	
Enclosure	Lockable (key) box provided by the supplier to be mounted on sensor, with IP65 or better protection	
Tools	Complete tool kit for operation and routine maintenance	
Manuals	Full Documentation and maintenance manual in English	
Mounting	Wiring from sensor to RTU/ datalogger must be through HDPE/ GI Pipe Conduiting and flexible metallic conduiting wherever applicable	
Display	Read out LCD / LED field mounted Display	
Process connections	through suitable coupling	
Manufacturer's Calibration Certificate	Required	
<b>4.3 Side Looking Acoustic Doppler Velocity Meter</b>		
A side looking ADVN is used to measure the discharge based of Doppler principle & shall be installed at sides of the canal, near the bottom end at the downstream. The height from the bottom of installation shall be such as not to affect the reflected wave from the canal bed. Shut-off shall not be needed for maintenance for that an aluminum/SS mounting frame for retraction of the sensor shall be provided.		
The instrument measures the average velocity over the canal area, by subdividing in separate segments along the length of the canal with all as built		



construction parameter like bed width, side slope, along with installation parameters, like height of instrument from bottom, programmed Doppler calculators calculates the average velocity of the complete cross section. The instrument shall have the ability of storing the total discharge data. A built-in temperature sensor shall be provided to take care of any changes in water properties due to temperature variations.		
The associated Civil works to install the side looking ADVN in Canal system shall be in scope of bidder.		
<b>Feature</b>	<b>Value</b>	
Make		
Model		
<b>Site Conditions</b>		
Ambient Temperature	From 0 to +55 Degree C	
Humidity	5-100 % (Non-Condensing)	
mode of operation	Real time velocity and discharge measurement from a side wall of Canal (Side looking)	
<b>Side Looking ADVN Sensor</b>		
Sensor Type	Side looking ADVN sensor for measurement of discharge in Canals /open channel environment	
Acoustic Frequency	1500 KHz to 3000 KHz	
Velocity measurement	2D water velocity	
Bed Width of Canal	0 - 40 m	
Range	+/- 0.00 to 6.00 m/s	
Accuracy	+/- 2 % of measured velocity or better	
Resolution	2 mm/s	
Overall Discharge measurement accuracy	Better than 3 %	
<b>Acoustic/pressure water level measurement</b>		
Range	0.1 to 10m	
Accuracy	+/- 0.3%	
<b>Temperature</b>		
Resolution	+/- 0.1 <sup>0</sup> C	
Accuracy	+/- 0.5 <sup>0</sup> C	
Internal Memory capacity	2 MB or Better	
Serial Data Communication	RS 485/ RS 232/SDI 12 or as compatible to Datalogger/RTU	
<b>Power input</b>	From solar power system provided by bidder/Datalogger/RTU	
<b>Computer Software</b>		
Operating System	Windows software for system	

	configuration / communication	
Version	English language version	
Licenses	All required licenses shall be included	
<b>Physical Parameters</b>		
Protection	IP68 or equivalent	
Cable Length	As per site requirement	
Software Technical Specification	Windows based	
Accessories	AStainless steel (SS grade) mounting frame assembly for installation of side looking ADVN, and the Sensor shall be easy to dismount and replace in the event of maintenance /malfunction.	
<b>4.4 Datalogger/RTU with minimum 8/16 channel input</b>		
Make		
Model No.		
The Datalogger/RTU shall automatically collect the observations from interconnected sensors, process and store them into its memory and transmit through GSM & GPRS communication link to Central Canal Monitoring system installed at SDC as per the pre-programmed measurement interval.		
The Datalogger/RTU shall also continuously monitor the status of sensors, power supply and communication. In the event of failure of any instrument or disruption of any of the power sources, an alarm shall be sent back to the State Data Center.		
The number of input channels in the Datalogger/RTU must be compatible to the sensors being supplied. Datalogger/RTU shall provide necessary electrical power to the sensors and conversion of electrical output signals from the sensors into engineering value based on calibration information stored in the memory. Full compatibility with all types of sensors provided in the package is mandatory. The power supply to Datalogger/RTU shall be made available from Solar Power system.		
Feature	Value	
<b>Site Conditions</b>		
Ambient Temperature	From 0 to +55 Degree C	
Humidity	5 to 95 % (non-Condensing)	
<b>Sensor Interface</b>		
Input type	8/16channels (as per the schedule of requirements)compatible with outputs of sensors	

<b>Input - Output Interfaces</b>		
Data Transfer	USB stick option for Data transfer	
Port for Configuration	One Serial Port (RS232) for communication with Laptop for programming	
Port for Telemetry	1 Ports for Communication with Telemetry (GPRS&GSM) device	
<b>Computer Software</b>		
Operating System	Windows or compatible software for system configuration & communication	
Version	English language version	
Licenses	All required licenses shall be included	
<b>Analog to Digital Converter</b>		
Resolution	16 bit or better	
Conversion Accuracy	± 1 LSB	
Sample intervals	1 Sec to 24 hours (user scalable)	
<b>General Features</b>		
Data Storage memory	Minimum 1GB memory that can store one year of data and shall be expandable	
Mathematical Function	For integration of discharge equations & discharge coefficient	
Firmware Operating System	Multi-tasking operating system - must log data and transmit at same time	
Display	Digital Display/HMI for viewing current data and setting values	
Power Supply	Shall be powered by solar Power supply to be provided by bidder	
Battery Voltage	Monitoring of battery voltage level	
Internal battery	Internal battery backup for clock, lithium battery, storage 2 years	
Charge Controller	Internal or External	
User Permissions	Different user levels, system of user rights / passwords, access restricted to authorized personnel	
Internal clock	Internal clock with drift less than 10 seconds per year or using GPS	
Keypad	For displaying or transferring data to memory stick, configuration of data logger and sensors	
Real time clock	GPS synchronized	
Enclosure	for wall-mounting in a shelter / enclosure with IP65 protection or better	
Accessories	Serial cable + adaptor (if required). All accessories (fixing units, etc.) as required	
Tools	complete tool kit for installation and routine maintenance giving full detail (number of pieces and type)	

Manuals	Full documentation and maintenance instructions in English (1 copy per station).	
<b>GPRS MODEM</b>		
<b>Ambient Site Conditions</b>		
Operating Temperature	From 0 to +55	
Performance	Data Reception availability of 95% or better	
Form factor	The GSM /GPRS modem should either be integral part of data logger/RTU specified above, or it should be supplied as independent unit compatible with supplied data logger/RTU	
<b>Specific Features</b>		
Communication Direction	Utilize network for two-way TCP/IP (INTERNET) connection and SMS	
Transmission trigger	Data collection to be triggered by interrogation from Data Center, or by event-based transmission triggered by remote site	
Power Saving	Ability to disable interrogation system in order to save power at remote site	
Communication Protocol	Data transmission to execute HTTP Post, FTP, SMS to transmit and receiving data to the Data Center	
Accessories	All associated equipment, including Antenna all cables and mounting hardware	
<b>Antenna features</b>		
Frequency range	900 MHz: 824-960 MHz/1800MHz:1710-1880 MHz, 4G and better	
Radiation	Omni-directional	
Connector	SMA or suitable RF connector adaptable to GSM/GPRS modem	
Cable length	As required at site	
<b>4.5 Solar Power System</b>		
The solar power system has to be provided as a power system for instrumentation system located at inflow & outflow gauging site. It shall have following minimum features:		
i. Supply, Erection and commissioning of Solar power system with all allied ancillaries for providing un-interrupted power supply at inflow & outflow gauging site as per the schedule of requirement and shall provide power backup for minimum 48 hours without sunshine/charge. The Solar Panels shall be provided in anodized aluminum frame with tubular batteries with conformance to IEC-61730, 61215 and 61701.		

ii. The Solar power system shall be mounted on the roof of site buildings wherever existing else the mast-based installation shall be adopted. The Contractor shall also supply a pole – mounted arrangement including a standard pole and necessary foundation and fixing arrangements. The location of solar power system installation shall be indicated by the concerned engineer – in –charge.		
iii. The batteries required for the equipment above shall be maintenance free, rechargeable sealed batteries with Overcharge and deep discharge protection Leak-proof Easy handling, Excellent recharge ability.		
iv. The battery pack shall also include arrangements of charging through a standard AC power supply available nearby and also from solar panels established as above.		
v. The solar power system unit shall have audio or visual alarms for overcharging and deep discharging conditions. The sealed construction shall allow trouble-free, safe operation in any position. The battery case shall be high impact, with sufficient resistance to shock, vibration, chemicals and heat.		
vi. The necessary housing and configuration of the batteries shall be furnished in detail by the Contractor.		
vii. The battery case shall be high impact, with sufficient resistance to shock, vibration, chemicals and heat.		
viii. The disposal of batteries during 5 years’ comprehensive warranty period is in the scope of bidder.		
<b>The solar panel offered shall confirm the following technical specifications:</b>		
<b>Feature</b>	<b>Requirement</b>	
<b>Battery</b>		
Voltage	As required for instrumentation system	
Type	Sealed maintenance free	
Capacity	power supply system shall provide 48 hour of backup to all equipment ‘s being powered up by the solar panel	
<b>Solar Panel</b>		
Size	power supply system shall provide 48 hours of backup to all equipment ‘s being powered up by	

	the solar panel	
Mounts	The mounts shall be detachable but shall not move or rotate with wind. It shall have a provision to adjust direction and elevation during installation for optimal solar power generation	
Charger	Smart solar charger shall be provided by the bidder	
<b>General</b>		
The supplier shall determine optimal size of solar panels and batteries such that the system will be operational for at least 48 hours in absence of charging/ without sunshine. The supplier shall also provide the calculation of power consumption of Solar power system.		
<b>4.6 Equipment's at Canal Control Room</b>		
Equipment at Barrage Control Room shall be provided by bidder which will mainly comprise of following major item:		
a. Main Server and Server as Workstation (operator Station)		
b. Canal Monitoring software with life time licenced version.		
c. Necessary data switch, router with modem, Static IP, and fire wall for System		
d. 3KVA online UPS with 4 hours' backup time		
e. External memory for data storage of 8TB for 5 years.		
f. A3 size Color printer		
g. 110" LED display/video wall/ (70", 2X1) DLP based system		
h. Network Video Recorder		
i. 3 KVA DG set for power Backup		
<b>4.7 Computer Servers</b>		
Server shall be industrial grade PC with USB, RS232/RS485, Ethernet Ports, OS Windows 8 or higher compatible to Canal Monitoring System. Barrage Control Room (BCR) shall have Master server with Canal Monitoring Software. 110" LED display/ (70", 2X1) DLP based System/video wall Unit to be connected to server with separate USB Port/ Ethernet Port.		

<p>There will be two servers with monitors required (one as work station) placed at the Barrage Control Room. These Computer servers are expected to operate the Canal Monitoring software as well as all software required for the project. The computer servers will be managed and operated by the successful bidder and his skilled trained experienced operators/engineers till the end of 5 years' warranty period. The minimum specifications for the servers are given in Table below:</p>		
<b>Feature</b>	<b>Value</b>	
Form Factor	Rack Mounted or equivalent Server mounting	
Processor	Intel XEON E5-2440 or higher compatible configuration	
DIMM Memory	Speed: 1600MT/s RDIMMS or higher compatible configuration 8GB RDIMM, 1600MT/s, Low Volt, Dual Rank or higher compatible configuration	
Hard Drive	RAID 5 Software or Hardware Controller compatible 5-1TB 7.2K RPM Near-Line SAS 6Gbps 2.5in Hot-plug Hard Drive or higher compatible configuration	
Network Adapter	2 GB or higher compatible	
Power Supply	Dual, Hot-plug, Redundant Power Supply/Solar Power and battery backup as compatible configuration	
Electrical Supply	220V AC and supply from AC distribution, DC of DG Set	
Connecting Devices	Soft touch Keyboard, Optical Mouse, Monitor (23" TFT) 110" LED screen (combination of more than one permitted) monitors/Video Wall/ (70", 2X1) DLP based in Barrage control room	
Software	Canal Monitoring compatible as per specification and OS Windows 8 or higher compatible.	
Additional Memory Rack	Additional memory Rack of minimum 8TB that shall be suitable for data logging for a period of at least 5 years.	
Accessories	Power Cord Rack Rail with cable management	

	system Power Points as needed	
<b>Computer Rack and related parts</b>		
The bidder is required to procure full height computer racks or equivalent that will hold the computer servers and UPS system.		
<b>4.8 LAPTOP</b>		
Laptops (i7 8th Gen) with all allied software and hardware accessories, for programming & configuration & monitoring of Canal Monitoring system shall be provided by bidder with licensed version client Canal Monitoring software as per following specifications:		
<b>Laptop</b> should be of standard brand and should have the following minimum specification:		
<ul style="list-style-type: none"> <li>• Intel Core i7 Processor (2.8GHz, 6MB L2 cache, 1066 MHz FSB)</li> </ul>		
<ul style="list-style-type: none"> <li>• 15.6-inch LED Screen: Touch-enabled (optional)</li> </ul>		
<ul style="list-style-type: none"> <li>• 8GB DDR4 RAM upgradeable to 8GB or More</li> </ul>		
<ul style="list-style-type: none"> <li>• HDD 1 TB 7200rpm</li> </ul>		
<ul style="list-style-type: none"> <li>• Integrated Stereo Speaker, Key Board with Touch Pad.</li> </ul>		
<ul style="list-style-type: none"> <li>• Genuine Windows 10 Operating System and MS Office 2016 or higher Lifetime Licensed Software Preloaded and with Good Antivirus is preferred.</li> </ul>		
<ul style="list-style-type: none"> <li>• Good quality Carry Bag will be part of delivery.</li> </ul>		
<ul style="list-style-type: none"> <li>• 2 or more USB Ports, Bluetooth Connectivity with 200mts range</li> </ul>		
<ul style="list-style-type: none"> <li>• USB to RS-232 converter for communication 1200 to 115,200 baud</li> </ul>		
<b>4.9 Color A3 size Printer</b>		
<ul style="list-style-type: none"> <li>i. Functions: Print, Copy, Scan</li> <li>ii. Printing Up to 20 page/minute</li> <li>iii. Black Print Speed (ppm) -12</li> <li>iv. Color Print Speed (ppm)-8</li> <li>v. Up to 8000 pages printing</li> <li>vi. Recommended monthly page volume: 250 to 2000</li> <li>vii. Processor speed: 600MHz</li> <li>viii. Connectivity: e print capability</li> </ul>		
<b>xi) Paper Handling: -</b>		
<ul style="list-style-type: none"> <li>ix. Paper handling input, standard: 100 sheet input trays</li> <li>x. Paper handling output, standard: 100-sheet face-down bin</li> <li>xi. Maximum output capacity (sheets): Up to 100 sheets</li> <li>xii. Duplex printing: Manual (Driver support provided)</li> </ul>		



<b>4.10 Uninterruptible Power Supply Systems (3 KVA UPS System)</b>	
<b>i. General Design</b>	
<ul style="list-style-type: none"> <li>• The UPS System shall be Single Phase LVAC 50Hz output with the charger and inverter normally supplying the load.</li> </ul>	
<ul style="list-style-type: none"> <li>• The charger shall be of thyristor-controlled type. The battery shall be of Nickel Cadmium/ SMF type. The inverter shall be of the Pulse Width Modulated (PWM) type, providing a single-phase output. Configuration with galvanic isolation transformer at the mains supply shall be supported.</li> </ul>	
<ul style="list-style-type: none"> <li>• UPS 3 KVA minimum capacity and all its consisting elements shall cover the required Station load, together with 20% spare for future use.</li> </ul>	
<b>ii. Operation Requirements</b>	
<ul style="list-style-type: none"> <li>• UPS charger shall continuously supply the load via the UPS inverter, while simultaneously maintaining the battery charge in the float charge mode. In the event of interruption or depression in the AC mains voltage to the charger, the battery shall supply the load requirements via inverter.</li> </ul>	
<ul style="list-style-type: none"> <li>• Upon restoration of the AC mains voltage, the UPS charger shall take over the power supply of the load via the inverter, while simultaneously recharging the battery.</li> </ul>	
<ul style="list-style-type: none"> <li>• UPS shall be capable of energizing the load within the permissible tolerances, without the battery connected.</li> </ul>	
<b>iii. Charger and Battery</b>	
<ul style="list-style-type: none"> <li>• The charger shall operate according to the constant voltage, current limiting principle, and shall incorporate a soft- start feature to gradually accept load on initial energizing.</li> </ul>	
<ul style="list-style-type: none"> <li>• UPS charger output characteristic shall provide an output voltage regulation of + 1%, for load changes 0-100 % and mains voltage supply and frequency within the tolerance ranges. Automatic compensation feature related on battery temperature shall be provided in case if lead-acid battery is installed.</li> </ul>	
<b>iv. Inverter</b>	
<ul style="list-style-type: none"> <li>• The UPS inverter output voltage shall be maintained to + 1% of the nominal value for load changes 0-100 % and mains voltage supply and frequency within the tolerance ranges. The dynamic output voltage</li> </ul>	

variations shall not exceed + 10% of the rated output voltage under any circumstances of instantaneous load changes	
<b>v. Readings/Instrumentation and Alarms</b>	
<ul style="list-style-type: none"> <li>• The following readings /instrumentation/LED indication shall be supplied as a minimum: <ul style="list-style-type: none"> <li>• Battery voltage</li> <li>• UPS output voltage</li> </ul> </li> <li>• The following alarms/LED Indication shall be supplied as a minimum: <ul style="list-style-type: none"> <li>• Charger fails</li> <li>• Inverter input voltage high /low</li> <li>• Inverter fails</li> </ul> </li> </ul>	
<b>vi. UPS Distribution</b>	
<ul style="list-style-type: none"> <li>• The distribution system shall be designed for incoming and outgoing AC supplies. Double pole miniature or moulded case circuit breakers complying to IEC 60157 shall be supplied, fitted with auxiliary contacts that operate when the circuit breaker trips. MCBs shall be rated to meet the load requirements and shall be labelled with the destination of the load.</li> </ul>	
<b>4.11 Display Units</b>	
The 110" Industrial Grade LED Display/ Video Wall/ (70", 2X1) DLP Based To Be Provided By Bidder At Barrage Control Room For Monitoring Of Canal Monitoring System. The Workstation Shall Be Connected To The Screen LED /DLP Display Panel Through Communication Bus.	
All The Required Information From The CANAL MONITORING Shall Be Continuously Updated In The Screen LED/DLP Display Panel. The Screen LED/DLP Display Panel Shall Map And Display The Vital Information Like, All Reservoir Levels, Discharges, Panel Status, Power Availability, Motor Data Etc.	
Specifications as below or better for 110" LED/ video wall/DLP based system shall be provided.	
<b>Display Unit for 110" LED /Video Wall/DLP based/System</b>	
Each Screen Size	55" class (54.64" diagonal)
Native Resolution	1920 x 1080 (FHD)
Pixels (H x V x 3)	6,220,800
Viewing Angle	178°/178°
Running Time	24Hr
Orientation	Portrait & Landscape
<b>INPUT</b>	
HDMI	Yes
RS232C IN	Yes

IR Receiver	Yes	
USB (USB3.0, USB2.0)	Yes	
<b>OUTPUT</b>		
DP Out	Yes	
Audio Output	Yes	
RS232C Output	Yes	
<b>SPECIAL FEATURES</b>		
Temperature Sensor	Yes	
Check Screen	Yes	
Set ID Setup	Manual, Auto	
Password Change	Yes	
Digital Audio Input	Yes	
Local Time Auto Setting	Yes	
Sync Mode	Time sync, Content sync	
Internal Memory	8GB (System 4GB + Available 4GB)	
Auto Configuration/Phase	Yes	
<b>POWER</b>		
Power Supply	100–240V~, 50/60Hz	
<b>ENVIRONMENT CONDITIONS</b>		
Operation Temperature	0 to 40 degree Celsius	
Operational Humidity	10%~80%	
<b>4.12 Internet Router and Firewall system</b>		
As per National institute of standards and technology combination of Router and firewall system is suggested as one of the Cyber security systems for Industrial Control systems. It shall ensure Intrusion detection and prevention, malware protection, Protection against network vulnerability; Router ensures basic packet filtering services.		
The following minimum specifications shall be followed for implementation of the same		
<p style="text-align: center;"><b>A. Router</b></p> <ul style="list-style-type: none"> <li>i. Backplane of minimum 2 Gbps</li> <li>ii. Packet throughput of minimum 3 Mbps with 64 bytes packet</li> <li>iii. have minimum 2 slots with two slots dedicated for Control Processor</li> <li>iv. have at least 2 slots for High speed WAN interfaces</li> <li>v. support USB storage and dual images</li> <li>vi. have redundant power Supply</li> <li>vii. Minimum one Console and one Aux interface</li> </ul>		
<p style="text-align: center;"><b>B. Firewall Throughput</b></p> <ul style="list-style-type: none"> <li>i. Firewall throughput – 4 Gbps</li> <li>ii. VPN throughput – 100 Mbps</li> </ul>		

<ul style="list-style-type: none"> <li>iii. Threat Protection – 260 Mbps</li> <li>iv. IPS throughput – 450 Mbps</li> <li>v. Interfaces RJ 45 GE (Minimum 8 No)</li> <li>vi. I/O interfaces – 1 USB, 1 Console</li> <li>vii. Authenticated users limit- Unrestricted</li> </ul>	
<p><b>C. VPN Tunnels</b></p> <ul style="list-style-type: none"> <li>i. SSL VPN 100</li> <li>ii. IP Sec VPN 100</li> </ul>	
<p><b>D. Security Features</b></p> <ul style="list-style-type: none"> <li>i. Firewall - State full packet inspection, deep packet inspection, proxy firewall</li> <li>ii. Application proxies - HTTP, HTTPS, SMTP, FTP, DNS, TCP, POP3</li> <li>iii. Threat protection - DoS attacks, fragmented packets, blended threats and more</li> </ul>	
<p><b>4.13 Centralized Canal Monitoring Software</b></p>	
<p>The Canal Monitoring software shall be provided as a combination of following major software modules</p>	
<p>3. <b>Data Acquisition Module</b>–This will provide a network schematic for visual representation of the irrigation canal network &amp; its real time data that can be used for by the operators &amp; administration to remotely monitor the data &amp; discharges in canal network.</p>	
<p>4. <b>Water Scheduling and Demand Prediction/Decision Support Module</b> – This module based on the available data and current and past trends shall predict water demand in different areas of the canal system &amp; based on the real time data from field instruments and ARG data it shall evaluate a schedule for water distribution. It shall also compute volumes provided to each part of the command area, and estimate shortfall/ over-supply.</p>	
<p><b>4.13.1 Data Acquisition Module</b></p>	
<p><b>i) General</b></p>	
<p>The Centralized Canal Monitoring software shall be installed in Server existing at SDC with internet connection with static IP and firewall system in combination with router. The Customized software will accept information sent by all the remote DCP (RTU/ Dataloggers) of canal system, store the information in a data base, display the information in appropriate mimic displays, analyses past data and trends, will have the authentication feature by way of user name and password for operating the software for various levels. Updating of parameters of the DCP (RTU/ Dataloggers) along with</p>	

instrumentation shall be done interactively from this software. The development of the software has to be customized for the end-user, WRD.	
The information available at remote stations shall also be available on any other PC/Laptop and on mobiles located at any place through the web. The Data provided Centralized software shall be displayed in complete explicit way and can be extracted in different formats.	
The DCP (RTU/ Dataloggers) based monitoring stations and computing systems shall be able to calculate the actual discharge for each monitored location, based on water levels alone using ADCP rating curves, on water levels and gate openings for gated structures, using the appropriate hydraulic flow equations for the structures based on the pool characteristics.	
The remote Monitoring systems shall be interconnected with the Centralized Canal Monitoring system via GPRS/GSM telemetry, and software shall analyze and display the required discharge as per predicted water demand and scheduling based on which regulator gates shall be operated manually by the operators.	
A software shall define the required total gate opening at a structure based on the required discharge for that structure.	
The software shall compare the required value with the total actual opening found by adding up the individual gate openings; if the deviation of one or more gates from the required value is large enough, an alarm shall be sent to the respective gate operator.	
In a software the 'open'- instruction/alarm shall be sent to that gate operator with gate no. specified, who at the time of the comparison controls the smallest opening manually. Similarly, a 'close' instruction/alarm shall be given to the gate operator for the largest opening.	
The software must continuously provide notifications/alarm for head and cross regulators operator to adjust gate position and flows to maintain water levels in each pool within the stipulated band while also ensuring that the flow rates released match the demand spatially and temporally based on availability of water in canal network. There must be minimum operational spills in the canal system.	
<b>ii) Functions/ Features of Data Acquisition Software Module</b>	
The remote DCP (RTU/Data logger) shall be able to communicate to Centralized software over GPRS wireless technology etc. It shall be possible to view and troubleshoot the DCP stations without requiring any additional software apart from the stated software. Data logs shall be stored in the DAS system and be downloadable in CSV format using a web browser.	
<ul style="list-style-type: none"> <li>• Normally, Dynamic Gate Operation Scheduling Program/Roster preparation will decide position of each Gate depending on the Water</li> </ul>	

Discharge requirement.	
<ul style="list-style-type: none"> <li>• Development of Dynamic Scheduling Program and integration with DAS system is included in the scope of work.</li> </ul>	
<ul style="list-style-type: none"> <li>• Operator shall be able to Monitor the movement of individual gates &amp; real time data from instruments via. software.</li> </ul>	
<ul style="list-style-type: none"> <li>• The customized, with life-time license version Canal monitoring software shall be designed, developed, Supplied, installed and commissioned by Contractor based on the inputs provided by Engineer-in- Charge which shall have following minimum features:</li> </ul>	
<ul style="list-style-type: none"> <li>i. It shall accept information send by all the remote locations /sites via. GPRS/GSM telemetry.</li> </ul>	
<ul style="list-style-type: none"> <li>ii. Collection and validation of data regarding the irrigation water requirements and interfacing with GIS data.</li> </ul>	
<ul style="list-style-type: none"> <li>iii. It stores and maintains a data in database for analysis purpose.</li> </ul>	
<ul style="list-style-type: none"> <li>iv. Processing the data received from divisional offices to prepare water delivery schedules for Canal System.</li> </ul>	
<ul style="list-style-type: none"> <li>v. Validation of the delivery schedules on the basis of water requirements and considering operational policies and simulation.</li> </ul>	
<ul style="list-style-type: none"> <li>vi. Perform off-line canal simulation studies to determine the sequence of operation of gates for all possible changes in discharge for each head and cross regulator gate for initial filling of the canal and during normal and abnormal operating conditions.</li> </ul>	
<ul style="list-style-type: none"> <li>vii. Maintain complete log of the events and alarms.</li> </ul>	
<ul style="list-style-type: none"> <li>viii. Historical data storage of all the canal system operational data in server database/additional memory Racks.</li> </ul>	
<ul style="list-style-type: none"> <li>ix. Provide an overview of the operational state of the Canal System using GIS mapping</li> </ul>	
<ul style="list-style-type: none"> <li>x. Display the information in appropriate mimic displays analyze past data and trends</li> </ul>	
<ul style="list-style-type: none"> <li>xi. The system shall be able to display connection status and network strength information of each monitoring station within Canal System.</li> </ul>	
<ul style="list-style-type: none"> <li>xii. The software shall have the authentication feature by way of username and password for operating the software</li> </ul>	
<ul style="list-style-type: none"> <li>xiii. Updating of parameters of the DCP along with instrument shall be done interactively from this software.</li> </ul>	

xiv. Development of software to be customized with end user at Site.	
xv. The software shall be of at least 50000 tags and screens shall be provided as per user requirement.	
xvi. Automatic alarm and report generation facility	
xvii. Auto e mail, SMS facility with web server facility	
xviii. The software shall be supplied as a complete package. No additional software shall be required to configure or run all the features of the canal monitoring system.	
xix. The Canal Monitoring software shall be audited by NIC and hosted on NIC web server to minimize the cyber security issues.	
xx. The DAS System software shall have the facility to track the non-functional instruments on daily basis and display on the web.	
xxi. The software shall have a capability to integrate the data from other various instruments/DCP of various Canal Monitoring stations being implemented in West Bengal to establish the common Canal Monitoring platform for various Canal system. The bidder shall facilitate the necessary interfacing of such monitoring stations with the proposed Centralized Canal monitoring software.	
<b>iii) Features of Graphical User Interface from Main Menu:</b>	
xi. Parameterization of monitoring stations	
xii. Real time data monitor on GUI and LED display.	
xiii. File creation and Storage control.	
xiv. External Data transmission control.	
xv. Power status monitor and logging.	
xvi. Instrument status monitor and logging.	
xvii. Data import and exporting features	
xviii. Integration of rating curves	
xix. Manual data entry and input programs	
xx. Printing graphical and tabular data	
<b>iv) Trend Analysis</b>	
The Software shall be provided for a real-time and a historical trend or plot capability. The plot function shall provide for pre-scaled display of selected	

<p>process variables. The operator shall be able to select either subsets or supersets of the data presented. The plot function shall automatically scale the requested data to fit the time frame requested by the operator. The plot function shall display these data as a multiline chart with each variable easily determined by color, pattern or combination. For real-time data displays, the plot function shall scroll data as necessary to include newly acquired data on the display.</p>	
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<p>The DAS software will support trend data and displays as follows:</p>	
<ul style="list-style-type: none"> <li>• Trend displays shall comprise line graphs with time on a linear, continuous horizontal or vertical axis and the trended variable on the vertical or horizontal axis.</li> </ul>	
<ul style="list-style-type: none"> <li>• Trend graphs shall be capable of displaying required plots with adjustable time base with user specified time ranges.</li> </ul>	
<ul style="list-style-type: none"> <li>• The capability to pan backward and forward within a selected time range to read the exact value of any displayed variable, by selecting a point on the graph or chart.</li> </ul>	
<ul style="list-style-type: none"> <li>• The capability for each pan shall display individual ranges and units.</li> </ul>	
<ul style="list-style-type: none"> <li>• Display of historical information as far back in time as desired shall be available on the history log.</li> </ul>	
<ul style="list-style-type: none"> <li>• "Zoom" and "pan" facilities for both the trended variable range and the time axis range. The "zoom" facility shall allow an operator to compress or expand the axis range whilst the "pan" facility shall allow an operator to shift the origin of the axis. The software shall allow a user to define any zoom area by dragging a mouse across the trend.</li> </ul>	
<ul style="list-style-type: none"> <li>• It shall be possible to define the section of the trend to be exported by clicking and dragging the mouse across the trend. Data shall be exported to CSV or TXT formatted files.</li> </ul>	
<ul style="list-style-type: none"> <li>• Printing the trends or plots generated above by A3 Color printer.</li> </ul>	
<p><b>iv) Alarms/events management:</b></p>	
<ul style="list-style-type: none"> <li>• The DAS software shall support alarm and data logging, using description text and time stamp.</li> </ul>	
<ul style="list-style-type: none"> <li>• The DAS software shall not limit the number of alarm occurrences logged to a database.</li> </ul>	



<ul style="list-style-type: none"> <li>• The DAS software shall provide the ability for viewing alarms that are logged while the system is on line or off line without causing any interruption to data acquisition or alarm processing.</li> </ul>	
<ul style="list-style-type: none"> <li>• The DAS software shall provide the capability for operator event logging with the logging of operator actions. The DAS software shall be capable of logging the following information: User Name, Action, Time, Date, Value, and Comment in free format.</li> </ul>	
<ul style="list-style-type: none"> <li>• The DAS Software shall notify the contractors operator with graphical screen indication of the presence of an unacknowledged or new alarm. These indications will be organized in an alarm screen that can be made always visible, if customized so. The DAS shall have facility to provide for audible alarm notification. The DAS shall present alarms in an alarm screen in such a way as to allow easy identification of a new alarm, an unacknowledged alarm and acknowledged alarms. The DAS shall provide the operator with the ability to review all alarms.</li> </ul>	
<ul style="list-style-type: none"> <li>• The DAS software shall be integrated such that an alarm acknowledged on one operator workstation will automatically appear as acknowledged on the other systems.</li> </ul>	
<ul style="list-style-type: none"> <li>• The DAS software shall provide alarms viewing and processing as follows: <ul style="list-style-type: none"> <li>v. A standard alarm page with the facility for scrolling alarms up and down the page and for acknowledgment of individual alarms.</li> <li>vi. Multiple levels of alarm priority or category.</li> <li>vii. Color coding of various alarm priorities or category.</li> <li>viii. Capability of audio interaction configurable for each alarm by category.</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• DAS Software shall provide the following information for each alarm as it appears on an alarm display page: <ul style="list-style-type: none"> <li>xi. Alarm Tag Name</li> <li>xii. Alarm Description</li> <li>xiii. Value of the Variable</li> <li>xiv. Trip/set point</li> <li>xv. Alarm Status - Disabled, Acknowledged, Unacknowledged</li> <li>xvi. Alarm Category (if applicable)</li> <li>xvii. Alarm Priority (if applicable)</li> <li>xviii. Time &amp; Date in International Formats</li> <li>xix. Privilege (if applicable)</li> <li>xx. Operator Comments (if applicable)</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>• The capability to display each alarm category or alarm priority in a different color (including flashing colors) dependent on whether the alarm is Active Unacknowledged, Active Acknowledged, Acknowledged Cleared, Unacknowledged Cleared or Disabled.</li> </ul>	
<ul style="list-style-type: none"> <li>• The capability to disable alarms on an individual basis, by page or by alarm category or all alarms.</li> </ul>	
<ul style="list-style-type: none"> <li>• The capability to automatically display any graphic display when an alarm occurs or to dynamically change the appearance of any graphical object</li> </ul>	

based on whether an alarm is On, Off, Acknowledged, Communications Error, and Disabled etc.		
<ul style="list-style-type: none"> <li>The DAS software shall monitor analog and digital variables and calculated conditions, and determine if a variable is in an alarm condition.</li> </ul>		
<ul style="list-style-type: none"> <li>For each Analog variable, the DAS database software shall provide the ability to process an alarm for each of the following conditions: -</li> </ul>		
x. Variable LOW-LOW,		
xi. Variable LOW,		
xii. Variable HI,		
xiii. Variable HI-HI		
xiv. Rate of Change		
xv. Bad input from I/O		
Alarm disables		
Dead band		
Real time synchronization error > 1 min		
<ul style="list-style-type: none"> <li>For each Digital variable, an alarm for each of the following conditions shall be assignable: <ul style="list-style-type: none"> <li>i. Variable ON,</li> <li>ii. Variable OFF</li> </ul> </li> </ul>		
The Customization of Canal monitoring system shall be done by the bidder as per engineer – in -charge inputs at site, which is a continuous activity till the end of comprehensive warrant & operation & Maintenance period.		
The alarms shall be categorized as Critical, High, Medium & Low category based on which alarm priority shall be set in DAS system.		
<ul style="list-style-type: none"> <li>The following minimum alarms/events shall be configured in DAS system by the bidder apart from any other alarms to be configured during customization of DAS software.</li> </ul>		
<b>Alarm/Event</b>	<b>Alarm /Event Description</b>	
Power Supply Faults	Solar power ON, battery Low etc.	
Instruments	Hi, Hi- Hi, Lo, Lo-Lo, Rate of change, communication error, Transmitter Failure, Gate Open/Close/Stop/ Intermediate.	
DCP System	communication loss/ signal loss, Delay of more than a specified time in transmission of data/events, software error, instrument error	
<b>4.13.2 Water demand and Scheduling Management/ Decision Support Software</b>		
The Decision Support System software shall be based on water demand, compared with water supply/availability, and facilitate operational decisions on where to supply water. Under normal conditions, equity of supply will be looked for. The DSS system will not however make operational decisions, but allow the WRD to make decisions based on improved and real time data.		
The DSS software must provide the following capabilities.		

viii.	Based on data analysis of water demand during kharif and Rabi season, real time rainfall measurement in the command area, and availability of water in respective source/ barrage, flow demands will be estimated along the Main Canal system and their off taking distributaries.	
ix.	The DSS software will be integrated with/ connected to the DAS software, which will provide information of flows through the canal system.	
x.	Data shall be displayed in tables and charts/ figures for better understanding. These shall show actual supply against demand, so that areas not receiving enough, or too much water, are known.	
xi.	While, real time data will be used to adjust operations, “average” data (from assessment/ analysis of previous years) shall be used so that it is apparent how the year in question compares to the “average”.	
xii.	The output from the DSS software will facilitate operational decisions and preparation of water distribution schedules for feed back to the DAS software for manual gate operations.	
xiii.	The software module shall have ability to check that the operational decisions/ operational schedules do not violate constraints such as: max/ min flows and water levels for structures (canals), maximum rate of change of flows/ water levels, etc.	
xiv.	It shall be possible to import & export DAS data to Hydrological Information System (HIS) to be developed under National Hydrology Project in Future.	
	<b>4.13.3 Web Server</b>	
	Canal Monitoring software shall have a web server facility. This will be used to allow display/data input in remote sites on any PC/mobile phone using user authentication system.	
	It shall have following minimum features.	
v.	Web server shall be able to display real time process data from Canal Monitoring software, historical data from Process database server, or any third-party relational database servers into graphs, dashboards, table format.	
vi.	shall be able to configure and integrate multiple data sources on a single window.	
vii.	shall be able to personalize the information on the web server window depending upon various needs of the various users, with user-based information access configuration.	
viii.	shall be able to view multi location information on single web server window either in graphical format or trend format.	

<b>4.13.4 System Security</b>	
v. The Canal Monitoring system shall provide for security to allow access to any individual part of the system only to users with appropriate security levels. Application privileges shall be assigned to users or groups.	
vi. The Canal Monitoring system software shall support an unlimited number of users. For each user, it shall be possible to define a password and the privilege level(s) and areas that are available to that user.	
vii. The Canal Monitoring system software shall provide the capability to define a minimum of 4 privilege levels. The software shall check to ensure that the user logged on has the correct privilege level for all actions he wants to perform. If the user does not have the correct privilege for an action, the software shall display a message informing the operator of insufficient privilege.	
viii. The Canal Monitoring system shall provide the capability to prevent access to the operating system by unauthorized personnel.	
The selected Contractor shall upgrade all such developed software during the O&M period on need basis and provide the latest versions of all such software including Source Codes, while handing over the facilities to Authority.	

## 5. Inspections and Tests

### 5.1 General

Many of the equipment as stated below shall be inspected and checked by a third-party representative of the employer at manufacturing place to carry out quality checks. The Supplier shall inform the Engineer in advance for the factory inspection for material and its fabrication. The inspection and test categories shall be applied prior to delivery of the equipment, of various categories as indicated below for each type of the equipment. The production routine test as per relevant IS shall be carried out as a part of acceptance test.

**Category A:** The Drawing, data sheet and Inspection test plan has to be approved by the Engineer before manufacturing and Testing. The equipment/ material has to be inspected by the Engineer or its representative at the manufactures premises before packing and dispatching. The Supplier shall provide the necessary equipment's and facilities for tests and the cost, thereof, shall be borne by the Supplier.

**Category B:** The drawings and datasheets of the instruments have to be submitted and to be approved by the Engineer prior to manufacture. The material has to be tested by the manufacturer and the manufacturer's test certificates are to be submitted and approved by the Engineer before dispatch of the Equipment. Not-with-standing the above, the Engineer, after examination of the test certificates, reserves the right to instruct the Supplier for retesting, if required, in the presence of Employer's representative.

**Category C:** The equipment/ material may be manufactured as per standard and delivered to the site.

#### TEST CATEGORIES FOR EQUIPMENT AND THE MATERIAL

Datalogger /RTU system, Ultrasonic/ RADAR Level transmitters, Side looking ADVN, Gate sensors, Rain gauges, Battery operated Ultrasonic/RADAR Level transmitters & Canal Monitoring Software	Category A
All other material, Signal Cable, conduits, computers, Solar Panel with batteries, LED display units, IT hardware etc.	Category B
Nuts and bolts, rubber gasket, rubber rings, and fittings, etc.	Category C

- i. The Supplier shall inform the Engineer about the likely dates of manufacturing, testing and dispatching. The Supplier shall notify the Engineer for Inspection and Testing, at least ten (10) days prior to packing and shipping and shall supply the manufacturer's test results and quality control certificates. For material/Equipment under category "A" and "B", the Engineer will provide an authorization for packing and shipping after inspection/verification of documents.
- ii. The inspection and dispatch clearance by the Employer or the waiver thereof shall not prejudice the right of the Employer or its consignee to test the equipment/goods on receipt at destination. Upon receipt of the goods at final destination, the Employer shall have the right to inspect and /or test the equipment/Goods to confirm their conformity to contract specifications.

- iii. If the equipment fails to meet the contract specifications during inspection, whether pre-dispatch or upon receipt at final destination, the supplier shall take immediate steps to remedy the deficiency or replace the defective equipment to ensure that all supplies meet with the specifications specified in the contract.

### ***Canal Monitoring Software***

*The Customized Canal Monitoring Software by the manufacturer includes:*

- i. Development of algorithms for, integration of discharge equations, development of various modules and various conditions are put based on the type of objective required from software at factory level.*
- ii. At site the report formats, dashboard and creation of Screens, some minor changes in algorithms as per actual site conditions are designed based on the requirement of client.*

*Therefore, at the factory various tests are conducted to ensure the quality of software based on*

## **5.2 Shop/ Factory Tests**

All equipment shall be checked by the Supplier in order to ascertain its correct functioning and Category "A" shall be witnessed by the Employer's Representative on the basis of approved datasheets, inspection test plan and drawings (if applicable).

## **5.3 Acceptance protocol**

### **General**

- a. The delivery of goods/equipment and software should be in accordance with the contract agreement and the process of delivery will adhere to the following 'Acceptance Protocol'. The Acceptance Protocol shall serve as a formal guidance during delivery of the Canal Monitoring system. Its primary goals are twofold.
  - i. Ascertain the delivery and completeness of all ordered products and related documents.
  - ii. Check the functioning of the equipment's of Canal Monitoring system in a formal way against the specifications by application of Acceptance Tests. The tests also verify the accuracy and stability of the equipment.
- b. The Acceptance Protocol shall be executed in close co-operation between the Supplier and the Client.
- c. Products shall be accepted only if they meet the requirements and are functioning in compliance with the approved technical specifications, approved QAP/ITP and the related documents are complete and correct. Defective products and any other discrepancies shall have to be replaced/resolved, within a pre-defined time frame.

The following documents shall accompany the delivery of the Canal Monitoring system:

- i. Administrative and Quality Assurance (QA) documents
- ii. Test and calibration documents

iii. Manuals and Guidelines

All documents shall have identification and references to subject or instrument, date, time, location and officer in charge.

- d. The Acceptance Report lays down the findings and observations during the execution of the Acceptance Protocol and is a formal document to record the acceptance or rejection of any item as covered in the Bid document. Any flaws or findings are to be reported. The forms and checklists filled out during the execution of the Acceptance Protocol are to be enclosed with the Acceptance Report. The Supplier receives a signed copy of the Acceptance Report, which the Supplier can use as proof that the items listed in the report were accepted.
- e. The content of the various documents shall be as follows:

**5.4 Administrative and QA documents:**

These QA documents shall include:

- i. Production documents associated with the instruments.
- ii. Type codes, serial numbers and other identification data on, possibly externally procured, sensors and major assemblies, to clearly demarcate the sensors/major assemblies associated with monitoring system.
- iii. Shipping documents indicating instrument/product type, serial number, measuring range, cable length and other similar data.

**5.5 Test and calibration documents:**

- i) A comprehensive Method Statement on the applied calibration and in-factory test procedures shall be submitted by bidder. The Method Statement should define the test and calibration methods applied on the instruments and the components thereof. The Method Statement shall also include, for each calibrated product, an audit trail to national standards on all instruments and facilities used for testing and calibration. The Audit Trail Report shall associate the calibration of the reference instruments and test equipment to the national calibration standards.
- ii) If the Supplier or Manufacturer is not in a position to deliver an Audit Trail Report to the national standards, the Manufacturer shall explain what the quality standards are and how they are maintained and monitored.
- iii) Conditions during calibration, such as room and/or instrument temperature, equipment and facilities used, shall be included in the calibration and test documents.
- iv) The test and calibration documents (QAP) shall contain the data generated during calibration and testing, including:
  - Calibration data provided by the Manufacturer for all instruments
  - Calibration and test data of the data-logger electronics
  - Data on hysteresis test, temperature tests, zero stability test, scale stability test
  - Humidity test
  - Spray test on enclosure(s), connectors and cables

## Manuals and Guidelines

- The manuals shall meet the requirements on style and clarity, completeness, preciseness, detail and accessibility. This includes:
- System manual,
- Operation, Maintenance and Service manuals,
- Observation guideline, and
- Training handouts

## 5.6 Acceptance Tests

### 1. General

- i) Qualified engineers under responsibility of a test manager shall execute the Acceptance Tests. The progress of the Acceptance Tests would be monitored and supervised by the Client and/or his authorized representative. The Client may have any tests redone or additional tests executed as deem required based on the results of previous tests conducted. The Client's and/or his authorized representative shall have the right of access to any instrument and may request any data or information at any time. The Supplier has the obligation to deliver requested information without delay; i.e. collected test data and documents must be available at the test site.
- ii) It is important that all activities (what, when, where, who, which instrument, etc.) are annotated and uniquely linked to the individual instruments.
- iii) The Acceptance Tests mainly comprise three levels viz.:
  - Functional Tests: The Functional Tests shall verify the proper functioning of the instruments and the associated software. Primary goal is to verify that the instrument performs its functions according to the bid specifications.
  - Accuracy Tests: The Accuracy Tests shall verify that each individual instrument is functional and operates according to the bid specifications. A number of relatively simple accuracy tests are routinely exercised on the instruments.
  - Overall Test: The main purpose of the Overall Test is to verify the common features that are identical to all the instruments in a series. Typical components of the Overall Test are: - in-built software functions of instruments, materials of the instrument, cables, connectors, etc. Further tests include battery and memory autonomy, details of sensor specifications like temperature effects, hysteresis, long term stability etc.
  - The above tests can be executed at any one of the following locations: -Premises of the Manufacturer/Supplier; Premises of the Client; Independent organization; at Site of installation
- iv) The charges for testing shall be borne by the Manufacturer/Supplier. The Client and/or his authorized representative may at his cost opt to be present during the performances of the tests.



- v) If the tests are executed at the Client's premises, the charge for testing shall be borne by the Client and the Supplier shall be responsible for conducting the tests. The bidder in his bid shall indicate the name of independent organisation and the charges for testing. The Client reserves the right to accept the independent organisation and its charges or get the tests done by any other agencies. However, the Supplier would be permitted to be present at these tests.
- vi) (Explanatory Note: Test report from manufacturer would be acceptable. In case purchaser desires to test the system from independent agency (i.es), testing charges would be borne by purchaser.)
  - vii) The details of these tests are as follows.

## **1.1 Functional Tests: The Functional Tests include: visual inspection, and user tests.**

### **1.1.1 Visual Inspection: Visual inspection includes the following activities.**

- i) All items are visually checked for damage, e.g. on cables, sensor and housing.
- ii) Availability of non-removable identification codes and specifications are verified, e.g. serial number, type identification, manufacturer and measuring range.
- iii) Cables have to be marked: each cable is to have an identification code and name.
- iv) Cable connectors shall have their ends marked suitably to indicate the device to which it is to be connected, e.g. PC, HHT, Power Supply etc. Suitable precaution shall be taken so that the connectors are not connected to wrong terminals, i.e. it shall be impossible to connect a power cable to a communication bulkhead socket.

### **1.1.2 User tests**

- i) All instruments have to be identical except for measuring range, cable length, identification code and similar aspects. Consequently, there is no need to check the functionality of all systems. It is assumed that the functional compliance with the specifications is tested under the Overall Tests. The objective of the user test is to detect any malfunction and/or defect. From practical point of view, the user tests can be coupled with other test, e.g. the stability tests.
- ii) Basic functions to be tested are:
  - Pre-deployment preparation, e.g. setting of clock, erasing of memory, setting data logging parameters, entry of identification data
  - Facilities for execution of on-site functional checks
    - Data retrieval and data transfer to PC
    - Battery status and voltage
    - Simple output test by observing pressure reading while the sensor is immersed in a bucket filled with water

## **1.2 Accuracy Tests: The Accuracy tests include:**

- accuracy tests on clock, and
- accuracy tests on pressure measurement

### **1.2.1 Accuracy tests on clock**

- i) The clock of the data logger shall be carefully checked against national time, e.g. taking the radio broadcast time beeps as a reference. The data logger clock is set

precisely and checked at the start of the individual tests and upon instrument and/or data retrieval. In between, the clock should not be readjusted.

- ii) The clock test shall cover at least 3 days to get sufficient time resolution. The reference clock, e.g. a watch, must be carefully tuned against national time prior to and during the tests. The clock drift, converted to seconds per month (31 days) shall comply with the defined specifications. This test method makes use of the specified time resolution of 1 s.

### 1.2.2 Accuracy tests on pressure measurement

- i) The accuracy test on the pressure sensor is an overall accuracy test covering both the pressure and electronics systems. The pressure tests are to be executed against accurately known reference pressure(s). Pressure can be generated from compressed air (gas) or by submerging the sensor to known depths in water.
  - ii) Reference pressure may be created via a precision pressure reduction valve from a source of compressed air. A high precision sensor like a Digi Quartz pressure sensor or a Dead Weight Tester can be implemented to quantify the applied pressure. Pressure should be measured in kPa (or mbar).
  - iii) When applying the immersion method it is much more difficult to check the instruments because water density affects the reading. Moreover, it is not simple to establish the exact depth of sensor immersion. And especially in narrow wells, while immersing a pressure sensor on its cable into a well, the water level will rise due to the additional volume of the immersed pressure sensor and cable. The water level will gradually fall again, when the well level adjusts again to equilibrium with the ground water level. In order to achieve a high accuracy these effects have to be assessed.
  - iv) The pressure sensor tests include:
    - Zero stability test
    - Scale test
    - Scale stability test
  - v) The pressure sensor tests shall focus on temperature effects on zero, scale and cable length, and in addition to that establish quantitative data on drift of zero, scale and creep of cable length.

#### 1.2.2.1 Zero stability test

- i) During the zero-test the instruments are in logging mode, say at an interval of 30 minutes, and shall be kept in a separate room where they will not be touched for at least 3 days. The instruments must be dry, i.e. not in a bucket of water, to exclude any water effect on the sensor, and hence, the instrument reading is expected to be 0.0.
- ii) Under this test, each instrument will record its short term zero drift and inherently the effectiveness of the air-pressure compensation method. During the zero-test, the instruments shall be in the same and constant position, vertical or horizontal. The room temperature shall vary over 5 °C or more, e.g. due to daily temperature fluctuation, this to assess temperature effects on the instrument reading. This requirement may affect the choice of venue for the zero-tests. To

avoid any adverse temperature strain, no direct sunlight shall fall on the instruments. At the end of the test, the collected data are offloaded from the data logger memory and analysed for zero stability. As the instruments are kept in air and are not touched, the reading shall be stable and not change over time, that is not beyond permissible limits.

- iii) Room temperature is to be logged against time, preferably by digital method. In case the RTDAS INSTRUMENTS has a built-in temperature sensor, that sensor may be used for temperature logging. The pressure sensors shall not be tested in an air-conditioned room for several reasons. First, temperature fluctuations may be so rapid that the sensor temperature compensation scheme may not be able to cope with it. Moreover, rapid air-pressure fluctuations may not be handled properly by the air-vent system and/or the pressure measurement method. This is to be understood from the perspective that the instruments are designed to operate in wells where changes occur but not rapidly. One or more fans may be operated continuously to minimise temperature gradient across the test room.
- iv) To test the creep and elongation of the electrical cum suspension cable some vertical open space is required, e.g. a stairwell can be used for this purpose. However, it is important that the cable is protected against touch to avoid interference with the measurements. The cable is loaded with some weight to emulate the weight of cable and sensor. The length of cable under tests shall be as long as possible, i.e. 10 m or more, to get the best accuracy of the tests. The lowest point is suspended to about 0.15 m above the floor. The gap between lowest point and floor is monitored against time. Initially readings are taken every 30 minutes for 12 hours, subsequently the reading interval may be increased to 6 hours. The cable test shall be executed during 7 days. Resolution of measurement should be 1 mm or better. The result is to be presented in mm length change per meter suspended cable length. Only one cable is to be tested.

**1.2.2.2 Scale test: A precisely known pressure is applied on the instrument and the instrument reading is taken. The instrument reading is converted into level or pressure whatever is applicable. The calculated value is compared with the applied value; the difference is regarded as the FS error. In case the specifications of the applied pressure sensor may give reason to doubt the instrument's linearity, then a mid-scale test is to be executed as well.**

**1.2.2.3 Scale stability test: Scale stability is tested by subjecting the instrument to the full-scale pressure for at least 24 hours. During the test, the applied pressure/level is to be accurately monitored by taking reference readings either by a reference logger of high accuracy or by manual readings. The accuracy and resolution of the reference measurement must be 1 mm water column or 0.01 kPa (0.1 mbar).**

**1.3 Overall Test: Part of the Overall Test is also covered under the Functional Tests and Accuracy Tests. The Overall Test comprises tests on:**

- autonomy
- fitness for environment
- functionality
- calibration

- stability
- reproducibility, and
- main power failure
- Details of the various tests are as follows.

### **1.3.1 Autonomy: Two autonomy tests shall be conducted:**

- battery capacity versus the power consumption per measurement, and
- memory capacity
  - i) Battery autonomy test: To execute the test, the instrument is set to a fast data collection interval and the capacity, i.e. the number of samples, is established by a continuous process of data collection until the batteries are depleted. The test shall be executed on new batteries. In this context, the batteries are deemed depleted when the instrument stops functioning because the battery voltage watchdog function detects a too low battery voltage or the normal operation of the instrument stops.
  - ii) Memory capacity verification: The memory is filled at the highest data-recording rate and the volume of collected data is verified against the bid specification. This test could be combined with the battery autonomy test and the samples are taken at a high rate to minimize the test duration.

### **1.3.2 Fitness for environment**

- i) Connectors, cable glands, cables and housing must be suitable for the environment of operation, be it submersed, in a well or above the ground. Water ingress can be assessed by visual inspection and / or by insulation measurement. Visual inspection may only reveal ingress of a significant amount of water. The insulation measurement is more sensitive, especially for cables, connectors and encapsulated electronics, but requires specialised equipment.
- ii) The above-surface components have to be compatible with IP65 standard and shall be tested accordingly by exposing them to a heavy shower for 3 minutes. Subsequently the ingress of water is assessed by opening of the instrument and connectors.
- iii) The submersible components must comply with IP68 standards. To verify this, the instrument shall be suspended in a well for at least one week, to a maximum depth, without affecting the calibration of the pressure sensor and not exceeding 2 times the rated measuring range. Although most pressure sensors can withstand considerably more than 2 times the rated measuring range, there is no need to exceed this. Prior to this test, the zero and scale of the sensor have to be established and verified again upon recovery.

### **1.3.3 Functionality**

- i) Functionality has to be verified for all requirements for operation of the RTDAS INSTRUMENTS with reference to the bid specifications and the instrument specifications as given by the Manufacturer. Missing functionality shall be reported.

- ii) All (software) functions as stated in the instrument manual(s) and the instrument specifications are tested for correct functioning. Any detected flaws are reported which shall be repaired/rectified by the Manufacturer/Supplier within seven days.

#### 1.3.4 Calibration

- i) The instrument calibration is checked for compliance with the bid specifications. In particular accuracy, stability, linearity, hysteresis and reproducibility are verified.
- ii) The scale or sensitivity of the complete instrument, including sensor and electronics, is to be checked for at least 11 pressures, equally distributed over the full measuring range. Furthermore, the calibration data as delivered with the instrument are verified for accuracy and consistency with data obtained from the calibration tests. The calibration may be executed by application of accurately known air-pressure or by immersion in a well. The temperature effects on the calibration should also be verified at low, mid and maximum range temperatures.
- iii) **Note:** Prior to execution of immersion tests, the effective position of the sensor membrane relative to the sensor housing is to be assessed and measured, e.g. by execution of a bucket experiment. In this experiment, the sensor is partly immersed in a water filled bucket to a depth where the related reading has changed by several centimetres, relative to the 'in-air' reading. During the test, the position of the water surface on the sensor's body shall be observed and marked accordingly. The 'effective-sensor-zero' lies below the water surface during the test. The position of the effective-sensor-zero is below the above mentioned water-surface mark by the equivalent of the sensor reading expressed in centimetres. The effective-sensor-zero may be close to the sensor membrane but not necessarily coincides with it.

#### 1.3.5 **Stability: Stability related to the RTDAS INSTRUMENTS is defined as a variation over time of the instrument specifications, whereas the circumstances and pressure do not vary. Parameters to be checked are:**

- zero: offset stability
- scale: full scale stability
- cable: length (extension/contraction) and creep stability

The methods to assess these stability factors are explained under the section on Accuracy Tests.

#### 1.3.6 **Reproducibility: The sensor reading in air is annotated, subsequently the sensor is immersed to the rated measuring depth, and a stable reading is collected. Then the sensor is recovered to the surface and again a stable reading is taken. This process is repeated 5 times and results are duly annotated. It is important that during the complete test the instrument is kept in the same, vertical position.**

#### 1.3.7 **Main power failure:**

- i) Some instruments operate on replaceable batteries or even external power and have a built-in back-up facility, usually based on a Lithium battery. It is quite possible that on some instruments the external power supply or the replaceable batteries fail because of total depletion, disconnection, defect on the cable or

connector etc. In such an event, the instrument must retain its clock, its program setting and most importantly all the collected data.

- ii) The Functional Tests are executed in conjunction with the stability test. Upon finalising these tests and after successful retrieval of all test data the power is disconnected by removing the main power batteries and/or disconnecting the power cable. The instrument is to be left in that state for at least 24 hours. Then the power shall be connected again and clock, program settings and recorded data are checked for availability and correctness.
- iii) Instruments with entirely built-in factory replaceable batteries cannot be tested in this way. In such case, the Manufacturer shall provide a technical description of the method applied to avoid loss of clock, program and collected data.

1. **Test Execution:** Two test programmes are to be executed:

- All Units Test Programme
- Single Unit Test Programme

Prior to execution of the tests, a detailed test script has to be drafted and agreed upon. The test script shall define:

- test sequence.
- the test conditions and requirements for each test.
- place of the test.
- person(s) responsible for conducting the tests.
- reporting requirements.
- handling failures and problems.

**1.1 All Units Test Programme:** The All Units Test Programme aims to identify the malfunctioning instruments and those not compliant with the bid specifications. The Functional Tests, the Clock Accuracy Test and the Zero Stability Test must be executed on each instrument. The design of the tests shall be selective and practical and enable execution with simple means, preferably at the Client's premises.

**1.2 Single Unit Test Programme**

- i) A full system shall be tested, that is: pressure sensor, electronics, cable, power supply, DRS, software and manuals. The Single Unit Test Programme is a combination of the Functional Tests, the Accuracy Tests and the Overall Test. The Client shall randomly select an instrument for testing from the instruments delivered. The Single Unit Test Programme can only be started after verification that all documents related to the order/delivery, including manuals, calibration data, QA data etc., are delivered to the Client. Any other unit, for which doubts arise on its compliance with the bid specifications, shall also be tested on the client's request.
- ii) Failing to pass the Single Unit Test Programme results in rejection of the entire delivery until the defective units have been repaired to meet the technical specifications, and such to the satisfaction of the Client.

2. **Evaluation of test results:** The test results have to be evaluated and results and conclusion shall be reported. Instruments that do not meet the bid specifications, shall be replaced by properly functioning and satisfactorily tested instruments.
3. **Post acceptance performance monitoring**
- i) After installation and field deployment the instrument performance shall be continuously monitored by taking manual observations, initially at a relatively high rate, e.g. every 3 hours, gradually migrating towards the normal monitoring interval. The level comparisons are required for reference and validation purposes. Manual observations and automatic readings shall be taken at short intervals after each other, in practice the time difference shall be kept to less than 15 minutes. The primary criterion though, is that the manual reading shall be taken before the water level changes more than 1 mm.
  - ii) Other checks are on functioning of the internal clock, data recording and retrieval, battery discharge, siltation of the sensor, moisture ingress and any development of corrosion.
  - iii) The tape used for taking the reference readings shall be of high accuracy, considerably better than the accuracy of the RTDAS INSTRUMENTS, only then the performance of the high accuracy instruments can be monitored. However, an accuracy of 1 mm over the full measuring range is enough. Only best quality tapes, e.g. the electric types, come close to this requirement. The tapes shall be checked for accuracy against a precise reference, e.g. over 10 or 20 m on a single stretch. Verification by a standard ruler will not reveal to overall accuracy of a tape. The 'tape verification reference' could be prepared using high accuracy geodetic equipment. A long, straight corridor, or a quiet stretch of road, could accommodate the length reference marks, the accuracy should be 1 mm relative to the reference point (0.000 m).
4. **Instrument History File:** For each instrument, an individual History File shall be opened and maintained (The Instrument history file shall be suppliers' scope.). In the History File the full instrument history and all documents generated shall be stored. This also includes any changes, adaptations, repairs etc. made to the instruments. The products and results of the execution of the Acceptance Protocol shall be included in the Instrument History File. Some document types and entries are listed below:
- 7.1 **Instrument identification:** The instrument identification uniquely defines the instrument particulars.
- Make, vendor, service provider, date of manufacturing, date of delivery
  - Instrument make, model and serial number
  - Instrument configuration
  - Measuring range
  - Cable type, length
  - Manual version
  - Instrument status: e.g. working, under calibration, under repair
- 7.2 **Functional, Accuracy and Over-all tests:** For each of the three test categories, a separate and unambiguous record shall be maintained. The test conditions and results shall be duly

recorded. Obviously any failures or irregularities shall be annotated accurately and comprehensively, as well as the actions taken and their results. At least the following data shall be recorded:

- Administrative data: what, when, where, who, which instrument and configuration
- List of tests
- Specifications for each test
- Results of each test
- Failures, actions, conclusions

### **5.7 Site Acceptance Protocol**

In order to facilitate the site acceptance of the system by the site - in - charges, the Bidder should give a list of deliverables for each site to the respective sites as well as to the headquarters. The list shall be verified by the site - in - charge and accordingly will give a verification report whether all deliverables have been delivered properly at the site. The Bidder should preferably, complete the required civil works at the site for proper installation of the equipment before supplying the equipment at the site.

For site acceptance test, the supplier should give a check - list of all components and their functions. This check list shall be decided in consultation with the department. This check list shall indicate the tests to be conducted at the site and the results that are expected for each and every component that are to be installed at the site. This check list will have to be provided to each and every site one month before the installation begins.

### **5.8 Site Acceptance Tests (SAT) for Remote Stations**

The acceptance test will be conducted by the department or any other person nominated by the department, at its option. Site acceptance test shall be carried out in two stages. The first stage of acceptance will be based on preliminary inspection of the equipment supplied with respect to the required and supplied components such as sensors, DCP with the weatherproof enclosures, batteries (charger/ regulator), gauge apparatus with enclosures and sensors, transmitter, antenna, solar panel and mounting hardware, including all associated accessories.

Second stage of site testing shall be undertaken for a period of 15 days following successful completion of witnessed commissioning to prove the equipment and the interconnecting cable installation and ensure that all operators are fully conversant with the equipment and calibration procedures, methods of operation and all facilities provided by software. During the period of 15 days, there shall be no occurrence of any malfunction in any component necessitating replacement or repairs. No malfunction, partial or complete failure of any part of hardware or excessive heating of motors or other electro-mechanical equipment or bugs in the software should occur. All the software should be complete and no missing modules/ sections will be allowed. The supplier shall maintain necessary log in respect of the results of the tests to establish to the entire satisfaction of the department, the successful completion of the test specified. An average data acquisition efficiency of 95% for the duration of test period shall be considered as satisfactory.

The testing schedule will be agreed to by both the parties during performance of contract. In this stage a regular comprehensive check of functioning of all the components will be made. On conclusion of site acceptance, all relevant documentation pertaining to the site shall be handed over



by the supplier to the representative of the department.

### 5.9 Data Centre Level Acceptance Tests

Data Centre Level acceptance tests shall involve successful receiving of remote stations data at the modeling center's server. It shall include (hardware and software), data dissemination software indicating their full implementation as specified and trouble-free operation of all modules for a period of 3 days operating on 24 X 7 basis. An average data acquisition efficiency of 95% for the duration of test period shall be considered as satisfactory.

### 4.11 Spare parts

Bidder shall provide the list of mandatory spare parts & ensure the availability of sufficient spare parts in its go down for fulfilling its service obligations during warranty period. The same can be inspected by respective Engineer-in Charge or its authorized representative.

### 4.12 Manuals

- Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals of the goods and equipment. These shall be in such detail as will enable the Purchaser to operate, maintain, adjust and repair all parts of the equipment as stated in the specifications.
- The manuals shall be in the ruling language (English) and in such form and numbers as stated in the contract.
- Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purpose of taking over until such manuals have been supplied to the Purchaser.

### 4.13 For the System and Other Software, the following will apply:

The Supplier shall provide complete and legal documentation of hardware, and licensed operating systems. The supplier shall also indemnify the purchaser against any levies/penalties on account of any default in this regard.

Supplier shall be responsible for any up gradations & renewals required for software & hardware till the life expectancy period of equipment's

### 4.14 Acceptance Certificates:

On successful completion of acceptability test, receipt of deliverables etc, and after the purchaser is satisfied with the working of the RTDAS system, the acceptance certificate signed by the supplier and the representative of the purchaser will be issued. The date on which such certificate is signed shall be deemed to be the date of successful commissioning of the systems.

## 6. PROFORMA OF CERTIFICATE FOR ISSUE BY THE PURCHASER AFTER SUCCESSFUL INSTALLATION AND STARTUP OF THE SUPPLIED GOODS

*[This is to be attached for supply, erection, supervision of erection and startup contracts only]*

No.

Date:

M/s.

Sub: Certificate of startup of the supplied Goods

1. This is to certify that the plant/s as detailed below has/have been received in good condition along with all the standard and special accessories (subject to remarks in Para No. 2) and a set of spares in accordance with the Contract/Specifications. The same has been installed and commissioned.

- (a) Contract No. \_\_\_\_\_ dated \_\_\_\_\_
- (b) Description of the plant \_\_\_\_\_
- (c) Plant Nos. \_\_\_\_\_
- (d) Quantity \_\_\_\_\_
- (e) Rail/Roadways Receipt No. \_\_\_\_\_ dated \_\_\_\_\_
- (f) Name of the consignee \_\_\_\_\_
- (g) Date of startup and proving test \_\_\_\_\_

2. Details of accessories/spares not yet supplied and recoveries to be made on that account.

<u>S. No.</u>	<u>Description</u>	<u>Amount to be recovered</u>
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3. The proving test has been done to our entire satisfaction and operators have been trained to operate the plant.

4. The supplier has fulfilled his contractual obligations satisfactorily. \*

or

The supplier has failed to fulfill his contractual obligations with regard to the following:

- (a)
- (b)
- (c)
- (d)

5. The amount of recovery on account of non-supply of accessories and spares is given under Para No. 2.
6. The amount of recovery on account of failure of the supplier to meet his contractual obligations is as indicated in endorsement of the letter.

Signature \_\_\_\_\_

Name \_\_\_\_\_

Designation with Stamp \_\_\_\_\_

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\* Explanatory notes for filling up the certificates:

- (a) He has adhered to the time schedule specified in the contract in dispatching the documents/drawings pursuant to Technical Specifications.
- (b) He has supervised the startup of the plan in time i.e., within the period specified in the contract from the date of intimation by the Purchaser in respect of the installation of the plant.
- (c) Training of personnel has been done by the supplier as specified in the contract
- (d) In the event of documents/drawings having not been supplied or installation and startup of the plant have been delayed on account of the supplier, the extent of delay should always be mentioned.

## PART 3 – CONTRACT

### SECTION VIII – GENERAL CONDITIONS OF CONTRACT

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## Section VIII. General Conditions of Contract

### 1. Definitions

The following words and expressions shall have the meanings hereby assigned to them:

- (a) “Bank” means the World Bank and refers to the International Bank for Reconstruction and Development (IBRD) or the International Development Association (IDA).
- (b) “Contract” means the Contract Agreement entered into between the Purchaser and the Supplier, together with the Contract Documents referred to therein, including all attachments, appendices, and all documents incorporated by reference therein.
- (c) “Contract Documents” means the documents listed in the Contract Agreement, including any amendments thereto.
- (d) “Contract Price” means the price payable to the Supplier as specified in the Contract Agreement, subject to such additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract.
- (e) “Day” means calendar day.
- (f) “Completion” means the fulfillment of the Related Services by the Supplier in accordance with the terms and conditions set forth in the Contract.
- (g) “GCC” means the General Conditions of Contract.
- (h) “Goods” means all of the commodities, raw material, machinery and equipment, and/or other materials that the Supplier is required to supply to the Purchaser under the Contract.
- (i) “Purchaser’s Country” is India.
- (j) “Purchaser” means the entity purchasing the Goods and Related Services, as specified in the SCC.
- (k) “Related Services” means the services incidental to the supply of the goods, such as insurance, installation, start-up, training and initial maintenance and other such obligations of the Supplier under the Contract.

- (l) “SCC” means the Special Conditions of Contract.
- (m) “Subcontractor” means any natural person, private or government entity, or a combination of the above, to whom any part of the Goods to be supplied or execution of any part of the Related Services is subcontracted by the Supplier.
- (n) “Supplier” means the natural person, private or government entity, or a combination of the above, whose bid to perform the Contract has been accepted by the Purchaser and is named as such in the Contract Agreement.
- (o) “The Project Site,” where applicable, means the place named in the SCC.

**2. Contract Documents**

- 2.1 Subject to the order of precedence set forth in the Contract Agreement, all documents forming the Contract (and all parts thereof) are intended to be correlative, complementary, and mutually explanatory. The Contract Agreement shall be read as a whole.

**3. Corrupt & Fraudulent Practices**

- 3.1 The Bank requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Appendix to the GCC.
- 3.2 The Purchaser requires the Supplier to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

**4. Interpretation**

- 4.1 If the context so requires it, singular means plural and vice versa.
- 4.2 Incoterms.
- (a) Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of parties there under shall be as prescribed by Incoterms.
  - (b) The terms EXW and other similar terms, when used, shall be governed by the rules prescribed in the current edition of Incoterms specified in the SCC and published by the International Chamber of Commerce in Paris, France.

#### 4.3 Entire Agreement

The Contract constitutes the entire agreement between the Purchaser and the Supplier and supersedes all communications, negotiations and agreements (whether written or oral) of the parties with respect thereto made prior to the date of Contract.

#### 4.4 Amendment

No amendment or other variation of the Contract shall be valid unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each party thereto.

#### 4.5 Nonwaiver

- (a) Subject to GCC Sub-Clause 4.5(b) below, no relaxation, forbearance, delay, or indulgence by either party in enforcing any of the terms and conditions of the Contract or the granting of time by either party to the other shall prejudice, affect, or restrict the rights of that party under the Contract, neither shall any waiver by either party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.
- (b) Any waiver of a party's rights, powers, or remedies under the Contract must be in writing, dated, and signed by an authorized representative of the party granting such waiver, and must specify the right and the extent to which it is being waived.

#### 4.6 Severability

If any provision or condition of the Contract is prohibited or rendered invalid or unenforceable, such prohibition, invalidity or unenforceability shall not affect the validity or enforceability of any other provisions and conditions of the Contract.

### **5. Language**

- 5.1 The Contract as well as all correspondence and documents relating to the Contract exchanged by the Supplier and the Purchaser, shall be English. Supporting documents and printed literature that are part of the Contract may be in another language provided they are accompanied by an accurate translation of the relevant passages in English language, in which case, for purposes of interpretation of the Contract, this translation shall govern.
- 5.2 The Supplier shall bear all costs of translation to the governing language and all risks of the accuracy of such translation, for documents provided by the Supplier.



- 6. Joint Venture, Consortium or Association** 6.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.
- 7. Eligibility** 7.1 The Supplier and its Subcontractors shall have the nationality of an eligible country. A Supplier or Subcontractor shall be deemed to have the nationality of a country if it is a citizen or constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country.
- 7.2 All Goods and Related Services to be supplied under the Contract and financed by the Bank shall have their origin in Eligible Countries. For the purpose of this Clause, origin means the country where the goods have been grown, mined, cultivated, produced, manufactured, or processed; or through manufacture, processing, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its components.
- 8. Notices** 8.1 Any notice given by one party to the other pursuant to the Contract shall be in writing to the address specified in the SCC. The term “in writing” means communicated in written form with proof of receipt.
- 8.2 A notice shall be effective when delivered or on the notice’s effective date, whichever is later.
- 9. Governing Law** 9.1 The Contract shall be governed by and interpreted in accordance with the laws of the Union of India.
- 10. Settlement of Disputes** 10.1 The Purchaser and the Supplier shall make every effort to resolve amicably by direct informal negotiation any disagreement or dispute arising between them under or in connection with the Contract.
- 10.2 If, after twenty-eight (28) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given. Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause shall be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Goods under the Contract. Arbitration

proceedings shall be conducted in accordance with the rules of procedure **specified in the SCC.**

- 10.3 Notwithstanding any reference to arbitration herein,
- (a) the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree; and
  - (b) the Purchaser shall pay the Supplier any monies due the Supplier.

**11. Inspections and Audit by the Bank**

- 11.1 The Supplier shall keep, and shall make all reasonable efforts to cause its Subcontractors to keep, accurate and systematic accounts and records in respect of the Goods in such form and details as will clearly identify relevant time changes and costs
- 11.2 The Supplier shall permit, and shall cause its Subcontractors to permit, the Bank and/or persons appointed by the Bank to inspect the Supplier's offices and all accounts and records relating to the performance of the Contract and the submission of the bid, and to have such accounts and records audited by auditors appointed by the Bank if requested by the Bank. The Supplier's and its Subcontractors and consultants' attention is drawn to Clause 3 [Fraud and Corruption], which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under this Sub-Clause 11.1 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures)

**12. Scope of Supply**

- 12.1 The Goods and Related Services to be supplied shall be as specified in the **Special Conditions of Contract.**

**13. Delivery and Documents**

- 13.1 Subject to GCC Sub-Clause 33.1, the Delivery of the Goods and Completion of the Related Services shall be in accordance with the Delivery and Completion Schedule specified in the Schedule of Requirements. The details of shipping and other documents to be furnished by the Supplier are specified in the **SCC.**

**14. Supplier's Responsibilities**

- 14.1 The Supplier shall supply all the Goods and Related Services included in the Scope of Supply in accordance with GCC Clause 12, and the Delivery and Completion Schedule, as per GCC Clause 13.

**15. Contract Price**

- 15.1 Prices charged by the Supplier for the Goods supplied and the Related Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid, with the exception of any price adjustments authorized in the **SCC.**

- 16. Terms of Payment**
- 16.1 The Contract Price, including any Advance Payments, if applicable, shall be paid as specified in the SCC.
- 16.2 The Supplier's request for payment shall be made to the Purchaser in writing, accompanied by invoices describing, as appropriate, the Goods delivered and Related Services performed, and by the documents submitted pursuant to GCC Clause 13 and upon fulfillment of all other obligations stipulated in the Contract.
- 16.3 Payments shall be made promptly by the Purchaser, but in no case later than sixty (60) days after submission of an invoice or request for payment by the Supplier, and after the Purchaser has accepted it.
- 16.4 The payments shall be made in Indian Rupees to the Supplier under this Contract.
- 16.5 In the event that the Purchaser fails to pay the Supplier any payment by its due date or within the period set forth in the SCC, the Purchaser shall pay to the Supplier interest on the amount of such delayed payment at the rate shown in the SCC, for the period of delay until payment has been made in full, whether before or after judgment or arbitrage award.
- 17. Taxes and Duties**
- 17.1 The Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser.
- 18. Performance Security**
- 18.1 If required as specified in the SCC, the Supplier shall, within twenty-one (21) days of the notification of contract award, provide a performance security for the performance of the Contract in the amount specified in the SCC.
- 18.2 The proceeds of the Performance Security shall be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.
- 18.3 As specified in the SCC, the Performance Security shall be denominated in the Indian Rupees, and shall be in the format stipulated by the Purchaser in the SCC, or in another format acceptable to the Purchaser.
- 18.4 The Performance Security shall be discharged by the Purchaser and returned to the Supplier not later than twenty-eight (28) days following the date of Completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless specified otherwise in the SCC.

**19. Copyright**

19.1 The copyright in all drawings, documents, and other materials containing data and information furnished to the Purchaser by the Supplier herein shall remain vested in the Supplier, or, if they are furnished to the Purchaser directly or through the Supplier by any third party, including suppliers of materials, the copyright in such materials shall remain vested in such third party.

**20. Confidential Information**

20.1 The Purchaser and the Supplier shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other party hereto in connection with the Contract, whether such information has been furnished prior to, during or following completion or termination of the Contract. Notwithstanding the above, the Supplier may furnish to its Subcontractor such documents, data, and other information it receives from the Purchaser to the extent required for the Subcontractor to perform its work under the Contract, in which event the Supplier shall obtain from such Subcontractor an undertaking of confidentiality similar to that imposed on the Supplier under GCC Clause 20.

20.2 The Purchaser shall not use such documents, data, and other information received from the Supplier for any purposes unrelated to the contract. Similarly, the Supplier shall not use such documents, data, and other information received from the Purchaser for any purpose other than the performance of the Contract.

20.3 The obligation of a party under GCC Sub-Clauses 20.1 and 20.2 above, however, shall not apply to information that:

- (a) the Purchaser or Supplier need to share with the Bank or other institutions participating in the financing of the Contract;
- (b) now or hereafter enters the public domain through no fault of that party;
- (c) can be proven to have been possessed by that party at the time of disclosure and which was not previously obtained, directly or indirectly, from the other party; or
- (d) otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

20.4 The above provisions of GCC Clause 20 shall not in any way modify any undertaking of confidentiality given by either of

the parties hereto prior to the date of the Contract in respect of the Supply or any part thereof.

20.5 The provisions of GCC Clause 20 shall survive completion or termination, for whatever reason, of the Contract.

## **21. Subcontracting**

21.1 The Supplier shall notify the Purchaser in writing of all subcontracts awarded under the Contract if not already specified in the bid. Such notification, in the original bid or later shall not relieve the Supplier from any of its obligations, duties, responsibilities, or liability under the Contract.

21.2 Subcontracts shall comply with the provisions of GCC Clauses 3 and 7.

## **22. Specifications and Standards**

22.1 Technical Specifications and Drawings

(a) The Goods and Related Services supplied under this Contract shall conform to the technical specifications and standards mentioned in Section VII, Schedule of Requirements and, when no applicable standard is mentioned, the standard shall be equivalent or superior to the official standards whose application is appropriate to the Goods' country of origin.

(b) The Supplier shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designed by or on behalf of the Purchaser, by giving a notice of such disclaimer to the Purchaser.

(c) Wherever references are made in the Contract to codes and standards in accordance with which it shall be executed, the edition or the revised version of such codes and standards shall be those specified in the Schedule of Requirements. During Contract execution, any changes in any such codes and standards shall be applied only after approval by the Purchaser and shall be treated in accordance with GCC Clause 33.

## **23. Packing and Documents**

23.1 The Supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. During transit, the packing shall be sufficient to withstand, without limitation, rough handling and exposure to extreme temperatures, salt and precipitation, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

23.2 The packing, marking, and documentation within and outside

the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in the SCC, and in any other instructions ordered by the Purchaser.

- 24. Insurance** 24.1 Unless otherwise specified in the SCC, the Goods supplied under the Contract shall be fully insured—against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery, in accordance with the applicable Incoterms or in the manner specified in the SCC.
- 25. Transportation & Incidental Services** 25.1 Unless otherwise specified in the SCC, responsibility for arranging transportation of the Goods shall be in accordance with the specified Incoterms.
- 25.2 The Supplier may be required to provide any or all of the following services, including additional services, if any, **specified in Schedule of Requirements and SCC:**
- (a) performance or supervision of on-site assembly and/or start-up of the supplied Goods;
  - (b) furnishing of tools required for assembly and/or maintenance of the supplied Goods;
  - (c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods;
  - (d) performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and
  - (e) training of the Purchaser's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods
- 25.3 Prices charged by the Supplier for incidental services, if not included in the Contract Price for the Goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.
- 26. Inspections and Tests** 26.1 The Supplier shall at its own expense and at no cost to the Purchaser carry out all such tests and/or inspections of the Goods and Related Services as are specified in the SCC.
- 26.2 The inspections and tests may be conducted on the premises of the Supplier or its Subcontractor, at point of delivery, and/or at the Goods' final destination, or in another place in the Purchaser's Country as specified in the SCC. Subject to GCC

Sub-Clause 26.3, if conducted on the premises of the Supplier or its Subcontractor, all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Purchaser.

- 26.3 The Purchaser or its designated representative shall be entitled to attend the tests and/or inspections referred to in GCC Sub-Clause 26.2, provided that the Purchaser bear all of its own costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.
- 26.4 Whenever the Supplier is ready to carry out any such test and inspection, it shall give a reasonable advance notice, including the place and time, to the Purchaser. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.
- 26.5 The Purchaser may require the Supplier to carry out any test and/or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications codes and standards under the Contract, provided that the Supplier's reasonable costs and expenses incurred in the carrying out of such test and/or inspection shall be added to the Contract Price. Further, if such test and/or inspection impedes the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected.
- 26.6 The Supplier shall provide the Purchaser with a report of the results of any such test and/or inspection.
- 26.7 The Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection, at no cost to the Purchaser, upon giving a notice pursuant to GCC Sub-Clause 26.4.
- 26.8 The Supplier agrees that neither the execution of a test and/or inspection of the Goods or any part thereof, nor the attendance by the Purchaser or its representative, nor the issue of any report pursuant to GCC Sub-Clause 26.6, shall release the Supplier from any warranties or other obligations under the Contract.

**27. Liquidated Damages**

27.1 Except as provided under GCC Clause 32, if the Supplier fails to deliver any or all of the Goods by the Date(s) of delivery or perform the Related Services within the period specified in the Contract, the Purchaser may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in the SCC of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the percentage specified in those SCC. Once the maximum is reached, the Purchaser may terminate the Contract pursuant to GCC Clause 35.

**28. Warranty**

28.1 The Supplier warrants that all the Goods are new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract.

28.2 Subject to GCC Sub-Clause 22.1(b), the Supplier further warrants that the Goods shall be free from defects arising from any act or omission of the Supplier or arising from design, materials, and workmanship, under normal use in the conditions prevailing in the country of final destination.

28.3 Unless otherwise specified in the SCC, the warranty shall remain valid for twelve (12) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the SCC, or for eighteen (18) months after the date of shipment from the port or place of loading in the country of origin, whichever period concludes earlier.

28.4 The Purchaser shall give notice to the Supplier stating the nature of any such defects together with all available evidence thereof, promptly following the discovery thereof. The Purchaser shall afford all reasonable opportunity for the Supplier to inspect such defects.

28.5 Upon receipt of such notice, the Supplier shall, within the period specified in the SCC, expeditiously repair or replace the defective Goods or parts thereof, at no cost to the Purchaser.

28.6 If having been notified, the Supplier fails to remedy the defect within the period specified in the SCC, the Purchaser may proceed to take within a reasonable period such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.



**29. Patent  
Indemnity**

29.1 The Supplier shall, subject to the Purchaser's compliance with GCC Sub-Clause 29.2, indemnify and hold harmless the Purchaser and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the Purchaser may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract by reason of:

- (a) the installation of the Goods by the Supplier or the use of the Goods in the country where the Site is located; and
- (b) the sale in any country of the products produced by the Goods.

Such indemnity shall not cover any use of the Goods or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, neither any infringement resulting from the use of the Goods or any part thereof, or any products produced thereby in association or combination with any other equipment, plant, or materials not supplied by the Supplier, pursuant to the Contract.

29.2 If any proceedings are brought or any claim is made against the Purchaser arising out of the matters referred to in GCC Sub-Clause 29.1, the Purchaser shall promptly give the Supplier a notice thereof, and the Supplier may at its own expense and in the Purchaser's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

29.3 If the Supplier fails to notify the Purchaser within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Purchaser shall be free to conduct the same on its own behalf.

29.4 The Purchaser shall, at the Supplier's request, afford all available assistance to the Supplier in conducting such proceedings or claim, and shall be reimbursed by the Supplier for all reasonable expenses incurred in so doing.

29.5 The Purchaser shall indemnify and hold harmless the Supplier and its employees, officers, and Subcontractors from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of any nature, including attorney's fees and expenses, which the

Supplier may suffer as a result of any infringement or alleged infringement of any patent, utility model, registered design, trademark, copyright, or other intellectual property right registered or otherwise existing at the date of the Contract arising out of or in connection with any design, data, drawing, specification, or other documents or materials provided or designed by or on behalf of the Purchaser.

- 30. Limitation of Liability**
- 30.1 Except in cases of criminal negligence or willful misconduct,
- (a) the Supplier shall not be liable to the Purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Purchaser, and
  - (b) the aggregate liability of the Supplier to the Purchaser, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment, or to any obligation of the supplier to indemnify the purchaser with respect to patent infringement.
- 31. Change in Laws and Regulations**
- 31.1 Unless otherwise specified in the Contract, if after the date of 28 days prior to date of Bid submission, any law, regulation, ordinance, order or bylaw having the force of law is enacted, promulgated, abrogated, or changed in India, where the Site is located (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the Delivery Date and/or the Contract Price, then such Delivery Date and/or Contract Price shall be correspondingly increased or decreased, to the extent that the Supplier has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced cost shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions where applicable, in accordance with GCC Clause 15.
- 32. Force Majeure**
- 32.1 The Supplier shall not be liable for forfeiture of its Performance Security, liquidated damages, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 32.2 For purposes of this Clause, “Force Majeure” means an event or situation beyond the control of the Supplier that is not

foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of the Supplier. Such events may include, but not be limited to, acts of the Purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

32.3 If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

**33. Change Orders  
and Contract  
Amendments**

33.1 The Purchaser may at any time order the Supplier through notice in accordance GCC Clause 8, to make changes within the general scope of the Contract in any one or more of the following:

- (a) drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
- (b) the method of shipment or packing;
- (c) the place of delivery; and
- (d) the Related Services to be provided by the Supplier.

33.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or in the Delivery/Completion Schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this Clause must be asserted within twenty-eight (28) days from the date of the Supplier's receipt of the Purchaser's change order.

33.3 Prices to be charged by the Supplier for any Related Services that might be needed but which were not included in the Contract shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.

33.4 Subject to the above, no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.

- 34. Extensions of Time**
- 34.1 If at any time during performance of the Contract, the Supplier or its subcontractors should encounter conditions impeding timely delivery of the Goods or completion of Related Services pursuant to GCC Clause 13, the Supplier shall promptly notify the Purchaser in writing of the delay, its likely duration, and its cause. As soon as practicable after receipt of the Supplier's notice, the Purchaser shall evaluate the situation and may at its discretion extend the Supplier's time for performance, in which case the extension shall be ratified by the parties by amendment of the Contract.
- 34.2 Except in case of Force Majeure, as provided under GCC Clause 32, a delay by the Supplier in the performance of its Delivery and Completion obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 26, unless an extension of time is agreed upon, pursuant to GCC Sub-Clause 34.1.
- 35. Termination**
- 35.1 Termination for Default
- (a) The Purchaser, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, may terminate the Contract in whole or in part:
- (i) if the Supplier fails to deliver any or all of the Goods within the period specified in the Contract, or within any extension thereof granted by the Purchaser pursuant to GCC Clause 34;
  - (ii) if the Supplier fails to perform any other obligation under the Contract; or
  - (iii) if the Supplier, in the judgment of the Purchaser has engaged in fraud and corruption, as defined in GCC Clause 3, in competing for or in executing the Contract.
- (b) In the event the Purchaser terminates the Contract in whole or in part, pursuant to GCC Clause 35.1(a), the Purchaser may procure, upon such terms and in such manner as it deems appropriate, Goods or Related Services similar to those undelivered or not performed, and the Supplier shall be liable to the Purchaser for any additional costs for such similar Goods or Related Services. However, the Supplier shall continue performance of the Contract to the extent not terminated.
- 35.2 Termination for Insolvency.

(a) The Purchaser may at any time terminate the Contract by giving notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser.

### 35.3 Termination for Convenience.

(a) The Purchaser, by notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

(b) The Goods that are complete and ready for shipment within twenty-eight (28) days after the Supplier's receipt of notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

(i) to have any portion completed and delivered at the Contract terms and prices; and/or

(ii) to cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Supplier.

## 36. Assignment

36.1 Neither the Purchaser nor the Supplier shall assign, in whole or in part, their obligations under this Contract, except with prior written consent of the other party.

## APPENDIX TO GENERAL CONDITIONS

### Bank's Policy- Corrupt and Fraudulent Practices

*(text in this Appendix shall not be modified)*

#### **Guidelines for Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, dated January 2011:**

##### **“Fraud and Corruption:**

1.16 It is the Bank's policy to require that Borrowers (including beneficiaries of Bank loans), bidders, suppliers, contractors and their agents (whether declared or not), sub-contractors, sub-consultants, service providers or suppliers, and any personnel thereof, observe the highest standard of ethics during the procurement and execution of Bank-financed contracts.<sup>10</sup> In pursuance of this policy, the Bank:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
  - (i) “corrupt practice” is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;<sup>11</sup>
  - (ii) “fraudulent practice” is 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;<sup>12</sup>
  - (iii) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;<sup>13</sup>
  - (iv) “coercive practice” is 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;<sup>14</sup>

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<sup>10</sup> In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

<sup>11</sup> For the purpose of this sub-paragraph, “*another party*” refers to a public official acting in relation to the procurement process or contract execution. In this context, “*public official*” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

<sup>12</sup> For the purpose of this sub-paragraph, “*party*” refers to a public official; the terms “*benefit*” and “*obligation*” relate to the procurement process or contract execution; and the “*act or omission*” is intended to influence the procurement process or contract execution.

<sup>13</sup> For the purpose of this sub-paragraph, “*parties*” refers to participants in the procurement process (including public officials) attempting either themselves, or through another person or entity not participating in the procurement or selection process, to simulate competition or to establish bid prices at artificial, non-competitive levels, or are privy to each other's bid prices or other conditions.

<sup>14</sup> For the purpose of this sub-paragraph, “*party*” refers to a participant in the procurement process or contract execution.

- (v) "obstructive practice" is:
- (aa) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or 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
  - (bb) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 1.16(e) below.
- (b) will reject a proposal for award if it determines that the bidder recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;
- (c) will declare misprocurement and cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement or the implementation of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;
- (d) will sanction a firm or individual, at any time, in accordance with the prevailing Bank's sanctions procedures,<sup>15</sup> including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated<sup>16</sup>;
- (e) will require that a clause be included in bidding documents and in contracts financed by a Bank loan, requiring bidders, suppliers and contractors, and their sub-contractors, agents, personnel, consultants, service providers, or suppliers, to permit the Bank to inspect all accounts, records, and other documents relating to the submission of bids and contract performance, and to have them audited by auditors appointed by the Bank."

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<sup>15</sup> A firm or individual may be declared ineligible to be awarded a Bank financed contract upon: (i) completion of the Bank's sanctions proceedings as per its sanctions procedures, including, inter alia, cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks, and through the application the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption; and (ii) as a result of temporary suspension or early temporary suspension in connection with an ongoing sanctions proceeding. See footnote 14 and paragraph 8 of Appendix 1 of these Guidelines.

<sup>16</sup> A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which has either been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.





## SECTION IX. SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract (SCC) shall supplement and / or amend the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

GCC 1.1(j)	<p>The Purchaser is: <i>Executive Engineer, Burdwan Investigation &amp; Planning Division, I&amp;W Directorate, Govt. of West Bengal</i></p> <p><b><i>The Engineer In-Charge is: Executive Engineer, Mayurakshi Electrical &amp; Mechanical Division, I &amp; WD, Suri, Birbhum.</i></b></p>
GCC 1.1 (o)	The Project Site(s)/Final Destination(s) is/are: <b><i>at Birbhum District</i></b>
GCC 4.2 (a)	The meaning of the trade terms shall be as prescribed by Incoterms.
GCC 4.2 (b)	The version edition of Incoterms shall be 2010.
SCC 6	<p>Clause is modified as follows: Joint Venture, Consortium or Association</p> <p>6.1 If the Supplier is a joint venture, consortium, or association, all of the parties shall be jointly and severally liable to the Purchaser for the fulfillment of the provisions of the Contract and shall designate one party to act as a leader with authority to bind the joint venture, consortium, or association. The composition or the constitution of the joint venture, consortium, or association shall not be altered without the prior consent of the Purchaser.</p>
GCC 8.1	<p>For <b><u>notices</u></b>, the Purchaser's address shall be:</p> <p>Attention: <i>Executive Engineer, Burdwan Investigation &amp; Planning Division, I&amp;W Directorate, Govt. of West Bengal</i>  Street Address: <i>NH-2</i>  Floor/ Room number: <i>Purta Bhawan, 3rd Floor</i>  City: <i>Burdwan</i>  PIN Code: <i>713103</i>  Country: <i>INDIA</i></p>

	<p>Telephone: +91342-2646799  Facsimile number: +91342-2646799  Electronic mail address: <a href="mailto:eebipd2012@gmail.com">eebipd2012@gmail.com</a></p>
<p><b>GCC 10.2</b></p>	<p><b>Settlement of Disputes</b>  The dispute settlement mechanism to be applied for ad hoc arbitration shall be as follows:</p> <p>(a) In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996 as amended up-to-date. The arbitral tribunal shall consist of 3 arbitrators one each to be appointed by the Purchaser and the Supplier. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the */president of the institution of Engineers (India), Kolkata</p> <p>(b) In the case of a dispute with a Foreign Supplier, the dispute shall be settled in accordance with provisions of UNCITRAL (United nations Commission on International Trade Law) Arbitration Rules. The Arbitral Tribunal shall consist of three Arbitrators one each to be appointed by the Purchaser and the Supplier. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the parties, and shall act as presiding arbitrator. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the *President of the Institution of Engineers (India)( c) If one of the parties fails to appoint its arbitrator in pursuance of sub-clause (a) and (b) above, within 30 days after receipt of the notice of the appointment of its arbitrator by the other party, then the *Indian Council of Arbitration/president of the Institution of Engineers (India)/The International Centre for Alternative Dispute Resolution (India), both in cases of the Foreign supplier as well as Indian supplier, shall appoint the arbitrator. A certified copy of the order of the President of the Institution of Engineers (India) Kolkata, making such an appointment shall be furnished to each of the parties.  Arbitration proceedings shall be held at _____Kolkata_____ India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English</p> <p>(c) The decision of the majority of arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as</p>

	<p>determined by the arbitral tribunal. However, the expenses incurred by each party in connection with the preparation, presentation etc. of its proceedings as also the fees and expenses paid to the arbitrator appointed by such party or on its behalf shall be borne by each party itself.</p> <p>(e) Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority namely the *Indian Council of Arbitration/President of the Institution of Engineers (India)/The International Centre for Alternative Dispute Resolution (India).</p> <p>(f) Except otherwise agreed to by the Parties, Arbitrators should give a decision in writing within 120 days of receipt of notification of dispute.</p>
<p><b>GCC 12.1 and 25.2</b></p>	<p>The scope of supply for the Goods and Related Services to be supplied shall be as specified below: <i>Scope of the supply including the related services is listed in Table-1 &amp; 2 of the Schedule of requirements and detailed in <b>Technical Specifications</b> (Section VII)</i></p>
<p><b>GCC 13.1</b></p>	<p>Details of Shipping and other Documents to be furnished by the Supplier are given below:</p> <p>GCC 13.1 Upon delivery of the goods to the transporter/consignee, the supplier shall notify the purchaser and mail the following documents to the Purchaser:</p> <ul style="list-style-type: none"> <li>(i) <i>Four (4)</i> Copies of the Supplier invoice showing contract number, goods description, quantity, unit price, total amount;</li> <li>(ii) Delivery note, Railway receipt, or Road consignment note or equivalent transport document or acknowledgement of receipt of goods from the Consignee;</li> <li>(iii) <i>Four (4)</i> Copies of packing list identifying contents of each package;</li> <li>(iv) Insurance certificate;</li> <li>(v) Manufacturer's/Supplier's warranty certificate;</li> <li>(vi) Inspection certificate issued by the nominated inspection agency, and the Supplier's factory inspection report; and</li> </ul>

	<p>(vii) Certificate or origin.</p> <p>The above documents shall be received by the Purchaser before arrival of the Goods (except where it is handed over to the Consignee with all documents) and if not received, the supplier will be responsible for any consequent expenses.</p>
GCC 14.1	<p>ADD to GCC 14.1;</p> <p>The supplier is responsible for and obliged to conduct all contracted activities in accordance with the contract using state- of- the- art methods and economic principles and exercising all means available to achieve the performance specified in the Contract. The Supplier is obliged to work closely with the Purchaser's staff, act within its own authority and abide by directives issued by the Purchaser and implementation activities. The Supplier will abide by the job safety measures prevalent in India and will free the Purchaser from all demands or responsibilities arising from accidents or loss of life the cause of which is the supplier's negligence. The Supplier will pay all indemnities arising from such incidents and will not holding the activities of its personnel or sub- contracted personnel and will hold itself responsible for any misbehavior/ misconduct. The Supplier will treat as confidential all data and information about the purchaser, obtained in the execution of his responsibilities, in strict confidence and will not reveal such information to any other party without the prior written approval of the Purchaser.</p>
GCC 15.1	<p>The prices charged for the Goods supplied and the related Services performed "<i>shall not</i>," be adjustable.</p>
GCC 16.1	<p><b>Payment shall be made in Indian Rupees in the following manner:</b></p> <p>The Bidder shall be paid <b>40%</b> (as per clause i) of the Contract Price and the balance <b>60%</b> (as per clause ii) of the Contract Price for O&amp;M and data communication over the next five years @ 12% per year which include 5 years period of onsite warranty as mentioned below:</p> <p><i>(Note: Contract Price does not include any taxes or levies, as may be applicable and treated separately)</i></p> <p><b>i) Disbursement of Payment shall be as under:</b></p> <ul style="list-style-type: none"> <li>● Advance Payment: Ten (10) % of the total contract price cost excluding GST shall be paid within thirty (30) days of signing of Contract and upon submission of bank guarantee for the equivalent amount valid until the goods are delivered and in the form provided in the bidding documents.</li> <li>● 20% of Contract Price, plus total GST amount charged in Invoice against Supply of Goods shall be released on pro-rata basis after 30 days of the</li> </ul>

	<p>successful Delivery of the instruments/ Equipment as per Schedule of Requirements and its Final acceptance upon submission of the documents specified in clause 13 of SCC.</p> <ul style="list-style-type: none"> <li>● 20% of Contract Price will be paid on pro-rata basis after 30 days of successful installation, testing, commissioning and final acceptance. Advance payment of 10% paid against Bank Guarantee will be adjusted in 20% payment paid on testing, commissioning and final acceptance as stated above.</li> </ul> <p><i>ii) 60% of the Contract Price but including replacement of parts if any and seamless data communication, here onwards referred as maintenance charges over the balance 05(five) years (5 years of warranty period) shall be paid as per follows;</i></p> <ul style="list-style-type: none"> <li>● <b>12% per Year to be paid on Half Yearly basis</b> (6% at every six month) inclusive of GST payable on Supply of related services. The Conditions (applicable for this payment) shall be governed by <b>Annexure I: Service Level Conditions.</b></li> </ul> <p><i>iii) Payment of GST will be against valid Invoice as per GST Act &amp; Rules and submission of GST Registration Certificate along with declaration that GST Registration is valid and all liabilities towards GST have been discharged by the vendor. GST amount will be reimbursed after 30 days of submission of valid Invoice and all required documents and declaration by vendor.</i></p> <p><i>iv) For all the payments to be made, against Bank guarantees, the bank guarantee shall be issued by a Scheduled Indian Bank or a foreign bank located in India. The guarantees issued by other banks should be confirmed by a Scheduled Indian Bank or a foreign bank operating in India.</i></p> <p><i>v) Bank Guarantee for advance payment shall be released not later than 30 days after the adjustment of advance amount against payment due after testing, commissioning and final acceptance. The bank guarantee should be valid for a period of 180 days or till the date of final testing, commissioning and final acceptance whichever is later, from the date of issue of bank guarantee including claim period.</i></p> <p>The bidder shall indicate in the Price Schedules specifying all items prices shown therein including the unit prices and total prices of the goods and related services along with GST or any other duties and taxes applicable against the schedule of requirements. GST shall be paid as applicable. Any statutory variation shall be paid on submission of documentary evidence. Bidders shall be required to quote HSN code and applicable tax rates.</p> <p><b>“GST” means all four Acts CGST, SGST, UTGST, IGST and any other regulations by Government in relation to GST and rules thereto.</b></p>
GCC 16.5	The payment-delay period after which the Purchaser shall pay interest to the

	<p>supplier shall be 60 days.</p> <p>The interest rate that shall be applied is <b>4 %</b>.</p>
<b>GCC 17</b>	<p>In the case of tax/ duty waiver, the purchaser will issue only the certificates in terms of the Government of India's notification as per information given by supplier in form stipulated in Section IV. Supplier is solely responsible for obtaining such benefits and in case of failure to receive such benefits; the purchaser will not compensate the supplier separately.</p>
<b>GCC 18.1</b>	<p><b>Within 21 days of notification of award, the supplier shall furnish the Performance Security</b> to the Purchaser shall be for an amount of 5% of the Contract value, valid upto 60 days after the date of completion of performance obligations including warranty obligations.</p> <p>In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected/ replaced material shall be extended to a further period of 12 months and the Performance Bank guarantee for proportionate value shall be extended 60 days over and above the extended warranty period.</p>
<b>GCC 18.3</b>	<p>If required, the Performance Security shall be in the form of a "Bank Guarantee" or "a cashier's cheque or banker's certified cheque or crossed demand draft or pay order" drawn in favour of the Purchaser, '<i>The Executive Engineer, Burdwan I&amp;P Division</i>'.</p>
<b>GCC 18.4</b>	<p>Discharge of the performance Security shall take place not later than 60 days following the date of completion of the Supplier's performance obligations, including the warranty obligation, under the contract.</p>
<b>GCC 18.5</b>	<p>Add as Clause 18.5 to the GCC the following:</p> <p>In the event of any Contractual amendment, the Supplier shall, within 28 days of receipt of such amendment, furnish the amendment to the Performance Security, rendering the same valid for the duration of the Contract, as amended for 60 days after the completion of performance obligations including warranty services obligations.</p>
<b>GCC 23.2</b>	<p><u>Packing Instructions</u>: The Supplier will be required to make separate packages for each Consignee. Each package will be marked on three sides with proper</p>

	<p>paint/indelible ink with the following:</p> <p>(i) Project; (ii) Contract No.; (iii) Country of Origin of Goods; (iv) Supplier's Name; (v) Packing List Reference Number.</p> <p>Suppliers should use recycled materials as much as possible for packing</p>
<b>GCC 24.1</b>	The insurance shall be paid in an amount equal to 110 percent of the EXW value of the Goods from "Warehouse to warehouse (final destination)" on "All Risks" basis including War Risks and Strikes.
<b>GCC 25.1</b>	The Supplier is required under the Contract to transport the Goods duly insured to the specified final destination, and all related costs shall be included in the Contract Price.
<b>GCC 25.2</b>	Incidental services to be provided are: As stipulated in the ' <i>Schedule of Requirements</i> '.
<b>GCC 26.1</b>	<p>The inspections and tests shall be as detailed in Para 5 of Section VI-Schedule of Requirement:</p> <p>The supplier shall get each item indicated in the Schedule of requirement inspected in manufacturer's works and submit a test certificate and also manufacturer's guarantee /warranty certificate that the items are conforms to the laid down specification.</p> <p>The Purchaser or its representative may inspect and /or test any or all the items to confirm their conformity to the contract specification, prior to dispatch from the manufacturer's premises. Such inspection and clearance will not prejudice the right of the consignee to inspect and test the items on receipt at destination to verify conformity to technical specification.</p> <p>If the items are fails to meet the laid down specifications the supplier shall take immediate steps to remedy the deficiency or replace the defective parts of the each to the satisfaction of the purchaser/ consignee</p>
<b>GCC 26.2</b>	<p>The Inspections and tests shall be conducted at: As stipulated in the '<i>Schedule of Requirements</i>'.</p> <p>The inspections and tests shall be:</p> <p>Any or all of the following inspection procedures and tests are required by the Purchaser.</p> <ol style="list-style-type: none"> <li>1. Inspection of equipment before dispatch.</li> <li>2. Inspection of equipment at site of work before installation</li> </ol>

	<p>commissioning.</p> <p>3. Testing of equipment at site of work after installation to ensure conformity to the specification.</p> <p>The detailed procedure of testing for the purpose of acceptance of the Goods and Services is given under Section VII Technical Specifications.</p>
<b>GCC 27.1</b>	<p>The liquidated damages shall be: <b>0.5%</b> of Contract price of delayed Goods or Services per week or part thereof. This is applicable upto successful installation testing and commissioning. Further, for the performance towards the related services, following shall govern-</p> <p>Penalty for Faulty Stations/ Data Centre;</p> <ol style="list-style-type: none"> <li>1. For remote site in monsoon period Rs 3000/- per day.</li> <li>2. For remote site in Non-monsoon period Rs 1000/- per day.</li> <li>3. For Data Centre (both monsoon and non- monsoon period) Rs 4000/- per day.</li> </ol> <p>The conditions when the penalty as above would be applicable, provision of clause 28.5 to be referred.</p>
<b>GCC 27.2</b>	<p>The maximum amount of liquidated damages shall be: 10% of the contract price.</p>
<b>GCC 28.3</b>	<p>The period of validity of the Warranty shall be Sixty (60) months after successful installation, testing, commissioning and acceptance. This includes seamless operation of SCAD system for Barrage. The warranty shall remain valid for Sixty (60) months after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination.</p>
<b>GCC 28.5</b>	<p>The period for repair or replacement shall be: 48 Hours/120 hrs. time required for bidder's maintenance engineers to restore the instrument or Telemetry system shall not exceed 48 hours during monsoon and 120 hrs. during non-monsoon period. The performance of the system would be continuously monitored by the service engineer of the contractor deployed at the BCR who shall be responsible for detection of any fault in the Telemetry&amp; surveillance System. On detection of fault, the Contractor shall repair or replace the defective Goods or parts thereof, without cost to the Department within stipulated time of 48 hrs /120 hrs. It is the responsibility of the Supplier to rectify/replace the equipment without any notice from purchaser and it is the duty of its personnel i.e. dedicated service engineer cum data entry operator to notice that site become non-operational or become faulty. A system shall be treated as faulty if it fails to respond or transmits erroneous data during six consecutive pre-programmed observation cycles/3 hours. The decision of</p>



	<p>Engineer-in-Charge about errors in data shall be final and binding. If a remote site/ instrument continues to remain "fail" for more than 3 hours in excess of the maintenance time schedule of 48/120 hours. The contractor is liable to pay penalty @ Rs. 5000/- per Day/ during non-monsoon period and @Rs 10000/ per day during monsoon period (15th June to 15th October). The Day for the purpose of penalty shall be taken as failure period of 24 hours or part thereof for a particular remote site. The amount of penalty will be recovered from performance bank guarantee or payment due to bidder during warranty period.</p> <p><b>Refer 4.35 “System Performance Criteria” for details of computation of Down time.</b></p>
<b>GCC 28.6</b>	The period shall be 14 days
<b>GCC 31.1</b>	This clause will apply only to variations in GST and other taxes payable in India on the final product which is being supplied and not for variations in tax on the individual components / raw materials which go into the product.
<b>GCC 33.5</b>	<p>(a) Add the following additional sub clauses.</p> <p>During the validity of the contract, the supplier shall supply and replace / reinstall /recommission goods in case of damage /theft or vandalism not attributable to the supplier, as per applicable line item / items listed in Price schedule for supply of goods as per schedule of requirement and Price and completion schedule – related services of this contract and payment shall be accordingly made at the quoted rates in this contract by the supplier for the line item. The procedure adopted shall be in accordance with GCC 33 Change orders and contract amendments.</p>
<b>GCC 37</b>	<p><b>Add the following additional sub clauses.</b></p> <p><b>37.1 Supplier integrity:</b></p> <p>The supplier is responsible for and obliged to conduct all contracted activities in accordance with the contract using state- of- the- art methods and economic principles and exercising all means available to achieve the performance specified in the Contract.</p>
	<p><b>37.2</b></p> <p><b>Supplier’s obligations :</b></p> <p>The Supplier is obliged to work closely with the Purchaser’s staff, act within its own authority and abide by directives issued by the Purchaser and implementation activities.</p> <p>The Supplier will abide by the job safety measures prevalent in India and will free the Purchaser from all demands or responsibilities arising from accidents or</p>

	<p>loss of life the cause of which is the supplier's negligence. The Supplier will pay all indemnities arising from such incidents and will not hold the purchaser responsible or obligated.</p> <p>The Supplier is responsible for managing the activities of its personnel or sub-contracted personnel and will hold itself responsible for any misdemeanors.</p> <p>The Supplier will treat as confidential all data and information about the purchaser, obtained in the execution of his responsibilities, in strict confidence and will not reveal such information to any other party without the prior written approval of the Purchaser.</p>
	<p><b>37.3</b></p> <p>Site preparation and installation</p> <p>The supplier is responsible for associated civil work required for installation and commissioning of the supplies in the Schedule of Requirement under the heading of Relative services</p>
	<p><b>37.4</b></p> <p>Hardware installation:</p> <p>The Supplier is responsible for all unpacking, assemblies, wiring, installations, cabling between hardware units and connecting to power supplies. The Supplier will test all hardware operations and accomplish all adjustments necessary for successful and continuous operation of the hardware at all installation sites.</p>

## **SERVICE LEVEL CONDITIONS**

1. The bidder is fully responsible to keep the system functional during installation, warranty period. The bidder should take sue-moto action to repair any faulty instrument and should not wait for a complaint from purchaser to initiate action.

## **2. DEFINITIONS**

### **i. REMOTE SITE**

Remote site is the site at remote location where hydro-meteorological sensors are installed. The Remote site may be river gauging site, automatic rain gauge station, canal gauging site, reservoir water level monitoring site, reservoir outflow monitoring site using gate sensor, groundwater level monitoring site or any combination of these sites.

### **ii. DATA CENTRE**

Data center is the respective server where data is expected to be received. In case of GSM & GPRS based telemetry, the data center is the server installed in state data center for receiving GSM & GPRS transmission.

### **INVALID DATA**

A data would be considered **invalid** if

- The value recorded / transmitted is beyond permissible limit for that variable. The examples of invalid data are negative rainfall, negative water level, relative humidity outside the range of 0-100, temperature outside the range of -40 to +60°C, any abnormally high or low number, negative values of atmospheric pressure, wind direction beyond the range of 0-360 degree etc. The valid permissible upper limits and lower limits for each monitoring variable for each site would be provided to bidder by the purchaser.
- If the sensor value recorded / transmitted is absurd values or sudden variation in the value (may be within the specified limits) which is not in-line with the actual physical parameter. (e.g. If the Water level sensor recorded / transmitted value is showing absurd sudden variation of 2mts (beyond the limits of rate of change of sensor value) with respective to the previous measurement interval, then this data is the invalid data).
- If the sensor value recorded / transmitted is having frequent / periodic gapes, then the data will be considered as invalid data.
- If the sensor value recorded / transmitted is remain constant, even if there is variation in the physical parameters. (e.g. If the Water level recorded / transmitted value is showing

constant / fix value even there is variation in the water level, then this data is the invalid data)

- If the sensor value recorded / transmitted is not in line with the value of co-located automatic / manual observation of the same sensor parameter.

### iii. FAILED DATA TRANSMISSION

For each remote station, each scheduled transmission (for all variables including battery voltage) would consist of one data transmission. A data transmission would be considered failed if any of the following conditions are true

- There is no transmission of data from **remote site**
- Data is transmitted form **remote site** but not received at **data centre / ERS /Eswis**.
- Data is recorded in data logger but not transmitted
- Data is not recorded by data logger
- Battery voltage and / or GPS status (GPS valid only in case of INSAT telemetry) not transmitted
- Only battery voltage is transmitted without any actual data from sensors
- Data is transmitted but data values are **invalid**.
- For automatic weather stations, data is missing / **invalid** for more than two variables
- Rainfall data is missing / **invalid** for automatic weather station

### iv. FAULTY STATION

A station would be considered faulty if:

- In case of hourly transmission cycle, there are six or more than six failed hourly data transmissions in a day.
- In case Datalogger is not recording any of the sensor Data / Battery voltage OR recording the **invalid** data of any of the sensor / Battery voltage for four or more than four measurement cycles.

### v. FAULTY DATA CENTRE

A Data Centre shall be treated as Faulty if

- Vital Hardware Equipment's installed by bidder at Data Centre are not functioning properly.
- Bidder has failed to pay the communication charges (SIM, internet, GSM/GPRS etc.) & system is not in function due to unpaid communication charges.
- Unauthorized absence of Bidders Operator/ Service engineer at Data Centre.

#### vi. MONSOON PERIOD

The monsoon period is defined between 15 June to 15 October or as per IMD notification every year.

#### vii. MAXIMUM RESPONSE TIME FOR REPAIR (MRTR)

- The MRTR for Remote station would be 48 hours during Monsoon season
- The MRTR for Remote station would be 120 hours during Non-Monsoon season
- The MRTR for Data Centre would be 24 hours during monsoon and non-monsoon season

#### viii. MINIMUM TIME BETWEEN REPAIRS PER STATION

- The minimum time between repairs is six months. If a station went faulty for reasons attributed to bidder and availed of MRTR once, it would not be eligible to avail the free repair period within payment period (six months)

### 3. PAYMENT FOR DATA RECEPTION

- The payment would be released proportion to data received at the Data centre. A table below presents the percentage of data reception and corresponding payment

Percentage of data received	Payment to be made to vendor
90-100%	100% of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
80-89.99 %	90% of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
70-79.99 %	80 % of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
60-69.99 %	70 % of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
50- 59.99%	60% of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
40- 49.99%	40%of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
30-39.99%	25% of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))
Below 30%	NIL of (6% of contract price to be paid six monthly as per SCC clause no. 16.1 (ii))

The calculations for data reception percentage are as below:

- Data reception percentage for each station = [1- (No of Failed transmissions / No of transmissions expected)] \*100
- Data reception percentage for each station is calculated for payment period (six months)
- Number of transmissions expected is calculated based on transmission cycle. For hourly transmission cycle, if there are 182 days in six months period, the no. of expected transmissions = 182 (days) \* 24 (hourly transmission) for a given station. If a station went faulty during payment period of six months and availed of free time of MRTR (48 hours or 120 hours based on monsoon / non-monsoon period), the 2 days / 5 days period would be subtracted from no. of expected transmissions. For example, if a station went faulty during monsoon period and payment period is for 182 days, the number of transmissions expected would be calculated as:
- Number of transmissions expected = (182-2) \* 24; here 2 represents 48 hours' time to repair in monsoon period. However, this deduction would be allowed only once in six months period for any given station.

$$\text{Total data Reception percentage} = \frac{\sum_{i=1}^n \text{Data reception percentage of } i^{\text{th}} \text{ station}}{n}$$

Where n is number of remote stations

- In case the percentage of data reception is below 50% continuously for 3 months, the Engineer-in-charge may initiate termination process as per GCC clause no. 35.

**Attachment: Price Adjustment Formula**  
**Not applicable**

## **SECTION X – CONTRACT FORMS**

# 1. LETTER OF ACCEPTANCE

*[letter head paper of the Purchaser]*

*[date]*

To: *[name and address of the Supplier]*

Subject: **Notification of Award Contract No.** .....

This is to notify you that your Bid dated . . . *[insert date]* . . . for execution of the . . . . . *[insert name of the contract and identification number, as given in the SCC]*. . . . . for the Accepted Contract Amount of . . . . . . . *[insert amount in numbers and words in Rupees]*, 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 21 days in accordance with the Conditions of Contract, using for that purpose the of the Performance Security Form included in Section X, Contract Forms, of the Bidding Document.

Authorized Signature: \_\_\_\_\_

Name and Title of Signatory: \_\_\_\_\_

Name of Agency: \_\_\_\_\_

**Attachment: Contract Agreement**



## 2. CONTRACT AGREEMENT

*[The successful Bidder shall fill in this form in accordance with the instructions indicated]*

THIS CONTRACT AGREEMENT is made

the *[insert: **number**]* day of *[insert: **month**]*, *[insert: **year**]*.

BETWEEN

- (1) *[insert complete name of Purchaser]*, a *[insert description of type of legal entity, for example, an agency of the Ministry of .... of the Government of {insert name of Country of Purchaser}, or corporation incorporated under the laws of {insert name of Country of Purchaser}]* and having its principal place of business at *[insert address of Purchaser]* (hereinafter called “the Purchaser”), and
- (2) *[insert name of Supplier]*, a corporation incorporated under the laws of *[insert: country of Supplier]* and having its principal place of business at *[insert: address of Supplier]* (hereinafter called “the Supplier”).

WHEREAS the Purchaser invited bids for certain Goods and ancillary services, viz., *[insert brief description of Goods and Services]* and has accepted a Bid by the Supplier for the supply of those Goods and Services in the sum of *[insert Contract Price in words and figures, expressed in Rs]* (hereinafter called “the Contract Price”).

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall constitute the Contract between the Purchaser and the Supplier, and each shall be read and construed as an integral part of the Contract Agreement. This Agreement shall prevail over all other contract documents: In the event of any discrepancy or inconsistency within the Contract documents, then the documents shall prevail in the order listed below.
  - (a) The letter of Acceptance
  - (b) this Contract Agreement
  - (c) Letter of Bid – Technical Part
  - (d) The Supplier’s letter of Bid – Financial Part and original completed Schedules including Price Schedules
  - (e) Special Conditions of Contract
  - (f) General Conditions of Contract
  - (g) Technical Requirements (including Schedule of Requirements and Technical Specifications)

(h) *[Add here any other document(s) listed in GCC/SCC as part of contract]*

3. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the Goods and Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Goods and Services 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 *[insert the name of the Contract governing law country]* on the day, month and year indicated above.

For and on behalf of the Purchaser

Signed: *[insert signature]*  
in the capacity of *[ insert title or other appropriate designation ]*  
in the presence of *[insert identification of official witness]*

For and on behalf of the Supplier

Signed: *[insert signature of authorized representative(s) of the Supplier]*  
in the capacity of *[ insert title or other appropriate designation ]*  
in the presence of *[ insert identification of official witness]*

### 3. Performance Security - Bank Guarantee

*[Guarantor letterhead or SWIFT identifier code]*

Performance Guarantee No.....*[insert guarantee reference number]*

Date.....*[insert date of issue of the guarantee]*

To: \_\_\_\_\_ *[name of Purchaser]*

\_\_\_\_\_ *[address of Purchaser]*

WHEREAS \_\_\_\_\_ *[name and address of Supplier<sup>17</sup>]* (hereinafter called "the Applicant") has undertaken, in pursuance of Contract No. \_\_\_\_\_ dated \_\_\_\_\_ to execute \_\_\_\_\_ *[name of Contract and brief description of Goods and related Services]* (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Applicant shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Applicant such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Applicant, up to a total of \_\_\_\_\_ *[amount of guarantee<sup>18</sup>]* \_\_\_\_\_ *[in words]*, such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of \_\_\_\_\_ *[amount of guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Applicant before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Goods and related Services to be supplied there under or of any of the Contract documents which may be

<sup>17</sup>*In the case of a JV, insert the name of the Joint Venture*

<sup>18</sup>*An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.*

made between you and the Applicant shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until ..... (i.e.) 60 days following the Completion date of the Contract including any warranty obligations<sup>19</sup>, and any demand for payment under it must be received by us at this office on or before that date.

Signature and seal of the guarantor \_\_\_\_\_

Name of Bank \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_

*Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.*

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<sup>19</sup> Completion date as described in GC Clause 18.4