



INVITATION FOR BIDS (Single Stage – One Envelope)

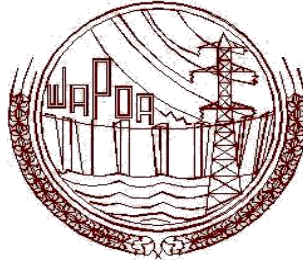
Country: PAKISTAN
Name of Project: Glacier Monitoring Research Centre, 197-WAPDA House, Lahore
Loan No.: IBRD-86460
Contract Title: Procurement of Supply, Installation, Testing and Commissioning of Equipment for Up-gradation of 16 Existing Weather Stations of GMRC in Upper Indus Basin under Dam Safety Component of Approved PC-I of T-5 HPP
Reference No. PK-AF-TARBELA 4TH-571307-GO-RFB

1. The Water and Power Development Authority through Islamic Republic of Pakistan has received financing from the World Bank jointly with Wapda towards the cost of the T5 Hydropower Project and intends to apply part of the proceeds toward payments under the contract for "Procurement of Supply, Installation, Testing and Commissioning of Equipment for Up-gradation of 16 Existing Weather Stations of GMRC In Upper Indus Basin" under Dam Safety Component of Approved PC-I of T5 HPP.
2. The General Manager (HRM), WAPDA now invites sealed bids from eligible bidders having valid registration with Pakistan Engineering Council in C6 Category or above with specialization field of EE-04 (Telecommunication)/EE-06 (Instrumentation & Control/Electronics, registered with Income Tax and Sales Tax Departments and who are on Active Taxpayers List (ATL) of the Federal Board of Revenue, for the NCB NO. PK-AF-TARBELA 4TH-571307-GO-RFB, for procurement of "Supply, Installation, Testing and Commissioning of Equipment for Up-Gradation of 16 Existing Weather Stations of GMRC In Upper Indus Basin" The contract shall be completed in 365 days.
3. Bidding will be conducted through National Competitive Bidding (NCB) procedures as specified in the World Bank's Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers (January 2011, Revised July 2014) and is open to all eligible bidders/vendors/manufacturers etc as defined in the Procurement Guidelines. In addition, please refer to paragraphs 1.6 and 1.7 setting forth the World Bank's policy on conflict of interest.
4. Interested eligible Bidders may obtain further information from the O/o GM (HRM), WAPDA House, Lahore and inspect the bidding documents during office hours (0900 to 1600 hours) at the address given below (Serial-8)
5. A complete set of bidding documents in English may be obtained/collected by interested eligible Bidders upon the submission of a written application to the address below and upon payment of a non-refundable fee of Rs. 2500/-. The method of payment will be Cash Deposit/Pay Order/Demand Draft in favor of General Manager (HRM), WAPDA House, Lahore. Bidding documents can also be downloaded from (www.wapda.gov.pk.com) free of cost.
6. Sealed Bids must be delivered to the address below (Serial-8) on or before 21st October 2026 up to 11:00 hours. Electronic Bidding will not be permitted. Late Bids will be rejected. Bids will be publicly opened in the presence of the Bidder's designated representatives and anyone who chooses to attend at the address below (Serial- 8) on 21st October, 2026 at 11:30 hours.
7. All Bids must be accompanied by a Bid Security of **Rs 8,000,000/-** in the form of Unconditional Bank Guarantee issued by a scheduled Bank in Pakistan or in the form of Call Deposit Receipt (CDR) in favor of General Manager HRM WAPDA House Lahore.
8. The address referred to above is:
9. Attn: Mr. Gohar Zaman Bhabha
 General Manager (HRM) WAPDA
 O/O General Manager (Hydro Resources Management) WAPDA, Room # 241WAPDA House, Sharah-e-Quaid-e-Azam, Lahore, Pakistan. Postal Code: Lahore (54000), Pakistan.
 Tel: +92-42-99202631, 99202211/2291
 Fax: +92-42-99202795

Electronic mail address: gmpndwater@gmail.com or pdgmrcwapda@gmail.com

**GENERAL MANAGER (HRM)
228- WAPDA HOUSE LAHORE**

**Procurement of Supply, Installation, Testing and
Commissioning of Equipment for Up-gradation of 16
Existing Weather Stations
of GMRC In Upper Indus Basin**



**NCB No:
CONTRACT NO. PK-AF-TARBELA 4TH-571307-GO-RFB**

**Under
Dam Safety Component of Approved PC-I T-5 HP
(Single Stage – One Envelope)**

**GENERAL MANAGER
(HYDRO RESOURCES MANAGEMENT), WAPDA,
WAPDA HOUSE, LAHORE**

CONTACTS:

Phone: 042-99202631, 99202211/2291

Fax: 042-99202795

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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 In connection with the Invitation for Bids, **specified in the Bid Data Sheet (BDS)**, the Purchaser, **as specified in the 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 International Competitive Bidding (ICB) 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) 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 Borrower or Recipient (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 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 proceeds of the Loan (or other financing).

- 3. Corrupt and 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 their agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and personnel, to permit the Bank to inspect all accounts, records and other documents relating to any prequalification process, bid submission 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, 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 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. **Unless specified in the BDS,** there is no limit on the number of members in a JV.
- 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

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- (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 works 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 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 Document

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 Addenda issued in accordance with ITB 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, the Minutes of the 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 A Bidder requiring any clarification of the Bidding Document shall contact the Purchaser in writing at the Purchaser's address **specified in the BDS**. The Purchaser will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of bids within a

period **specified in the BDS**. The Purchaser shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so **specified in the BDS**, the Purchaser shall also promptly publish its response at the web page **identified in the BDS**. Should the clarification result in changes to the essential elements of the Bidding Documents, the Purchaser shall amend the Bidding Documents following the procedure under ITB 8 and ITB 22.2.

- 8. Amendment of Bidding Document**
- 8.1 At any time prior to the deadline for submission of bids, the Purchaser may amend the Bidding Documents by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Purchaser in accordance with ITB 6.3. The Purchaser shall also promptly publish the addendum on the Purchaser's web page in accordance with ITB 7.1.
- 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 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 the language **specified in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages into the language **specified in the BDS**, in which case, for purposes of

interpretation of the Bid, such translation shall govern.

**11. Documents
Comprising the
Bid**

11.1 The Bid shall comprise the following:

- (a) Letter of Bid in accordance with ITB 12;
- (b) completed schedules , in accordance with ITB 12 and 14
- (c) Bid Security or Bid-Securing Declaration, in accordance with ITB 19.1;
- (d) alternative bids, if permissible, in accordance with ITB 13;
- (e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.2;
- (f) documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract if its bid is accepted;
- (g) documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to bid;
- (h) documentary evidence in accordance with ITB 16, that the Goods and Related Services to be supplied by the Bidder are of eligible origin;
- (i) documentary evidence in accordance with ITB 16 and 30, that the Goods and Related Services conform to the Bidding Documents;
- (j) any other document **required in the BDS.**

11.2 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.

11.3 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.

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- 12. Letter of Bid and Price Schedules** 12.1. The Letter of Bid 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.
- 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 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 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, 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 29. 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 opened at the same time.

14.7 The terms EXW, CIP, 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 each Price Schedule included in Section IV, Bidding Forms. The dis-aggregation of price components is required solely for the purpose of facilitating the comparison of bids by the Purchaser. This shall not in any way limit the Purchaser's right to contract on any of the terms offered. 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 manufactured in the Purchaser's Country:

- (i) the price of the Goods quoted EXW (ex-works, ex-factory, ex warehouse, ex showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable on the components and raw material used in the manufacture or assembly of the Goods;
- (ii) any Purchaser's Country sales tax and other taxes which will be payable 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 Goods manufactured outside the Purchaser's

Country, to be imported:

- (i) the price of the Goods, quoted CIP named place of destination, in the Purchaser's Country, as **specified in the BDS;**
- (ii) the price for inland transportation, insurance, and other local services required to convey the Goods from the named place of destination to their final destination (Project Site) **specified in the BDS;**
- (c) For Goods manufactured outside the Purchaser's Country, already imported:
 - (i) the price of the Goods, including the original import value of the Goods; plus any mark-up (or rebate); plus any other related local cost, and custom duties and other import taxes already paid or to be paid on the Goods already imported.
 - (ii) the custom duties and other import taxes already paid (need to be supported with documentary evidence) or to be paid on the Goods already imported;
 - (iii) the price of the Goods, obtained as the difference between (i) and (ii) above;
 - (iv) any Purchaser's Country sales and other taxes which will be payable on the Goods if the contract is awarded to the Bidder; and
 - (v) 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.**
- (d) for 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).

- 15. Currencies of Bid and Payment**
- 15.1 The currency(ies) of the bid and the currency(ies) of payments shall be **as specified in the BDS**. The Bidder shall quote in the currency of the Purchaser's Country the portion of the bid price that corresponds to expenditures incurred in the currency of the Purchaser's country, unless otherwise **specified in the BDS**.
- 15.2 The Bidder may express the bid price in any currency. If the Bidder wishes to be paid in a combination of amounts in different currencies, it may quote its price accordingly but shall use no more than three foreign currencies in addition to the currency of the Purchaser's Country.
- 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 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.

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- 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 and Qualifications of the Bidder**
- 17.1 To establish Bidder's their eligibility in accordance with ITB 4, Bidders shall complete the Letter of Bid, 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, 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;
 - (b) that, if **required in the BDS**, in case of a Bidder not doing business within the Purchaser's Country, 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; and
 - (c) that the Bidder meets each of the qualification criterion specified in Section III, Evaluation and Qualification Criteria.
- 18. Period of Validity of Bids**
- 18.1. Bids shall remain valid until the date specified **in the BDS** or any extended date if amended by the Purchaser in accordance with ITB 8. A Bid that is not valid until the date specified **in the BDS**, or any extended date if amended by the Purchaser in accordance with ITB

8, shall be rejected by the Purchaser as nonresponsive.

18.2. In exceptional circumstances, prior to the expiry of the bid validity, 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 18, 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 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 specified in accordance with ITB 18.1, 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**.
- (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 its bid, either a Bid-Securing Declaration or a bid security, as **specified in the BDS**, in original form and, in the case of a bid security. In the amount and currency **specified in the BDS**.

19.2. A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.

19.3. If a bid security is specified pursuant to ITB 19.1, the bid security shall be a demand guarantee in any of the following forms at the Bidder's option :

- (a) an unconditional guarantee issued by a bank or financial institution (such as an insurance, bonding or surety company);

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- (b) an irrevocable letter of credit;
 - (c) a cashier's or certified check; or
 - (d) another security **specified in the BDS**,

from a reputable source from an eligible country. If the unconditional guarantee is issued by a financial institution located outside the Purchaser's Country, the issuing financial institution shall have a correspondent financial institution located in the Purchaser's Country to make it enforceable. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms, or in another substantially similar format approved by the Purchaser prior to bid submission. The bid security shall be valid for twenty-eight (28) days beyond the original date of expiry of the bid validity, or beyond any extended date if requested under ITB 18.2.

- 19.4. If a Bid Security is specified pursuant to ITB 19.1, any bid not accompanied by a substantially responsive Bid Security shall be rejected by the Purchaser as non-responsive.
- 19.5. If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the contract and furnishing the Performance Security pursuant to ITB 42.
- 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 withdraws its bid prior to the expiry date of the bid validity specified by the Bidder on the Letter of Bid, or any extended date provided by the Bidder;
 - (b) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB41; or
 - (ii) furnish a performance security in accordance with

ITB 42.

19.8. The bid security or 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 security or 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.

19.9. If a bid security is **not required in the BDS**, pursuant to ITB 19.1, and

- (a) if a Bidder withdraws its bid prior to the expiry date of the bid validity specified by the Bidder on the Letter of Bid, or any extended date provided by the Bidder, or
- (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 41; or furnish a performance security in accordance with ITB 42;

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 one original of the documents comprising the bid as described in ITB 11 and clearly mark it "ORIGINAL." Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE." In addition, the Bidder shall submit copies of the bid, in the number **specified in the BDS** and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

20.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation **as specified in the BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid where entries or amendments have been made shall be signed or initialed by the person signing the bid.

20.3 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.

- 20.4 Any inter-lineation, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

D. Submission and Opening of Bids

21. Sealing and Marking of Bids

- 21.1. The Bidder shall enclose the original and all copies of the bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as “ORIGINAL”, “ALTERNATIVE” and “COPY.” These envelopes containing the original and the copies shall then be enclosed in one single envelope.

- 21.2. The inner and outer envelopes shall:

- (a) bear the name and address of the Bidder;
- (b) be addressed to the Purchaser in accordance with ITB 24.1;
- (c) bear the specific identification of this bidding process indicated in ITB 1.1; and
- (d) bear a warning not to open before the time and date for bid opening.

- 21.3. If all envelopes are not sealed and marked as required, the Purchaser will assume no responsibility for the misplacement or premature opening of the bid.

22. Deadline for Submission of Bids

- 22.1. Bids must be received by the Purchaser at the address and no later than the date and time **specified in the BDS**. When so **specified in the BDS**, bidders shall have the option of submitting their bids electronically. Bidders submitting bids electronically shall follow the electronic bid submission procedures **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 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 Purchaser shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 22. Any bid received by the Purchaser after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.

24. Withdrawal, Substitution, and Modification of Bids

24.1. A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization (the power of attorney) in accordance with ITB 20.2, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be:

(a) prepared and submitted in accordance with ITB 20 and 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” or “MODIFICATION;” and

(b) received by the Purchaser prior to the deadline prescribed for submission of bids, in accordance with ITB 22.

24.2. Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned unopened to the Bidders.

24.3. No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.

25. Bid Opening

25.1. Except as in the cases specified in ITB 23 and 24, the Purchaser shall publicly open and read out in accordance with ITB 25.3 all bids received by the deadline at the date, time and place **specified in the BDS** in the presence of Bidders’ designated representatives and anyone who choose to attend. Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.1, shall be as **specified in the BDS**.

25.2. First, envelopes marked “WITHDRAWAL” shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. If the withdrawal envelope does not contain a copy of the “power of attorney” confirming the signature as a person duly authorized to sign on behalf of the Bidder, the corresponding bid will be opened. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked “SUBSTITUTION” shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked “MODIFICATION” shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening. Only bids that are opened and read out at Bid opening shall be considered further.

25.3. All other envelopes shall be opened one at a time, reading out: the name of the Bidder and whether there is a modification; the total Bid Prices, per lot (contract) if applicable, including any discounts and alternative bids; the presence or absence of a Bid Security, if required; and any other details as the Purchaser may consider appropriate. Only discounts and alternative bids read out at Bid opening shall be considered for evaluation. The Letter of Bid and the Price Schedules are to be initialed by representatives of the Purchaser attending bid opening in the manner **specified in the BDS**. The Purchaser shall neither discuss the merits of any bid nor reject any bid (except for late bids, in accordance with ITB 25.1).

25.4. The Purchaser shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price, per lot (contract) if applicable, including any discounts, and

alternative bids; and the presence or absence of a Bid Security, if one was required. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

E. Evaluation and Comparison of Bids

- 26. Confidentiality**
- 26.1 Information relating to the evaluation of bids and recommendation of contract award, shall not be disclosed to bidders or any other persons not officially concerned with the bidding process until information on Contract Award is communication to all Bidders in accordance with ITB 40.
- 26.2 Any effort by a Bidder to influence the Purchaser in the evaluation or contract award decisions may result in the rejection of its Bid.
- 26.3 Notwithstanding ITB 26.2, from the time of bid opening to the time of Contract Award, if any Bidder wishes to contact the 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 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 and 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 31.
- 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.

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- 28. Deviations, Reservations, and Omissions**
- 28.1 During the evaluation of bids, the following definitions apply:
- (a) “Deviation” is a departure from the requirements specified in the Bidding 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. Determination of Responsiveness**
- 29.1 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.
- 29.2 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.
- 29.3 The Purchaser shall examine the technical aspects of the bid submitted in accordance with ITB 16 and ITB 17, in particular, to confirm that all requirements of Section VII, Schedule of Requirements have been met without any material deviation or reservation, or omission.
- 29.4 If a bid is not substantially responsive to the requirements of Bidding Documents, it shall be rejected by the Purchaser and may not subsequently be made responsive by correction of the

material deviation, reservation, or omission.

30. Nonconformities, Errors and Omissions

- 30.1 Provided that a Bid is substantially responsive, the Purchaser may waive any nonconformities in the Bid.
- 30.2 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 of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.
- 30.3 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 by adding the average price of the item or component quoted by substantially responsive Bidders. 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.

31. Correction of Arithmetical Errors

- 31.1 Provided that the Bid is substantially responsive, the Purchaser shall correct arithmetical errors on the following basis:
- (a) if there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of the Purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;
 - (b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
 - (c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed

in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

31.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 31.1, shall result in the rejection of the Bid.

32. Conversion to Single Currency

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

33. Margin of Preference

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

34. Evaluation of Bids

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

34.2 To evaluate a 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 clause 14;
- (b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1;
- (c) price adjustment due to discounts offered in accordance with ITB 14.3;
- (d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;
- (e) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 30.3;
- (f) the additional evaluation factors are specified in Section III, Evaluation and Qualification Criteria;

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

34.4 If these Bidding Documents allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated price of the lot (contract) combinations, including any discounts offered in the Letter of Bid Form, is specified in Section III, Evaluation and Qualification Criteria

34.5 The Purchaser's evaluation of a bid will exclude and not take into account:

- (a) in the case of Goods manufactured in the Purchaser's Country, sales and other similar taxes, which will be payable on the goods if a contract is awarded to the Bidder;
- (b) in the case of Goods manufactured outside the Purchaser's Country, already imported or to be imported, customs duties and other import taxes levied on the imported Good, sales and other similar taxes, which will be payable on the Goods if the contract is awarded to the Bidder;
- (c) any allowance for price adjustment during the period of execution of the contract, if provided in the bid.

34.6 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 34.2 (f).

35. Comparison of Bids

35.1 The Purchaser shall compare the evaluated prices of all substantially responsive bids established in accordance with ITB 34.2 to determine the lowest evaluated bid. The comparison shall be on the basis of CIP (place of final destination) prices for imported goods and EXW prices, plus cost of inland transportation and insurance to place of destination, for goods manufactured within the Borrower's country, together with prices for any required installation, training, commissioning and

other services. The evaluation of prices shall not take into account custom duties and other taxes levied on imported goods quoted CIP and sales and similar taxes levied in connection with the sale or delivery of goods.

36. Qualification of the Bidder

- 36.1 The Purchaser shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive bid meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.
- 36.2 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.
- 36.3 Prior to Contract award, the Purchaser will verify that the successful Bidder (including each member of a JV) is not disqualified by the Bank due to noncompliance with contractual SEA/SH prevention and response obligations. The Purchaser will conduct the same verification for each subcontractor proposed by the successful Bidder. If any proposed subcontractor does not meet the requirement, the Purchaser will require the Bidder to propose a replacement subcontractor.
- 36.4 An affirmative determination shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the bid, in which event the Purchaser shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's qualifications to perform satisfactorily.

37. Purchaser's Right to Accept Any Bid, and to Reject Any or All Bids

- 37.1 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 bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

F. Award of Contract

38. Award Criteria

- 38.1 Subject to ITB 37.1, 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.

**39. Purchaser's
Right to Vary
Quantities at
Time of Award**

39.1 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 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.

**40. Notification of
Award**

40.1 Prior to the date of expiry of the Bid validity, the Purchaser shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the "Letter of Acceptance") shall specify the sum that the Purchaser will pay the Supplier in consideration of the supply of Goods (hereinafter and in the Conditions of Contract and Contract Forms called "the Contract Price"). At the same time, the Purchaser shall also notify all other Bidders of the results of the bidding and shall publish in *UNDB online* the results identifying the bid and lot (contract) 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.

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

40.3 The Purchaser shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 40.1, requests in writing the grounds on

which its bid was not selected.

**41. Signing
Contract**

- of 41.1 Promptly after notification, the Purchaser shall send the successful Bidder the Contract Agreement.
- 41.2 Within twenty-eight (28) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Purchaser.
- 41.3 Notwithstanding ITB 41.2 above, in case signing of the Contract Agreement is prevented by any export restrictions attributable to the Purchaser, to the country of the Purchaser, or to the use of the products/goods, systems or services to be supplied, where such export restrictions arise from trade regulations from a country supplying those products/goods, systems or services, the Bidder shall not be bound by its bid, always provided however, that the Bidder can demonstrate to the satisfaction of the Purchaser and of the Bank that signing of the Contract Agreement has not been prevented by any lack of diligence on the part of the Bidder in completing any formalities, including applying for permits, authorizations and licenses necessary for the export of the products/goods, systems or services under the terms of the Contract.

**42. Performance
Security**

- 42.1 Within twenty-eight (28) 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, subject to ITB 34.5, using for that purpose the Performance Security Form included in Section X, Contract Forms, or another Form acceptable to the Purchaser. If the Performance Security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Purchaser. A foreign institution providing a bond shall have a correspondent financial institution located in the Purchaser's Country.
- 42.2 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.

**43. Procurement
Related
Complaint**

- 43.1 The procedures for making a Procurement-related Complaint are as specified in the BDS.

Section II. Bid Data Sheet (BDS)

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	The reference number of the Invitation for Bids is: PK-AF-TARBELA 4TH-571307-GO-RFB Procurement procedure: Single Stage – One Envelope.
ITB 1.1	The Purchaser is: Pakistan Water & Power Development Authority represented by General Manager (Hydro Resources Management) WAPDA or any other representative authorized by the Employer to represent from time to time.
ITB 1.1	The name of the NCB is: Supply Installation, Testing and Commissioning of equipment for Up-gradation of existing 16 Automatic Weather Stations (AWS) in UIB , under Dam Safety Component of T-5 HP. The identification number of the NCB is: PK-AF-TARBELA 4TH-571307-GO-RFB The number and identification of lots (contracts) comprising this NCB is: N/A
ITB 2.1	The Borrower is: <i>Government of Islamic Republic of Pakistan</i>
ITB 2.1	Loan or Financing Agreement amount: US \$ 390 Million and a portion of the funds shall be applied to eligible payments under the contract for which these Bidding Documents are issued. Payment for the foreign component (equipment) shall be made through the World Bank under the T5 HPP financing arrangement, while the local component, including related services, shall be financed by WAPDA
ITB 2.1	The name of the Project is: Tarbela 5 th Extension HP, Tarbela- Dam Safety Component
ITB 4.1	Maximum number of Members in the JV shall be: 02.

IITB 4.4	A list of debarred firms and individuals is available on the Bank's external website: http://epms.ppra.gov.pk/public/active-blacklisted-firms <u>Ineligibility also applies on black listed firms appearing on PPRA Website</u> http://epms.ppra.gov.pk/public/active-blacklisted-firms
	B. Contents of Bidding Documents
ITB 7.1	For <u>Clarification of bid purposes</u> only, A pre-bid meeting will be held at below mentioned address on 06.10.2026 at 1100 hrs. Bidders are encouraged to visit the purchaser before submitting a bid and to attend pre-bid meeting. Attending the pre-bid meeting is optional. Bidders should inform in writing to Purchaser's Representative their officials name attending the meeting. The Purchaser's address is: General Manager (Hydro Resources Management), WAPDA Atten: PD GMRC Street Address: Room # 228 WAPDA House, Sharah-e-Quaid-e-Azam City: Lahore ZIP Code: 54000 Country: Pakistan Telephone: +92-42-99202631, 99202211/2291 Facsimile number: +92-42-99202795 Country: Pakistan Email: gmpndwater@gmail.com, pdgmrcwapda@gmail.com Requests for clarification should be received by the Employer no later than: 15 days prior to date of bid opening.
ITB 7.1	www.wapda.gov.pk.com
	C. Preparation of Bids
ITB 10.1	The language of the bid is: <i>“English”</i> All correspondence exchange shall be in <i>“English”</i> language. Language for translation of supporting documents and printed literature is <i>“English”</i>.
ITB 11.1 (j)	The Bidder shall submit the following additional documents in its bid: ▪ The firm's valid registration with Federal Board of Revenue for

	Income Tax and Sales Tax and shall be on the active taxpayer's list. ▪ Affidavit confirming that the firm has not been blacklisted by any government agency. ▪ Provide the manufacturer authorization where applicable. ▪ The certification by the manufacturer that the equipment is brand new, latest and suitable for outdoor applications having ISO(International Standards Organization) Certification, WMO(World Metrological Organization) Certification, or equivalent , quality assurance certificates. ▪ The equipment literature, catalogues/broachers and operating manuals, servicing and maintenance of each sub system including all block diagrams and detailed circuit diagrams. ▪ Bidder should provide name and contact information of the service agent responsible for the after-sales services preferably in Pakistan. ▪ Bidder should have valid registration with Pakistan Engineering Council in C6 Category or above with specialization field of EE-04 (Telecommunication)/EE-06(Instrumentation& Control/Electronics, ▪ Registered with Income Tax and Sales Tax Departments and who are on Active Taxpayers List of the Federal Board of Revenue ▪ Compliance/Non-Compliance Statement: The bidder shall submit a detailed item-wise compliances/non-compliance statement referring Para- wise to the requirements given in this document. In case the original broachers do not contain the description of any of the specification, it shall be supported by compliance undertaking by the manufacturer. Make and models of all the equipment should be given. Compliance/ noncompliance statement be submitted with hard and soft copy
ITB 13.1	Alternative Bids <i>“shall not be”</i> considered.
ITB 14.5	The prices quoted by the Bidder <i>“shall not”</i> be subject to adjustment during the performance of the Contract.
ITB 14.6	N/A
ITB 14.7	The Incoterms edition is: <i>Latest edition available 28 days before submission of bid</i> The Incoterm type is: Delivered Duty Paid (DDP)

ITB 14.8 (b) (i) and (c) (v)	Quoted Price: DDP. Place of Destination: Initially Contractors Warehouse afterwards to various sites/locations as per mentioned in the List of Goods and Delivery Schedule Section- VII- Schedule of Requirements
ITB 14.8 (a) (iii);(b) (ii) and (c)(v)	“Final destination (Project Site)”: Initially Contractors Warehouse afterwards to various sites/locations as per mentioned in the List of Goods and Delivery Schedule Section- VII- Schedule of Requirements.
ITB 15.1	The prices shall be quoted by the bidder and payment shall be made to the bidder in: PKR
ITB 15.2	N/A
ITB 16.4	Period of time the Goods are expected to be functioning (for the purpose of spare parts): More than Five (05) Years.
ITB 17.2 (a)	Manufacturer’s authorization is required where applicable (for Foreign Supplied Equipment). However, the bidder shall submit documentation regarding his status as a supplier, to the satisfaction of the Purchaser (e.g. certificate of authorized dealer/ distributor/importer of the items).
ITB 17.2 (b)	After sales service is: “required”
ITB 18.1	The bid shall be valid until 91 days after the opening of bids.
ITB 18.3 (a)	The bid price shall be adjusted by the following factor(s): N/A
ITB 19.1	A Bid Security “shall be” required. A Bid-Securing Declaration “shall not be” required. A Bid Security shall be required, the amount and currency of the bid security shall be: PKR 8,000,000/- in form of Unconditional Bank Guarantee/ Call Deposit Receipt (CDR)/Pay Orders/ Bank Draft issued by a scheduled Bank in Pakistan. Guarantees from other financial institutions such as insurance, bonding or security companies shall not be permitted. Unconditional Bank Guarantee/ Call Deposit Receipt (CDR)/Pay Orders/ Bank Draft shall be valid for twenty-eight (28) days beyond the expiry of bid validity period. This shall also apply if the period of Bid Validity is extended Bid Security (in original) prior to opening of bid 21.10.2026, at 11:00 AM) shall be submitted to the Office of General Manager (HRM), WAPDA House Lahore.

ITB 19.3 (d)	Not Applicable
ITB 19.9	N/A
ITB 20.1	In addition to the original of the bid, the number of copies is: 05
ITB 20.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: <i>Power(s) of Attorney given by Bidder.</i>
	D. Submission and Opening of Bids
ITB 22.1	For <u>bid submission purposes</u> only, the Purchaser's address is: General Manager (Hydro Resources Management), WAPDA Street Address: Room # 228 WAPDA House, Sharah-e-Quaid-e-Azam City: Lahore Country: <i>Pakistan</i> The deadline for bid submission is: Date: 21.10.2026 Time: 1100 hrs Bidders "<i>shall not</i>" have the option of submitting their bids electronically.
ITB 25.1	The bid opening shall take place at: Street Address: <i>Office of the General Manager (HRM) – 228 WAPDA House</i> City: <i>Lahore</i> Country: <i>Pakistan</i> Date: 21.10.2026 Time: 1130 hrs
ITB 25.3	The Letter of Bid and Price Schedules shall be initialed by all committee representatives of the Purchaser conducting Bid opening.
	E. Evaluation and Comparison of Bids
ITB 32.1	N/A
ITB 33.1	A margin of domestic preference " <i>shall not</i> " apply.
ITB 34.2(a)	Evaluation will be done for all Items

ITB 34.6	The adjustments shall be determined using the following criteria, from amongst those set out in Section III, Evaluation and Qualification Criteria: <i>[refer to Schedule III, Evaluation and Qualification Criteria; insert complementary details if necessary]</i> (a) Deviation in Delivery schedule: No <i>No credit will be given to deliveries before the earliest date, and bids offering delivery after the final date shall be treated as nonresponsive.</i> (b) Deviation in payment schedule: No <i>The SCC stipulates the payment schedule and any deviation proposed will render the bids non-responsive.</i> (c) the cost of major replacement components, mandatory spare parts, and service: No (d) the availability in the Purchaser's Country of spare parts and after-sales services for the equipment offered in the bid: No (e) the projected operating and maintenance costs during the life of the equipment: No (f) the performance and productivity of the equipment offered; No.
ITB 38.1	the Purchaser shall award the Contract to the Bidder whose bid has been determined to be the "Most Advantageous Bid" evaluated bid and is substantially responsive to the Bidding Documents
	F. Award of Contract
ITB 39.1	The maximum percentage by which quantities may be increased is: 15% The maximum percentage by which quantities may be decreased is: 15%

ITB 43.1 Procurement Related Complaint	The procedures for making a Procurement-related Complaint are detailed in the “Procurement Regulations for IPF Borrowers (Annex III).” If a Bidder wishes to make a Procurement-related Complaint, the Bidder should submit its complaint following these procedures, in writing (by the quickest means available, that is either by email or fax), to: For the attention: General Manager (M&S) Title/position: General Manger (M&S) Purchaser: General Manager (HRM) Email address: gmpndwater@gmail.com In summary, a Procurement-related Complaint may challenge any of the following: 1. the terms of the Bidding Documents; and 2. the Purchaser’s decision to award the contract.
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Section III. Evaluation and Qualification Criteria

This Section contains all the criteria that the Purchaser shall use to evaluate a bid and qualify the Bidders. in accordance with ITB 34 and ITB 36, no other factors, methods or criteria shall be used.

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1. Margin of Preference (ITB 33)

Not Applicable

2. Evaluation (ITB 34)

2.1. Evaluation Criteria (ITB 34.6)

The Purchaser's evaluation of a bid may take into account, in addition to the Bid Price quoted in accordance with ITB Clause 14.8, one or more of the following factors as specified in ITB 34.2(f) and in BDS referring to ITB 34.6, using the following criteria and methodologies.

- (c) Cost of major replacement components, mandatory spare parts, and service.
[insert one of the following]
 - (i) *The list of items and quantities of major assemblies, components, and selected spare parts, likely to be required during the initial period of operation specified in the BDS 16.4, is in the List of Goods. An adjustment equal to the total cost of these items, at the unit prices quoted in each bid, shall be added to the bid price, for evaluation purposes only.*

2.2. Multiple Contracts (ITB 34.4)

Not Applicable

2.3. Alternative Bids (ITB 13.1)

Not Applicable

3. Qualification (ITB 36)

3.1 Post-qualification Requirements (ITB 36.1)

After determining the lowest-evaluated bid in accordance with ITB 35.1, the Purchaser shall carry out the post-qualification of the Bidder in accordance with ITB 36, using only the requirements specified. Requirements not included in the text below shall not be used in the evaluation of the Bidder's qualifications.

- (a) **Financial Capability:** The Bidder shall submit audited financial statements or, if not required by the law of the Bidder's country, other Audited financial statements acceptable to the Purchaser, for the last 03 years containing UDIN prior to bid submission deadline, demonstrating the current soundness of the Bidder's financial position.

The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, stock in hand and other financial means (independent of any contractual advance payment) sufficient to meet the cash flow requirements estimated as PKR 250 million for the subject contract(s) net of the Bidders other commitments (use Form FIN – 3.1, with attachments).

- (b) **Average Annual Turnover:** The bidder shall demonstrate an average annual turnover for the last five (5) years in similar nature of works/items not less than 60% of the offered bid price. (Use Form FIN – 3.2)
- (c) **Specific Experience:** The Bidder shall demonstrate that, during the last ten (10) years prior to the Bid Submission Deadline, it has successfully completed at least three (3) contracts of a similar nature, each having a minimum contract value of PKR 100 million. The Bidder shall provide full references and contact details of the respective employers/clients for verification. The contracts shall have been successfully and substantially completed and shall be similar in nature, scope, complexity, and size to the Goods and Related Services required under this Contract.
- (d) **Documentary Evidence:** The Bidder shall furnish documentary evidence to demonstrate that the goods it offers meet the following usage requirement: *as per specification and verifiable performance certificate/Purchase Order/Contract Agreement of all equipment (quoted make/model), supplied during last 10 years by bidder itself or any other supplier, from purchasers.*
- (e) **Manufacturing experience and Technical Capacity:** For the items under the Contract that the bidder is a manufacturer, the Bidder shall furnish documentary evidence to demonstrate that:
 - (i) It has manufactured and supplied goods of similar nature and complexity for at least 10 years prior to the bid submission deadline for at least 03 projects, supported by successful operation certification of the supplied equipment.
 - (ii) Its annual production capacity of goods of similar nature and complexity for each of the last 03 years prior to the bid submission deadline, is at least 02 times the quantities specified under the contract.
- (f) **If Bidder is not manufacturer:** If a Bidder is not a manufacturer, but is offering the Goods on behalf of the Manufacturer under Manufacturer's Authorization Form (Section IV, Bidding Forms), the Manufacturer shall demonstrate the above qualifications (i), (ii), and the Bidder shall demonstrate that it has successfully completed at least 03 contracts of similar goods in the past 10 years.

Section IV. Bidding Forms

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Letter of Bid

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 form and shall be deleted from the final products.*

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

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

Invitation for Bid No.: **[insert identification]**

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

To: ***[insert complete name of Purchaser]***

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB 8)___;
- (b) We 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) **Sexual Exploitation and Abuse (SEA) and/or Sexual Harassment (SH):** *[select the appropriate option from (i) to (iii) below and delete the others. In case of JV members and/or subcontractors, indicate the status of disqualification by the Bank of each JV member and/or subcontractor].*

We, including any of our subcontractors:

- (i) [have not been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations.]
- (ii) [are subject to disqualification by the Bank for non-compliance with SEA/ SH obligations.]
- (iii) [had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations, and were removed from the disqualification list. An arbitral award on the disqualification case has been made in our favor.]

-
- (e) 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: **[insert a brief description of the Goods and Related Services];**
- (f) The total price of our Bid, excluding any discounts offered in item (f) below is:
- In case of only one lot, total price of the Bid **[insert the total price of the bid in words and figures, indicating the various amounts and the respective currencies];**
- (g) 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];**
- (h) Our bid shall be valid until *[insert day, month and year in accordance with ITB 18.1]*, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (i) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;
- (j) 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;
- (k) 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 a member of 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;
- (l) We are not a government owned entity/ We are a government owned entity but meet the requirements of ITB 4.5;
- (m) We have paid, or will pay the following commissions, gratuities, or fees 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.”)

- (n) 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; and
- (o) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (p) 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

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

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]**

*: 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 to be attached with the Bid Schedules.

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]*

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

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

Page _____ of _____ pages

1. Bidder's Name <i>[insert Bidder's legal name]</i>
2. In case of JV, legal name of each member : <i>[insert legal name of each member in JV]</i>
3. Bidder's actual or intended country of registration: <i>[insert actual or intended country of registration]</i>
4. Bidder's year of registration: <i>[insert Bidder's year of registration]</i>
5. Bidder's Address in country of registration: <i>[insert Bidder's legal address in country of registration]</i>
6. 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>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i> ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.3. ☐ In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. ☐ In case of Government-owned enterprise or institution, in accordance with ITB 4.5 documents establishing: • Legal and financial autonomy • Operation under commercial law

-
- Establishing that the Bidder is not dependent agency of the Purchaser
2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Bidder's JV Members Information Form

*[The Bidder shall fill in this Form in accordance with the instructions indicated below.
The following table shall be filled in for the Bidder and for each member of a Joint Venture]].*

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

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

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

Page _____ of _____ pages

1. Bidder's Name: <i>[insert Bidder's legal name]</i>
2. Bidder's JV Member's name: <i>[insert JV's Member legal name]</i>
3. Bidder's JV Member's country of registration: <i>[insert JV's Member country of registration]</i>
4. Bidder's JV Member's year of registration: <i>[insert JV's Member year of registration]</i>
5. Bidder's JV Member's legal address in country of registration: <i>[insert JV's Member legal address in country of registration]</i>
6. Bidder's JV Member's authorized representative information Name: <i>[insert name of JV's Member authorized representative]</i> Address: <i>[insert address of JV's Member authorized representative]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers of JV's Member authorized representative]</i> Email Address: <i>[insert email address of JV's Member authorized representative]</i>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i> ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.3. ☐ In case of a Government-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and absence of dependent status, in accordance with ITB 4.5. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Sexual Exploitation and Abuse (SEA) and/or Sexual Harassment Performance Declaration

[The following table shall be filled in by the Bidder, each member of a Joint Venture and each subcontractor proposed by the Bidder]

Bidder's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member's or Subcontractor's Name: *[insert full name]*

ICB No. and title: *[insert ICB number and title]*

Page *[insert page number]* of *[insert total number]* pages

SEA and/or SH Declaration

in accordance with Section III, Qualification Criteria, and Requirements

We:

- | |
|--|
| <p>☐ (a) have not been subject to disqualification by the Bank for non-compliance with SEA/SH obligations</p> <p>☐ (b) are subject to disqualification by the Bank for non-compliance with SEA/ SH obligations</p> <p>☐ (c) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations, and were removed from the disqualification list. An arbitral award on the disqualification case has been made in our favor.</p> |
|--|

<i>[If (c) above is applicable, attach evidence of an arbitral award reversing the findings on the issues underlying the disqualification.]</i>

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:

- 1. All prices should be quoted in PKR whether to be imported/already imported as per detail required in forms.*
- 2. “ICB” mentioned in the forms may be considered as replaced with NCB.*
- 3. “CIP” mentioned in the forms may be considered as replaced with DDP.*

Price Schedule: Goods Manufactured Outside the Purchaser's Country, to be Imported

(Group C bids, goods to be imported)						Date: _____		
Currencies in accordance with ITB 15						NCB No: _____		
						Alternative No: _____		
						Page N° _____ of _____		
1	2	3	4	5	6	7	8	9
Line Item N°	Description of Goods	Country of Origin	Delivery Date as defined by Incoterms	Quantity and physical unit	Unit price CIP <i>[insert place of destination]</i> in accordance with ITB 14.8(b)(i)	CIP Price per line item (Col. 5x6)	Price per line item for inland transportation and other services required in the Purchaser's country to convey the Goods to their final destination specified in BDS	Total Price per Line item (Col. 7+8)
<i>[insert number of the item]</i>	<i>[insert name of good]</i>	<i>[insert country of origin of the Good]</i>	<i>[insert quoted Delivery Date]</i>	<i>[insert number of units to be supplied and name of the physical unit]</i>	<i>[insert unit price CIP per unit]</i>	<i>[insert total CIP price per line item]</i>	<i>[insert the corresponding price per line item]</i>	<i>[insert total price of the line item]</i>
Total Price								

Name of Bidder *[insert complete name of Bidder]* Signature of Bidder *[signature of person signing the Bid]* Date *[Insert Date]*

Price Schedule: Goods Manufactured Outside the Purchaser's Country, already imported*

(Group C bids, Goods already imported)										Date: _____	
Currencies in accordance with ITB 15										ICB No: _____	
Page N° _____ of _____										Alternative No: _____	

1	2	3	4	5	6	7	8	9	10	11	12
Line Item N°	Description of Goods	Country of Origin	Delivery Date as defined by Incoterms	Quantity and physical unit	Unit price including Custom Duties and Import Taxes paid, in accordance with ITB 14.8(c)(i)	Custom Duties and Import Taxes paid per unit in accordance with ITB 14.8(c)(ii) , [to be supported by documents]	Unit Price net of custom duties and import taxes, in accordance with ITB 148 (c) (iii) (Col. 6 minus Col.7)	Price per line item net of Custom Duties and Import Taxes paid, in accordance with ITB 14.8(c)(i) (Col. 5×8)	Price per line item for inland transportation and other services required in the Purchaser's country to convey the goods to their final destination, as specified in BDS in accordance with ITB 14.8 (c)(v)	Sales and other taxes paid or payable per item if Contract is awarded (in accordance with ITB 14.8(c)(iv)	Total Price per line item (Col. 9+10)

<i>[insert number of the item]</i>	<i>[insert name of Goods]</i>	<i>[insert country of origin of the Good]</i>	<i>[insert quoted Delivery Date]</i>	<i>[insert number of units to be supplied and name of the physical unit]</i>	<i>[insert unit price per unit]</i>	<i>[insert custom duties and taxes paid per unit]</i>	<i>[insert unit price net of custom duties and import taxes]</i>	<i>[insert price per line item net of custom duties and import taxes]</i>	<i>[insert price per line item for inland transportation and other services required in the Purchaser's country]</i>	<i>[insert sales and other taxes payable per item if Contract is awarded]</i>	<i>[insert total price per line item]</i>
										Total Bid Price	

Name of Bidder *[insert complete name of Bidder]* Signature of Bidder *[signature of person signing the Bid]* Date *[insert date]*

* *[For previously imported Goods, the quoted price shall be distinguishable from the original import value of these Goods declared to customs and shall include any rebate or mark-up of the local agent or representative and all local costs including import duties and taxes.]*

Price Schedule: Goods Manufactured in the Purchaser's Country

Purchaser's Country _____		(Group A and B bids) Currencies in accordance with ITB 15				Date: _____ ICB No: _____ Alternative No: _____ Page N° _____ of _____			
1	2	3	4	5	6	7	8	9	10
Line Item N°	Description of Goods	Delivery Date as defined by Incoterms	Quantity and physical unit	Unit price EXW	Total EXW price per line item (Col. 4x5)	Price per line item for inland transportation and other services required in the Purchaser's Country to convey the Goods to their final destination	Cost of local labor, raw materials and components from with origin in the Purchaser's Country % of Col. 5	Sales and other taxes payable per line item if Contract is awarded (in accordance with ITB 14.8(a)(ii))	Total Price per line item (Col. 6+7)

<i>[insert number of the item]</i>	<i>[insert name of Good]</i>	<i>[insert quoted Delivery Date]</i>	<i>[insert number of units to be supplied and name of the physical unit]</i>	<i>[insert EXW unit price]</i>	<i>[insert total EXW price per line item]</i>	<i>[insert the corresponding price per line item]</i>	<i>[Insert cost of local labor, raw material and components from within the Purchase's country as a % of the EXW price per line item]</i>	<i>[insert sales and other taxes payable per line item if Contract is awarded]</i>	<i>[insert total price per item]</i>
								Total Price	

Name of Bidder *[insert complete name of Bidder]* Signature of Bidder *[signature of person signing the Bid]* Date *[insert date]*

Price and Completion Schedule - Related Services

Currencies in accordance with ITB 15						Date: _____
						ICB No: _____
						Alternative No: _____
						Page N° _____ of _____
1	2	3	4	5	6	7
Service N°	Description of Services (excludes inland transportation and other services required in the Purchaser's country to convey the goods to their final destination)	Country of Origin	Delivery Date at place of Final destination	Quantity and physical unit	Unit price	Total Price per Service (Col. 5*6 or estimate)
<i>[insert number of the Service]</i>	<i>[insert name of Services]</i>	<i>[insert country of origin of the Services]</i>	<i>[insert delivery date at place of final destination per Service]</i>	<i>[insert number of units to be supplied and name of the physical unit]</i>	<i>[insert unit price per item]</i>	<i>[insert total price per item]</i>

Total Bid Price						

Name of Bidder *[insert complete name of Bidder]* Signature of Bidder *[signature of person signing the Bid]* Date *[insert date]*

Form FIN – 3.1: Financial Situation and Performance

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

ICB No. and title: _____

Page _____ of _____ pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, _____ (amount in currency, currency, exchange rate, PKR				
	Year 1	Year 2	Year 3	Year4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

2. Sources of Finance

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

No.	Source of finance	Amount (PKR equivalent)
1		
2		
3		

2. Financial documents

The Bidder and its parties shall provide copies of financial statements for years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.2. The financial statements shall:

- (a) reflect the financial situation of the Bidder or in case of JV member, and not an affiliated entity (such as parent company or group member).
- (b) be independently audited or certified in accordance with local legislation.
- (c) be complete, including all notes to the financial statements.
- (d) correspond to accounting periods already completed and audited.

☐ Attached are copies of financial statements¹ for the _____ years required above; and complying with the requirements

¹ If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

² Cash flow requirements will be evaluated pursuant to criteria mentioned in Sub-Clause.

Form FIN - 3.2: Average Annual Turnover

Bidder's Name: _____

Date: _____

Joint Venture Member's Name _____

ICB No. and title: _____

Page _____ of _____ pages

		Annual turnover data (construction only)	
Year	Amount Currency	Exchange rate	PKR equivalent
<i>[indicate year]</i>	<i>[insert amount and indicate currency]</i>		
Average Annual Construction Turnover *			

* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.

Form FIN - 3.3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Section III (Evaluation and Qualification Criteria)

Source of financing	Amount (PKR equivalent)
1.	
2.	
3.	
4.	

Form of Bid Security

(Bank Guarantee)

[The bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[Purchaser to insert its name and address]*

IFB No.: *[Purchaser to insert reference number for the Invitation for Bids]*

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

Date: *[Insert date of issue]*

BID GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that _____ *[insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof]* (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its bid (hereinafter called "the Bid") for the execution of _____ under Invitation for Bids No. _____ ("the IFB").

Furthermore, we understand that, according to the Beneficiary's conditions, bids must be supported by a bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (_____) upon receipt by us of the Beneficiary's complying demand, supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

-
- (a) has withdrawn its Bid prior to the Bid validity expiry date set forth in the Applicant's Letter of Bid, or any extended date provided by the Applicant; or
 - (b) having been notified of the acceptance of its Bid by the Beneficiary prior to the expiry date of the Bid validity or any extension thereof provided by the Applicant has failed to: (i) sign the contract agreement, or (ii) furnish the performance security, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful bidder, upon our receipt of copies of the contract agreement signed by the Applicant and the performance security issued to the Beneficiary in relation to such contract agreement; or (b) if the Applicant is not the successful bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the bidding process; or (ii) twenty-eight days after the expiry date of the Bid validity.

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

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

[Signature(s)]

Note: All italicized text is for use in preparing this form and shall be deleted from the final product.

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 binding on the Manufacturer. The Bidder shall include it in its bid, if so indicated in the **BDS**.]*

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

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

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

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.

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.

We confirm that we do not engage or employ forced labor or persons subject to trafficking or child labor, in accordance with Clause 14 of the General Conditions of Contract.

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]*

Dated on _____ day of _____, _____ *[insert date of signing]*

Section V. Eligible Countries

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: the Borrower's country prohibits commercial relations with that country

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.² 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;³
 - (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;⁴
 - (i) “collusive practice” is an arrangement between two or more parties designed to achieve an improper purpose, including to influence.

² In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

³ 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.

⁴ 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.

improperly the actions of another party;⁵

(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;⁶

(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 mis-procurement 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

⁵ 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.

⁶ For the purpose of this sub-paragraph, “party” refers to a participant in the procurement process or contract execution.

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,⁷ 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 nominated⁸;
- (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."

⁷ 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.

⁸ 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

Contents

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Notes for Preparing the Schedule of Requirements

The Schedule of Requirements shall be included in the bidding documents by the Purchaser, and shall cover, at a minimum, a description of the goods and services to be supplied and the delivery schedule.

The objective of the Schedule of Requirements is to provide sufficient information to enable bidders to prepare their bids efficiently and accurately, in particular, the Price Schedule, for which a form is provided in Section IV. In addition, the Schedule of Requirements, together with the Price Schedule, should serve as a basis in the event of quantity variation at the time of award of contract pursuant to ITB 39.

The date or period for delivery should be carefully specified, taking into account (a) the implications of delivery terms stipulated in the Instructions to Bidders pursuant to the *Incoterms* rules (i.e., EXW, or CIP, FOB, FCA terms—that “delivery” takes place when goods are delivered **to the carriers**), and (b) the date prescribed herein from which the Bidder’s delivery obligations start (i.e., notice of award, contract signature, opening or confirmation of the letter of credit).

1. List of Goods and Delivery Schedule

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

Line Item No	Description of Goods	Qty	Physical unit	Final (Project Site) Destination as specified in BDS	Delivery (as per Incoterms) Date		
					Earliest Delivery Date	Latest Delivery Date	Bidder’s offered Delivery date <i>[to be provided by the bidder]</i>
1	Equipment						
1.1	RTU/Data Loggers						
1.1.1	Data logger- With Touch Screen Display, 2GB Industrial Grade Secure or equivalent SD Card, Hydro-Meteorological Software, with GSM/GPRS(M2M) Modem along with SIM and Satellite Modem (UHF/VHF, Iridium satellite/ GOES/ METEOSAT / Imarsat/ Thuraya) alongwith connection including all accessories, antenna and cables etc., Serial Extension Board, Connection Terminals, Detailed specifications are mentioned in the Section VII. Schedule of Requirements	16	No.	Location Maps attached at Annexures-I	N/A	150 days. <i>number of days following the date of Signing of the Contract</i>	<i>number of days following the date of Signing of the Contract</i>

Abbreviations are attached at Annexure IV

1.1.2	Solar panels and Rechargeable Battery Proposed PV Solar Panel and Spill proof maintenance free battery should be of suitable rating to support the proposed system not less than 30 days. Detailed specifications are mentioned in the Section VII. Schedule of Requirements Minimum 150W PV Solar panel including all accessories & Charge controller Minimum 12V dc 100AH Spill proof maintenance free battery	16	No.		N/A	-do-	
1.1.3	Armor Plated National Electrical Manufacturers Association (NEMA) or equivalent Enclosure Stainless steel patch box (for data loggers, solar panel & battery powered station + Armor plating, must be IP66/IP67	16	No.		N/A	-do-	
1.1.4	Lightning Arrestor and Grounding Kit depending upon site requirements. * 1m Copper lightning rod * 2m Copper grounding rod * 4m Lightning cable * 2m Earthing cable	16	No.				

1.2	SENSORS						
1.2.1	Combined Temperature and Relative Humidity Sensor/Probe with protective cap & standard shaft including installation and all accessories & suitable connector required to connect with data logger mentioned above in serial # 1.1.1 Detailed specifications are mentioned in the Section VII. Schedule of Requirements	16	No.				
1.2.2	Wind sensor (Wind speed/wind direction) including all accessories & suitable connector required to connect with data logger mentioned above in serial # 1.1.1. Wind Sensor should be based on ultrasonic technology Detailed specifications are mentioned in the Section VII. Schedule of Requirements	16	No.				
1.2.3	Heated Rain and Snow gauge (Tipping bucket) sensor with 10m cable and Separate 1 Meter Pedestal for Rain Gauge including all accessories & suitable connector required to connect with data logger mentioned above in serial # 1.1.1. Detailed specifications are mentioned in the Section VII. Schedule of Requirements	16	No.				

1.2.4	Pyranometer with all accessories & Connector required to connect with Data Logger mentioned above at Sr. No.1.1.1 Detailed specifications are mentioned in the Section VII. Schedule of Requirements	16	No.				
1.2.5	Digital Snow Depth Sensor, Laser Based, opto-electronic for all-in all-weather conditions and maintenance-free accessories & Connector required to connect with Data Logger mentioned above at Sr. No.1.1.1 and Installation Charges Detailed specifications are mentioned in the Section VII. Schedule of Requirements	16	No.				
1.2.6	Outdoor Observation and Surveillance Field Camera Compatible for Weather stations at High Altitude and Having capability to store images in Data Logger.	16	No.				
Spares sets of Equipment							
1.2.7	Spare set of Data Logger alongwith GSM & Satellite Modems (UHF/VHF, Iridium satellite/ GOES/ METEOSAT / Imarsat/ Thuraya) including complete accessories (Antenas & cables etc.), Solar Panel with controller, Battery, NEMA Enclosure	1	No.				
1.2.8	Spare set of Sensors mentioned above in Sr. Nos.1.2.1, 1.2.2 , 1.2.3, 1.2.4, 1.2.5 & 1.2.6 (spare set for each sensor)	1	No.				

1.3	Equipment related to Data Management & Field Investigations						
1.3.1	UPS Online (05 KVA) along with 10 No. Batteries Detailed specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				
1.3.2	Central Server Hardware for Server/Master Detailed specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				
1.3.3	Server Software. (Unified Data collection system/Hydro-metrological database with Customized displays /tools & utilities. Detailed specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				
1.3.4	SAN (Storage Area Network) 20 TB	1	No.				
1.3.5	Switches	2	No.				
1.3.6	Desktop Computers with 32" LED display with mount rack. Detailed specifications are mentioned in the Section VII. Schedule of Requirements	3	No.				
1.3.7	LAPTOPS for site commissioning of standard brand	3	No.				
1.3.8	65" UHD LED Display with Mount Rack for data display and viewing.	3	No.				
1.3.9	Hand held latest GPS Detailed specifications are mentioned in the Section VII. Schedule of Requirements	4	No.				

1.3.10	Rain Gauge Calibration Kit as per WMO standard and system requirement Detailed specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				
1.3.11	Hand held Latest weather Meter Detailed specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				
1.3.12	Laser Range Finder (Unit-T)	4	No.				
1.3.13	Standard Relative humidity indicator as per WMO standard and system requirement Detailed specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				
1.3.14	Cordless Drill Machine (DeWalt) Detailed specifications are mentioned in the Section VII. Schedule of Requirements	2	No.				
1.3.15	Steam Ice Drill. Detailed specifications are mentioned in the Section VII. Schedule of Requirements	2	No.				
1.3.16	Digital Latest Multimeter specifications are mentioned in the Section VII. Schedule of Requirements	1	No.				

Note: Earliest Date marked as N/A, it means Supplier can provide already available equipment any time after Contract Signing and submission of Performance Guarantee. However, delivery to final destination or place of destination should not be delayed beyond latest delivery.

2. List of Related Services and Completion Schedule

[This table shall be filled in by the Purchaser. The Required Completion Dates should be realistic, and consistent with the required Goods Delivery Dates (as per Incoterms)]

Service	Description of Service	Qty ¹	Physical Unit	Place where Services shall be performed	Final Completion Date(s) of Services
2.1	Installation, Testing & Commissioning including Shipment etc.				
2.1.1	Enclosure box, sensors and testing including all necessary installation material like power cables, screws and bolts etc.	16	No.	Location Maps attached at Annexures-I	150 days after inspection of equipment at Contractors Warehouse
2.1.2	Installation of Sites Galvanized chain link Fencing 07 feet high with chain link including Levelling of Sites as per WMO standard/site requirement with gate etc. & Sign Boards for respective sites	16	No.	Location Maps attached at Annexures-I	
2.1.3	Communication charges for 01 Year.	16	No.	Location Maps attached at Annexures-I	

2.1.4	Renovation of the server room as per site specification Detailed requirements/specifications are mentioned in the Section VII. Schedule of Requirements	LS		GMRC Office, Lahore	
2.1.5	Imparting training to GMRC persons of WAPDA who are involved in the configuration of Equipment and performance of Installation, testing, operation and maintenance, Training to be delivered by foreign experts or its representative for all equipment provided in List of Goods and Delivery Schedule	LS		GMRC Office, Lahore	
2.1.6	All Latest Volumes of Related ISO/WMO, IEEE, CE standards. System Documentation (System circuit diagram, operation & maintenance, service manuals and any other documents of all the equipment installed (Hard copies) and CD's containing soft copies)	LS		GMRC Office, Lahore	
3.1	On site Reliability Test (OSRT) Detail are mentioned in Section-VII Schedule of Requirements.	16	No.	Location Maps attached at Annexures-I/Data receive on the server	Sixty (60) days starts after successful installation
4.1	Maintenance Period (one Year) Detail are mentioned in Section-VII Schedule of Requirements.	16	No.	Location Maps attached at Annexures-I	2 visits during warranty period

4. Technical Specifications

All goods as mention below should be brand new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided for otherwise in the contract.

INTRODUCTION

Glacier Monitoring Research Centre , WAPDA has planned for:-

Up-gradation of the existing sixteen (16) Automatic Weather Stations (AWS) installed in Upper Indus Basin(UIB) from obsolete Meteor Burst Communication System (MBCS) technology to modern GSM/GPRS and Satellite/Meteosat GOES/ METEOSAT /Imarsat/ Thuraya or equivalent communications for transmission of data. The AWS (Automatic Weather Station) should provide real time Weather data (Air Temperature & Relative Humidity, Wind speed & direction, Rain/Precipitation, Snow depth/ snow water equivalent & Solar Radiation) through GSM/GPRS and Satellite/Meteosat GOES/ Imarsat/ Thuraya/ Irridium network at scheduled interval and as & when requested by the users. The WMO SYNOP (Surface Synoptic Observations) MOBIL and BUFR (Binary Universal form for the Representation of Meteorological Data) message format is required to be generated at the server located in Lahore, Pakistan.

GENERAL REQUIREMENTS:

i. Environmental Conditions

The equipment and hardware to be provided under this Contract shall be capable of withstanding the worst possible conditions, without deterioration or distortion, expected in the Project area. The following environmental parameters indicate typical conditions:

- | | |
|--------------------------------------|-----------------------|
| • Altitude | 1500 to 5000 m |
| • Maximum outdoor shade temperature | + 50 °C to 65 °C |
| • Minimum outdoor temperature | - 40 °C |
| • Relative humidity | Approaching 100% |
| • Isokeraunic level | 10 |
| • Maximum wind speed (3.5 sec. gust) | 160/200 km/hr |
| • Atmosphere | Occasional dust laden |
| • Terrain | Mountainous |

ii. Equipment

All equipment to be provided under this Contract shall be manufactured, constructed, assembled and finished with workmanship of the highest quality throughout, and all

components shall be new and of the class most suitable for the required application. State-of-the-art shall be applied in all aspects of the work. The equipment shall be designed and manufactured to ensure a useful service life of at least 5 to 10 years under the specified working conditions.

Standardized in-factory quality control shall, as far as possible, be applied to all components of the equipment. The components shall not be subjected to any service conditions outside the operational values given in the manufacturer's published data.

The circuits shall be designed to ensure that:

- a. The reliable operation of the components is guaranteed. No degradation of performance results under the specified conditions.
- b. The changes in component values and parameters which may occur during the operational life of the equipment are either negligible or adequately compensated.

Compensations through adjustable controls shall be minimized. Wherever un-avoidable, complete and clear descriptions of such controls shall be furnished.

The equipment shall be designed to ensure that in case of replacement of any part, only minor adjustments are required.

The interactions between circuits shall be minimized and it shall be ensured that the adjustment of any parameter shall not affect the stability of other parameters as far as possible. Similarly, it shall be ensured that a component fault is confined as closely as possible to the faulty component and other components are protected from consequential damage.

The components generating significant amount of heat shall be adequately spaced from other

components. If necessary, heat sinks shall also be provided. Power level circuits shall be super-efficient designed. All equipment shall be natural convection cooled. Forced air cooling shall not be utilized.

The circuit designs shall provide efficient protection against short circuit or faulty operation of measuring apparatus at all test and check points.

The circuits shall have LED indicators to indicate normal and alarm states. Self-diagnostic features shall be provided, as far as possible.

The equipment shall be designed and constructed to incorporate standard parts to the maximum extent feasible. Small modular packages that can be removed and replaced easily shall be used. Rapid positive fault detection and isolation of defective circuits and modules shall be facilitated. The circuit boards should be easily removable/ replaceable without causing any damage and without interfering with the operation of the rest of the equipment. Switching-off of the power supplies should not be necessary while changing circuit boards. Indicator lamps shall be replaceable from the front with a push-to-test capability.

All equipment shall be designed to operate without undue vibrations, dissipation of heat,

and with the least amount of noise.

It shall be ensured that all operating controls are kept at ground potential. For operating voltages exceeding 100 V, the equipment shall be labeled accordingly and shielded for accidental contact.

The equipment shall be designed for ease of maintenance.

The equipment shall be modularly constructed. All circuits shall be totally solid-state designed around state-of-the-art families of semiconductors. Use of electromechanical components other than sensors shall be restricted to a minimum possible level.

Enclosure and outer finish shall be according to the relevant international standards. Safety shall be provided against splashes, dust and fungus etc.

iii. Documentation

Documentation shall be provided for each equipment (or each category of equipment) and be subject to the Employer's approval before delivery to the site. All descriptions, drawings, etc. shall be in the English language.

The documents shall enable the Purchaser's trained personnel to perform the following tasks:

- a. Packing and unpacking
- b. Understanding of operations.
- c. Maintenance and trouble-shooting after expiry of warranty period.

The documentation shall include all necessary schematic drawings and manuals for, at least, the following information:

- Operational and technical characteristics of equipment.
- Instruction service manuals for maintenance and repairs.

In addition, the Contractor shall submit the following, before provisional taking-over of the complete system:

- As-built drawings.
- Records of all tests (type, routine, in-factory and on-site).

iv. Tools and Test Equipment

Special tools and measuring equipment required for installation, testing, commissioning, service and maintenance shall be provided as part of the Contract. List of such tools/test equipment is given in the List of Goods and Delivery Schedule in Section VII and any other testing tools required for Maintenance and repairing must be added in the list given by bidder.

1. SCOPE

i. AUTOMATIC WEATHER STATIONS (AWS)

Supply, Installation and Commissioning of Automatic Weather Stations as described in the "List of Goods and Delivery Schedule".

In order to meet the above requirements, the Contractor shall provide equipment and services for the following facilities:

-
- Responsibility to execute the project on a turn-key basis by taking up the installation of 16 No. AWS on sites as per **Annexure-I** or on sites/locations as directed by Engineer/Employer.
 - Identify a suitable GSM/GPRS Service provider for the mobile subscriber network.
 - Installation of Data Loggers based on GSM/GPRS and Satellite/GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium Communication Network and sensors at Automatic Weather stations to obtain Air Temperature & Relative Humidity, Wind speed & Direction, Catchment Rainfall, Precipitation, Snow Depth/ Snow Water Equivalent and Solar Radiation parameters etc.
 - Up-gradation of 16 no. High Altitudes Automatic Weather Stations with Central Management Data Center / Master Station Server operating on either Windows or Linux based Software for data collection. Details of Master Station Hardware & Software attached at **Annexure-II**.
 - Data of 16 no. AWS will also be received with Central Server, operating Data Collection on Windows or Linux based Software installed in GMRC office . Details of Central Server / Master Station Hardware & Software attached at **Annexure-II**.
 - Integration of already existing 4 no. GSM stations in the new data Server.
 - For any further additional support regarding integration/configuration of the new stations / additional equipment / sensors with the new server (to be installed).
 - Integration of Client workstations with Central Servers for display of Meteorological data of all the sites (AWS) under GMRC. Details of Client Workstation Hardware & Software attached at **Annexure-II**.
 - Scheduled and on demand transmission of data through GSM/GPRS and Satellite/GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium based Communication network.
 - Integration and commissioning of all sensors including transportation of all the equipment at site is bidder's responsibility.
 - The security of equipment at the sites will be the responsibility of the bidders till it is handed over to the GMRC WAPDA after successful installation, testing & commissioning of the Sensors.

Bidder will be required to install the AWS equipment on sites (on already installed mast/Tower) as per **Annexure-I** or on sites/locations as directed by Engineer / Employer. Tentative list of locations for sensor installation for AWS sites is attached as **Annexure-I**. The locations can be altered/shifted as per site requirement or as directed by the Employer/Engineer.

2. **REQUIREMENTS FOR AWS STATIONS**

- The equipment should incorporate the state-of the-art technology and provide capability for unattended operation using a minimum 12V/100AH single sealed maintenance-free battery, rechargeable through minimum 150W solar panel. The battery shall be capable to run the system for minimum of 30 days during total cloudy conditions.
- The Equipment (RTU/Data Loggers, Sensors, Tools & Accessories including Equipment for Testing & Measurement) etc. must be provided/supplied along with all the Accessories required for installation, testing & commissioning etc..

-
- All equipment should be qualified for Pakistan Meteorological Department (PMD)/World Meteorological Organization (WMO) Specifications and suitable for outdoor applications in extreme conditions.
 - The Automatic Weather Station's equipment must be housed in IP66/IP67 & NEMA-4 weather-proof enclosure and shall meet all specified environment specification of international standards. The proposed enclosure must guarantee: extreme weather protection.
 - Data loggers must have certification from WMO for functional operation.
 - The system should have in-built memory of storing data for at least 6 months period.
 - PCMCIA (Personal Computer Memory Card International Association) memory card slot/ USB (Universal Serial Bus) or any other commercially available latest technology memory device for data retrieval and transfer of set up of the system shall be provided. All set up and configuration files should be transferable through the solid state memory device to the data logger and vice versa.
 - Facility to give manual commands to transmit data for testing as well as for manual operation purposes shall be provided.
 - The number of analog/digital/SDI (Serial Digital Interface) channels provided in the data logger shall be compatible to the sensors being supplied. There should have facility to further expand to interface at least 8 additional digital & 8 additional analog channels.
 - Software CDs of AWS station's software utilized in the data logger and transmission unit is to be provided. Suitable training in these aspects may also be provided in Pakistan for 08 (Eight) personnel for at least 07 (Seven) working days each.

REQUIREMENTS FOR ONSITE DISPLAY UNIT

- System should have provision for a dedicated port in the Data Loggers to interface a cable linked remote display unit and facilitate values of Hydro-Meteorological parameters to be displayed in real time basis at user-defined intervals.
- Measured data should be sent to the display through a suitable output port, preferably RS-485 port.
- Provision for onsite display for user selected parameters at desired time interval.

DETAILS OF WEATHER PARAMETERS

The following weather parameters are required from the sensors interfaced with the data logger through GSM/ GPRS/ Satellite/ GOES/ METEOSAT/ Imarsat/ Thuraya/ Iridium transmission.

- i. Instantaneous sampled value of air temperature in deg C at every 10-minute interval.
- ii. Max. air temperature of the hour (samples taken every minute)
- iii. Minimum air temperature of the hour (samples taken every minute)
- iv. Daily maximum and Minimum Temperature
- v. Wind speed in knots at every 30-minute interval with 3-minute vector averaging or as per the requirement of the client.
- vi. Wind direction in degrees at every 30-minute interval or as per the requirement of the client with 3-minute vector averaging.
- vii. Daily minimum and maximum wind speed
- viii. Daily maximum wind gust.

-
- ix. Instantaneous value of RH(Relative Humidity) at the end of every 10 minutes.
 - x. Daily maximum and minimum value of Relative Humidity
 - xi. Dew Point temperature at every 30-minute interval.
 - xii. Cumulative rainfall since last reset (reset at 03 Hours Pakistan Standard Time every day)
 - xiii. Hourly rainfall (reset every full hour Pakistan Standard Time)
 - xiv. Solar Radiation Reading on hourly basis
 - xv. Average Solar Radiation parameter on 6 hours basis
 - xvi. Hourly & Daily Snow Depth
 - xvii. Hourly & Daily Snow Fall
 - xviii. Hourly & Daily Snow Melting
 - xix. Battery voltage (hourly)

3. DATA COMMUNICATION SYSTEM REQUIREMENTS

- It is requirement of Water & Power Development Authority that all locations where GSM/GPRS cellular coverage is available, main communication medium used for remote stations be based on cellular networks and sites where no cellular coverage is available main communication media be based on Satellite mobile communications or / GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium Link communication. However, the option for communication system (GSM/GPRS/Satellite/Meteosat GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium) offered by the Bidder should ensure security regarding Data Leakage.
- Overall requirements for compatibility to a GSM/GPRS cellular network may be ensured by the bidder. Technical specifications in this aspect are broadly indicative. Complete end-to end solution shall be the responsibility of the bidder. In addition to sending an SMS of -Meteorological data over GSM network, GPRS communication features shall include support for UDP (User Datagram Protocol)/TCP(Transmission Control Protocol) for data transmission. The bidder will have to bear all the expenses in this regard.
- Planning of all proposed GSM/GPRS/Satellite/GOES/ METEOSAT/ Imarsat/ Thuraya/ Iridium communication medium should be offered keeping in view high availability of all remote stations during normal and disaster circumstances.
- All stations should be capable of accommodating both GSM/GPRS and Satellite/ GOES/ METEOSAT/ Imarsat/ Thuraya/ Iridium communication modules simultaneously. In case of GSM/GPRS cellular media failure, the data logger should automatically be able to switch to Satellite/GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium communication System.
- All quoted GSM/GPRS modules should be able to integrate high gain external antennas for better reception and transmission of cellular signals.
- Data from a network of both AWS stations in Pakistan shall be utilized to analyze the changes in Meteorological data and provide real time access to users of GSM/GPRS network or satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium.
- A robust, reliable, broad based on terrestrial GSM/GPRS communication system or Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium based Communication System with capacity of sending data in text format shall be proposed with alternate stand-by data transmission facility.
- Each station shall have facility to transmit data via GSM/GPRS and Satellite/

GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium services to ensure data transfer in real time and avoid delay in reception of data at the server in case of network congestion.

- Each station based on the GSM/GPRS and Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium shall send an automatic message every pre-defined interval (sampling interval) to the server. The sampling interval shall be programmable for user-defined intervals, say from 2 minutes to 4 hours.
- Facility to log and store data locally into a flash EPROM (Erasable Programmable Read-Only Memory), retrieve them later from server by placing a data call so as to obtain detailed logs with sampling intervals as accurate as 2 minutes.
- Facility to automatically gather data as & when needed at user-defined time interval and store in the server for later analysis.
- Respond to a Query/SMS requesting for current Meteorological data.
- Automatic SMS alarms at programmable levels for low/high temperature, strong wind, heavy rain/ snow fall and other adverse weather.
- The GSM/GPRS and Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium based stations must be configured to connect the Server at a user specified time.
- Each station shall connect the Server at the set time to transmit the GPRS message. If the transmission isn't successfully acknowledged, Each station shall take 4 to 5 retries before switching to other communication mode.
- Software to manage a GSM/GPRS and Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium network for auto troubleshooting and making the systems functional with minimum down time.
- Facility to transmit using both GSM/GPRS and Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium mode.
- Facility to display data, export to Excel/ Mat lab or similar applications for graphical representation of data etc.
- Provide data on sudden development like gust, threshold, rainfall etc.
- All the data received in the Central Server should be in standard exchangeable RDBMS (Relational Database Management System) format Necessary RDBMS software along with license is to be installed in the server for any query on any station for any period on any parameter. GUI (Graphical User Interface) based statistical tool should be available on the server.
- Each station based on The GSM/GPRS and Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium there has to be an Omni or directional antenna which transmits the signals to GSM/GPRS and Satellite/ GOES/ METEOSAT / Imarsat/ Thuraya/ Iridium network.
- Bidder has to install the Global System for Mobile Communication (GSM/GPRS for M2M services) Static IP Data Sims at all the sites. Bidder will be responsible for the payment of monthly bill of each site till the successful commissioning and handing over of the sites to WAPDA. No separate cost will be charged against SIMs and their monthly bills.
- The Bidder shall be responsible for payment of monthly satellite communication charges for those stations where GSM connectivity is not available and data transmission is carried out through satellite. For those stations where GSM connectivity is available and data transmission is carried out through GSM network, the Bidder shall be responsible for payment of all monthly GSM service

charges. Such responsibility shall remain valid until successful commissioning and formal handing over of the sites to WAPDA. No separate payment shall be made for communication connections or their recurring monthly

- Bidder will be responsible for provision of Land line/Fiber 12 Mega Byte Internet Connection (with Static IPs) in the Office of GMRC for Central Server and for payment of monthly bill till the successful commissioning and handing over of the sites to WAPDA. No separate cost will be charged against connection and its monthly bill.
- Bidder will be responsible for provision of Wireless 4G Broadband/GSM/GPRS Internet Connection (with Static IPs) in the Office of GMRC for Central Server and for payment of monthly bill till the successful commissioning and handing over of the sites to WAPDA. No separate cost will be charged against connection and its monthly bill.

Summary of Technical Specifications of Major Equipment of AWS STATIONS

Item No. as per List of Goods	Name of Goods or Related Service	Technical Specifications and Standards
1.1.1	Data Logger	Quality assurance certificates and standards required as under EN ISO 9001:2008 and EN ISO:14001:2004 or EN ISO 9001:2015 and EN ISO:14001:2015 EMC-Directive 2014/30/EU or 2004/108/EC and LVD-Directive 2014/35/EU or 2006/95/EC Analog Inputs • 20-22 Single Ended Precise Analog Inputs(expandable to 20 inputs at 24-bit) • 8-10 differential analog inputs • 24 bit A/D converter resolution Digital Inputs • 8-12 digital inputs, opto-isolated (expandable to 96) Outputs • 4-8 Digital Open Collector (expandable to 48), Drain current: 500mA, should handle up to 100 wireless inputs and 128 devices in an RS485 network. • 2 Analog Output 0-2V, 12 bit (25mA max/out) Communication and Connectivity Ports • 2 x RS232 interface (expandable up to 6) • RS485 interface • Ethernet interface • 2 x USB interface • SDI-12 • 1xInternal socket for secure digital cards Memory and RTC • Internal 64MB or better Flash memory • Internal 128MB or better SRAM memory • Internal Secure Digital Card minimum 2GB • External Secure Digital Card 64 GB or better

		Processor • Main processor 32-bit ARM or latest (latest Version) • Slave processor 32-bit ARM or better (optional) Operating System • Window Embedded or equally stable Linux OS Integrated Solar Battery Charges • Integrated automatic battery charger • Maximal charging current 5 A • Voltage MPPT: 18V Operating Temperature Range • -40 °C to +60 °C Humidity Range • Humidity without condensation 99% or better Degree of Protection • IP66/IP67 (when installed in junction box) • EMC Power Protection on input power, input, output and communication interfaces												
1.1.1 (cont.)	GSM Modem	• Frequency range: 800-900 MHz and 1700-2100 MHz • Shall support SMS and Data • Quad Band GSM transmission • Operating Temperature: -40 °C to +60 °C • PC(Personal Computer) Communication via RS 232/485/USB/ Ethernet Port • Compatible for Standard GSM/GPRS Networks available in Pakistan												
1.1.1 (cont.)	Satellite Modem	• Single board transceiver • Small form factor • Designed to be incorporated into an OEM solution • Operating Temperature: -30°C to + 60°C • Duplexing Method TDD (Time Domain Duplex) • Input/output Impedance 50 • Multiplexing Method TDMA/FDMA												
1.1.1 (cont.)	Meteosat Satellite Equipment	i) Terminal • A Transmitter • A GPS antenna and its antenna mounts and coaxial cable • A 11 dBi Right-Hand Circular Polarized (RHCP) Yagi antenna and coaxial cable • A Power supply, with battery, solar panel and charge regulator; ii) COAXIAL CABLE <table><tr><td>Type</td><td>Bidder to propose</td></tr><tr><td>Characteristic impedance</td><td>Matched with the antenna</td></tr><tr><td>Cut-off frequency</td><td>> 100 MHz</td></tr><tr><td>Attenuation</td><td>< 0.1 dB/100m</td></tr><tr><td>Power rating</td><td>1 kW</td></tr><tr><td>Bending radius</td><td>80 mm</td></tr></table>	Type	Bidder to propose	Characteristic impedance	Matched with the antenna	Cut-off frequency	> 100 MHz	Attenuation	< 0.1 dB/100m	Power rating	1 kW	Bending radius	80 mm
Type	Bidder to propose													
Characteristic impedance	Matched with the antenna													
Cut-off frequency	> 100 MHz													
Attenuation	< 0.1 dB/100m													
Power rating	1 kW													
Bending radius	80 mm													

		Temperature range	-40 to 60 deg. C																												
1.1.2	Battery, Solar Panel & Control Unit	Battery • Maintenance free AGM (Absorbent Glass Mat) or Dry Gel of Standard Brand. • Capacity (minimum 12V/100AH). • Capable to run the station in complete cloudy weather for at least 30 days. • Minimum Designed life in years (25°C/77°F) should be 8 years. Solar Panel • Solar Panels should be Mono-crystalline of standard brand. • Rating minimum 150W to charge the battery during sun. • Product warranty should be 10 years • 25 years linear performance warranty • 3%- 5% positive tolerance. • Panel efficiency should be minimum 18%. Control Unit <table><tr><td>Voltage range</td><td>Voltage range Nominal + 30%</td></tr><tr><td>Regulation current range</td><td>0 to 110% of the rated current with current limiting circuit</td></tr><tr><td>Protection circuits</td><td> • Short circuit protection. • Battery overcharging protection. • Reverse power flow protection. • Disconnection of the battery from load just before its depletion. </td></tr><tr><td>Monitoring circuits</td><td>Array current and voltage to be suitably indicated on load.</td></tr></table> Electrical Specifications: <table><tr><td>Temp. Comp. (mV/°C)</td><td>– 30mV</td></tr><tr><td>Accuracy</td><td>40mV</td></tr><tr><td>Min Voltage to Operate</td><td>8V</td></tr><tr><td>Self-consumption</td><td>22mA</td></tr><tr><td>Lvd Current Coefficient</td><td>– 20mV</td></tr><tr><td>Charge Algorithm</td><td>PWM, constant voltage</td></tr><tr><td>Operating Temperature</td><td>– 40°C to + 60°C</td></tr><tr><td>Operating Temp.</td><td>– 30°C to + 85°C</td></tr><tr><td>Voltage Accuracy</td><td>0.5%</td></tr><tr><td>Self-Consumption</td><td>1 A</td></tr></table>		Voltage range	Voltage range Nominal + 30%	Regulation current range	0 to 110% of the rated current with current limiting circuit	Protection circuits	• Short circuit protection. • Battery overcharging protection. • Reverse power flow protection. • Disconnection of the battery from load just before its depletion.	Monitoring circuits	Array current and voltage to be suitably indicated on load.	Temp. Comp. (mV/°C)	– 30mV	Accuracy	40mV	Min Voltage to Operate	8V	Self-consumption	22mA	Lvd Current Coefficient	– 20mV	Charge Algorithm	PWM, constant voltage	Operating Temperature	– 40°C to + 60°C	Operating Temp.	– 30°C to + 85°C	Voltage Accuracy	0.5%	Self-Consumption	1 A
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Operating Temp.	– 30°C to + 85°C																														
Voltage Accuracy	0.5%																														
Self-Consumption	1 A																														

1.1.3	Junction Box/ NEMA Enclosure	Protection Rating	NEMA-4, IP66/IP67
		Material	Stainless Steel 316 grade
		Degree of protection against falling dirt, rain, sleet, snow, wind blown dust, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure	
		Additional radiation shield to protect the enclosure from direct sunlight radiation	
1.2.1	Combined Air Temperature and Relative Humidity Sensor/Probe with Protective Cap	<u>General Specification</u>	
		Storage- /Operating Temperature	-40°C to 70 °C
		Cable coating	PUR
		Housing Classification	IP65 or Better
		Housing Material	Stainless Steel or POM-C or TECAPET Low or Painted anodized anticorrosional aluminum
		Communication Standards	SDI-12
		Digital output	RS-485
		<u>Air Temperature</u>	
		Measurement Range	-40 °C to +70 °C
		Accuracy	± 0.2 Deg C or better (with radiation shield)
		Resolution	± 0.1 Deg C
		Response Time	10 sec or better
		Sensor element	pt1000 DIN A
		<u>Relative Humidity</u>	
		Measurement Range	0 to 100% Rh
		Accuracy	± 3% or better
		Resolution	± 1%
		Response Time	10 sec or better
		Sensor element	Capacitive, with protective HC01 coating
1.2.2	Ultrasonic Wind sensor (Wind speed/wind	<u>General Specification</u>	
		Storage- /Operating Temperature	-40 °C to 90 °C / -40 °C to 70 °C

	direction)	Housing Classification	IP65 or Better
		MTBF	10 years
		EMC certified	
		Materials	Resin & Aluminum or Luran S KR 2861/1C ASA/PC or Stainless steel
		Wind Speed	
		Range (Operation)	0 to 60m/s or better
		Accuracy	± 2% @15m/s or better
		Sensor Type	Ultrasonic
		Response time	< 0.25 sec or immediate (being ultrasonic)
		Wind Direction	
		Range (Operation)	0 to 359 Degrees (no dead band)
		Accuracy	± 2 degrees@15m/s or better
		Sensor Type	Ultrasonic
		Response time	< 0.25 sec or immediate (being ultrasonic)
1.2.3	HEATED RAIN & SNOW GAUGE	Sensor Type	Tipping Bucket / Weight Type
		Measurement Range EU	0 - 2 in/min (0 - 50 mm/min)
		Interface	SDI-12, RS-485, Pulse
		Intensity Threshold	0.01 cm/min (0.1 mm/min)
		Collection Volume	30 in (750 mm)
		Collection Area	31 in ² (200 cm ²)
		Accuracy	Amount: ±0.004 in or ±1 % of measured value Intensity: ±0.004 in/min, ±0.24 in/h or ±1 % of measured value
		Heater	Yes
		EMC Certified	
1.2.4	Pyranometer	Global Solar Radiation Sensor with thermopile,	
		Slope	200000 [W/m ²]/V
		Offset	0 or better
		Response time (95%)	15s or better
		Non-linearity (0 ... 1000 W/m ²)	<1% or better
		Sensitivity	5 ... 20 µV/W/m ² or better

		<table><tr><td>Level accuracy</td><td>0.1°</td></tr><tr><td>Expected Daily Accuracy:</td><td>±2% or better</td></tr><tr><td>Operating temperature</td><td>-40 ... +80 °C</td></tr><tr><td>Spectral range (50% points)</td><td>285 ... 2800 nm</td></tr><tr><td>Max. irradiance</td><td>2000 W/m²</td></tr></table>	Level accuracy	0.1°	Expected Daily Accuracy:	±2% or better	Operating temperature	-40 ... +80 °C	Spectral range (50% points)	285 ... 2800 nm	Max. irradiance	2000 W/m²
Level accuracy	0.1°											
Expected Daily Accuracy:	±2% or better											
Operating temperature	-40 ... +80 °C											
Spectral range (50% points)	285 ... 2800 nm											
Max. irradiance	2000 W/m²											
1.2.6	Snow depth sensor	Sensor Type: Laser-based opto-electronic snow depth sensor Measurement Range: Up to 15 m (height) Accuracy: Millimeter precision Supply Voltage Range: Standard DC supply (via RS interfaces) Operating Temperature: Suitable for all weather conditions (–40 °C to +70 °C typical) Resolution: Millimeter level Humidity Range: 0–100% (maintenance-free operation) Material: Rugged outdoor housing, weatherproof design Interfaces: RS485, RS232 with Modbus RTU, UMB, UMB-ACII 2.0, SDI-12 protocol Installation: Automatic inclination angle compensation for easy setup Certification: WMO compliance, EMC certified										
1.2.7	CCTV Camera for Station	• Resolution: 1920 × 1080 (Full HD) up to 60 fps; • Video Compression: H.265+/H.265/H.264+/H.264/MJPEG • Interfaces: Ethernet (10/100/1000M), Audio I/O, Alarm I/O, CVBS analog output, MicroSD storage up to 128 GB • Operating Temperature: –40 °C to +70 °C (with optional smart heater) • Protection: IP66 weatherproof, IK10 vandal-resistant, anti-surge, anti-static • Power Supply: DC12V/AC24V/PoE+										
	Enclosure with Fencing chain link and gate.	AWS ENCLOSURE • Site enclosure area: 6 m × 8 m (or as per site requirements/Engineer’s instructions). FENCING FOR AWS • Height: 2 m above ground level. • Fencing angle: 50 mm × 50 mm × 6 mm, pre-coated with red oxide. • Length of angle: 2.8 m (2.0 m above ground + 0.8 m below ground). CHAIN-LINK • GI chain-link dimensions: 2" × 2" mesh, gauge 10 (3 mm diameter). GATE • Dimensions: 2 m × 1 m × 6 mm (L × W × Thickness). • Fabricated with MS Angle (minimum size 30 mm × 30 mm × 6 mm).										

4. DETAILED TECHNICAL SPECIFICATIONS OF AWS STATIONS

4.a. EQUIPMENT

4.a.i. DATA LOGGER SPECIFICATION

The logger should be manufactured under the supervision of a quality assurance system certified according to EN ISO 9001:2008 and EN ISO:14001:2004 **or** EN ISO 9001:2015 and EN ISO:14001:2015.

The logger should conform to following standards:

EMC-Directive 2014/30/EU or 2004/108/EC and **LVD-Directive** 2014/35/EU or 2006/95/EC.

Data Logger should be a precise compact single-board system, combining advanced data-logger, user-interface and power-control functions in one compact and small device:

Data Loggers for Automatic Weather Stations should have capability to integrate CCTV camera to capture images around the stations as and when required". Furthermore, bidder will be responsible for supply, installation, testing and commissioning of CCTV Cameras with all Data loggers required for AWS Stations and no separate / extra cost for supply, installation, testing and commissioning of CCTV cameras with all data loggers of AWS stations will be charged by the bidders.

Proposed data logger should be designed and tested to integrate following sensors;

- Ultrasonic Wind Sensor for Speed & Direction
- Temperature and Relative Humidity sensor
- Pyranometer for Solar Radiation
- Snow Depth
- Heated Bucket Rain Gauge

Advanced micro-controller system for intelligent data measuring and collection, solar panel and backup-battery power control, sensor diagnostics, remote updates of firmware, and more other functions

Analogue Inputs

- 20-22 Single Ended Precise Analog Inputs(expandable to 20 inputs at 24-bit)
- 24 bit A/D converter resolution
- Selectable sampling frequency, sample hold function
- 8-10 differential analog inputs
- Voltage measurement accuracy 0.06% or better
- Resistance measurement accuracy 0.06% or better

Digital Inputs

- 8-12 digital inputs, opto-isolated (expandable to 96)
- Counter 5KHz or better

Outputs

-
- 4-8 Digital Open Collector(expandable to 48), Drain current: 500mA, should handle up to 100 wireless inputs and 128 devices in an RS485 network.
 - 2 Analog Output 0-2V, 12 bit (25mA max/out)
 - 4 Switching Power Supply upto 1.5A (optional)

Communication and Connectivity Ports

- 2 x RS232 interface (expandable up to 6)
- RS485 interface
- Ethernet interface
- 2 x USB interface
- SDI-12
- 1xInternal socket for secure digital cards
- Simple extension by modules:
- GSM/GPRS and Satellite modems

Other Features

- Touch screen display with 32-key membrane keyboard
- Automatic battery charging (intelligent power control)

Memory and RTC

- Internal 64MB or better Flash memory
- Internal 128MB or better SRAM memory
- Internal Secure Digital Card minimum 2GB
- Real time clock (backup with Lithium battery)
- External Secure Digital Card 64 GB or better

Processor

- Main processor 32-bit ARM or latest (latest Version)
- Slave processor 32-bit ARM or better (optional)

Operating System

- Window Embedded or equally stable Linux OS

Integrated Solar Battery Charges

- Integrated automatic battery charger
- Digital configuration of battery parameters
- Maximal charging current 5 A
- Battery monitoring with full charge state and cut off voltage
- Voltage MPPT: 18V

Operating Temperature Range

- -40 °C to +60 °C

Humidity Range

- Humidity without condensation 99% or better

Degree of Protection

- IP66/IP67 (when installed in junction box)
- EMC Power Protection on input power, input, output and communication interfaces

4.a.ii. GSM/GPRS MODEM

GSM and GPRS facility with fast and reliable wireless data communications along with support for dynamic domain access to the central server IP address. The following technical specifications are indicative and not exhaustive. (If power consumption is more, additional battery supported by solar panel need to be included for power supply in addition to the Minimum 12V dc 100AH battery specified). The bidder has to ensure that a complete solution is to be provided.

GPRS Industrial GPRS/UMTS quad band, complete of omni-directional antenna, cable for serial data communication.

Omni-directional amplified antenna for GSM/GPRS/UMTS, complete of minimum 5m cable and connector.

High Gain Directional antenna for GSM/GPRS/UMTS, 8.5 dB gain, complete of connector and minimum 5m cable, arm support for fixing on pole.

- Frequency range: 800-900 MHz and 1700-2100 MHz
- GSM/GPRS facility with fast and reliable wireless data communications.
- Shall support SMS and Data
- Quad Band GSM transmission
- Accept standard SIM(Subscriber Identity Module) card with built-in holder
- Operating Temperature: -40 to +60 degrees Celsius
- RS 232 interface with data cable
- PC(Personal Computer) Communication via RS 232/485/USB/ Ethernet Port
- Facility for transfer of data through GPRS
- Full SMS Support
- Compatible for Standard GSM/GPRS Networks available in Pakistan
- Suitable power supply to function during alarm situations like fog, thunder, rainfall etc.
- If required additional battery supported by solar panel needs to be included for power supply.

4.a.iii. SATELLITE MODEM

The Satellite Modem should be manufactured under the supervision of a quality assurance system certified according to EN ISO 9001:2008 and EN ISO:14001:2004 **or** EN ISO 9001:2015 and EN ISO:14001:2015 and at the minimum, Satellite Modem should have following specifications:

- Single board transceiver
- Small form factor
- Designed to be incorporated into an OEM solution
- Operating Temperature Range -30°C to + 60°C
- Humidity without condensation 99% or better
- Duplexing Method TDD (Time Domain Duplex)
- Input/output Impedance 50
- Multiplexing Method TDMA/FDMA(Frequency Domain Duplex)

4.a.iv. **METEOSAT-7 TRANSMISSION TERMINAL**

In case the bidder opts for METEOSAT GOES/ METEOSAT / Imarsat/ Thuraya/Iridium transmission medium in-place of Satellite, the following specifications for Meteosat Transmission Equipment must be considered:

i) Meteosat GOES/ METEOSAT / Imarsat/ Thuraya/Iridium terminal will be designed for use on the EUMETSAT Meteosat Data Collection Services satellite networks. Associated to a RTU Equipment, will be implemented:

- A Transmitter
- A GPS antenna and its antenna mounts and coaxial cable
- A 11 dBi Right-Hand Circular Polarized (RHCP) Yagi antenna and coaxial cable
- A Power supply, with battery, solar panel and charge regulator;

4.a.iv.ii) **COAXIAL CABLE**

The Bidder shall propose the type and characteristics of the coaxial cable. The length of cable at each site shall also be determined by the Bidder and shall be kept as short as possible.

The coaxial cable shall be flexible with a high degree of weather resistance. Outer protection shall consist of an abrasion' resistant plastic sheath. The cable shall be properly clamped to the steel structures.

Technical features:

Type	Bidder to propose
Characteristic impedance	Matched with the antenna
Cut-off frequency	> 100 MHz
Attenuation	< 0.1 dB/100m
Power rating	1 kW
Bending radius	80 mm
Temperature range	-40 to 60 deg. C

4.a.v. **Battery & SOLAR PANEL**

Battery: The battery must be maintenance free AGM (Absorbent Glass Mat) or Dry Gel type & it must be of such a capacity (minimum 12V/100AH) that the station will run uninterrupted even in complete cloudy weather for at least 30 days. Battery should meet specifications of standard brand. Minimum Designed life in years (25°C/77°F) should be 8 years.

Solar Panel: The solar panel should be enough rating minimum 150W to charge the battery during sun. Solar Panels should be Mono-crystalline of standard brand. Product warranty should be 10 years and 25 years linear performance warranty and 3%- 5% positive tolerance. Panel efficiency should be minimum 18%.

There should be universal brackets for fixing on pole, tower or wall depending upon site situation.

SOLAR POWER SUPPLY

The remote stations being located at distant, unattended locations shall be powered from a solar system. The Manufacturer shall design the system required at the site according to, but not limited to, the basic specifications mentioned herein and submit detailed design calculations to justify the ratings and characteristics of the equipment offered.

SOLAR ARRAY

The solar array design shall be such that the support hardware and foundations will support the structure at the appropriate angle under the wind load of 150 km/sec and the severe environmental and climatic conditions experienced at these remote stations. The array shall be installed on the equipment support structure. The materials used shall be able to withstand these conditions viz. corrosion-resistant structures, fungus-resistant cables and sealed enclosures for electronic equipment. The solar array modules shall have a rigid front surface of suitable material for maximum strength and light transmission, a resilient encapsulation material and a moisture repellent, durable rear surface.

A junction box shall be mounted on the rear of each module and will include a blocking diode to prevent discharge through the array during the periods of darkness. Weather-proof glands for cable entry shall be used.

All interconnecting cables shall be weather-proof or armored and output cables from the array to the battery bank and control units shall be suitably protected against fungus and shall be installed in such a manner to be safe against attack by vermin and rodents.

Anti-reflective coating shall be provided over the cells to maximize the light absorbed and enhance output.

The solar array must be electrically matched to its load circuit for the reliable operation of the system. In normal operation the solar array cells shall simultaneously supply uninterrupted power to the equipment load and charge the storage battery. The cells shall respond primarily to visible light so as to produce power under all daylight conditions including overcast skies for year round, uninterrupted service.

The Bidder shall size the solar array, for a nominal voltage required for the equipment, considering the insulation level and length of daylight hours of December 23 at the latitude of installation, to reliably supply the load as well as to charge the battery. The design shall be based on the requirement that the battery regains 60% of its charge during the day under the above specified conditions. Detailed calculations shall be submitted, by the Contractor to the Employer for approval, prior to finalization of design. If during the trial run it is observed that

the Solar System including batteries fail to meet the required battery charge replenishment of 60% specified herein, the battery- solar array combination shall be resized accordingly with no additional cost. The minimum wattage of the solar panel shall be 40 watts.

The degree of tilt of the solar array to maximize its reception of sunlight shall be stated by the Bidder and detailed calculations for the value selected shall be provided to the Engineer for approval.

Full details of the configuration used for the solar array to produce the desired voltage and output current shall be provided by the Bidder.

Electrical Characteristics:

– Max power(Pm)	150W
– Maximum power voltage (Vpm)	18.1V
– Maximum power current (Ipm)	3.69A
– Short circuit current (Isc)	3.9A
– Open circuit voltage (Voc)	22.0V
– Module efficiency	12.19%
– Tolerance	±5%
– Nominal Voltage	12V
– Temperature coefficient of Voc	-0.36%/K
– Temperature coefficient of Pm	-0.46%/K
– Temperature coefficient of Isc	0.05%/K
– NOCT	48°C±2°C
– Maximum series fuse rating	12A
– Maximum system voltage	600V

Mechanical Characteristics

– Construction	Tempered glass, silicon cell, EVA,
– Solar Cells	Polyester with Tedlar
6X6 series	36 Cells (156mm x 78mm) in matrix connected in
– Front Cover	High transmission
3.2mm(1/8'') glass	
– Encapsulant	EVA(Double layers)
– Back Cover	White polyester
– Frame	Anodized aluminum
– Junction Box	IP65, UL94-5VA material
– Diodes	Schottky by-pass diodes
– Terminal	Accept 8-14 AWG wire
– Dimensions	38.9in(987mm)x21.3in(540mm)x1.38in (35mm)
– Weight	15.4lb (7.0kg)
– Operating Temperature	-40°C~90°C
– Storage Humidity	<90%

CONTROL UNIT

A control unit shall be provided to match the solar array characteristics to the battery and the load. The type of unit to be provided shall be stated by the Bidder.

The control unit shall be rated such that it can supply full load plus 30% spare capacity.

The equipment shall be designed to include terminal facilities for the other system elements. Hence, cables from the solar array, battery bank and load equipment shall terminate in the control unit which shall also act as a system junction box.

The equipment shall be modular in structure and shall be housed in a weather-proof cabinet mounted on the tower or near the battery cabinet. The installation shall shelter the equipment from direct sunlight and water splash.

The control unit shall be designed according to the following main parameters:

- | | | |
|---|--------------------------|---|
| - | Voltage range | Voltage range Nominal + 30% |
| - | Regulation current range | 0 to 110% of the rated current
with current limiting circuit |
| - | Protection circuits | Short circuit protection.
Battery overcharging
protection.
Reverse power flow protection.
Disconnection of the battery
from load just before its
depletion. |
| - | Monitoring circuits | Array current and voltage.
to be suitably indicated on
Load. |

Electrical Specifications:

- | | | |
|---|-------------------------|-----------------------|
| - | Temp. Comp. (mV/°C) | - 30mV |
| - | Accuracy | 40mV |
| - | Min. Voltage to Operate | 8V |
| - | Self-consumption | 22mA |
| - | Lvd Current Coefficient | - 20mV |
| - | Charge Algorithm | PWM, constant voltage |
| - | Operating Temperature | - 40°C to + 60°C |
| - | Operating Temp. | - 30°C to + 85°C |
| - | Voltage Accuracy | 0.5% |
| - | Self-Consumption | 1 mA |

4.a.vi. Junction Box/ NEMA Enclosure

Junction boxes/ system enclosure should meet with minimum NEMA-4, IP66/IP67 rating. Enclosure should be Constructed of Stainless Steel 316 grade for outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by the external formation of ice on the enclosure. Should include additional radiation shield to protect the enclosure from direct sunlight radiation.

4.b. SENSORS

4.b.i. Combined Air Temperature and Relative Humidity Sensor/Probe with Protective Cap

The Combined Air Temperature (T) and Humidity (Rh) sensor, according to WMO norms with natural ventilation for outdoor use. Out: 4÷20mA (T) and 4÷20mA (RH) complete of Calibration Report, Cable and support should be available with Sensor.

General Specification

Storage-/Operating Temperature	-40°C to 70 °C
Cable coating	PUR
Housing Classification	IP65 or Better
Housing Material	Stainless Steel or POM-C or TECAPET Low or Painted anodized anticorrosional aluminum
Power consumption	5-30 V DC
Sensor protection	Stainless steel sinter filter cap, pore size 10µm or better
Communication Standards	SDI-12
Digital output	RS-485
EMC compliance	EN61326-2-3

Air Temperature

Measurement Range	-40 °C to +70 °C
Accuracy	± 0.2 Deg C or better (with radiation shield)
Resolution	± 0.1 Deg C
Response Time	10 sec or better
Sensor element	pt1000 DIN A

Relative Humidity

Measurement Range	0 to 100% Rh
Accuracy	± 3% or better
Resolution	± 1%
Response Time	10 sec or better
Sensor element	Capacitive, with protective HC01 coating

AT/RH Radiation Shield

Construction	UV stabilized white thermoplastic plates, aluminum mounting bracket, white stainless steel u-bolt clamp
Mounting	U-bolt fit vertical pipe 1 in.-2 in. (25mm to 50mm) dia.
Radiation Error	@1080 W/m ² intensity (dependent on wind speed) 0.4°C (0.7°F) RMS @ 3 m/s (6.7 mph) 0.7°C (1.3°F) RMS @ 2 m/s (4.5 mph) 1.5°C (2.7°F) RMS @ 1 m/s (2.2 mph)

4.b.ii. Ultrasonic Wind sensor (Wind speed/wind direction)

The sensor should be capable of measurement of wind speed and direction in the horizontal plane. It should have following features:

- Consistent performance, no accuracy degradation
- Corrosion free, UV resistant material
- Maintenance free
- No calibration required
- Robust construction
- Software configurable
- True 0° - 360° operation (no dead band on direction output)
- Wind speed and direction from a single unit
- Complete of Calibration Report
- Cable and support should be available with Sensor.

General Specification

Storage-/Operating Temperature	-40 °C to 90 °C / -40 °C to 70 °C
Housing Classification	IP65 or Better
Low power consumption	5-30 V DC
Outputs	RS232, RS422/RS485 0-5V or 4-20mA

	SDI-12(optional)
MTBF	10 years
EMC certified	
Materials	Resin & Aluminium or Luran S KR 2861/1C ASA/PC or Stainless steel

Wind Speed

Range (Operation)	0 to 60m/s or better
Accuracy	± 2% @15m/s or better
Resolution	0.01 m/s
Sensor Type	Ultrasonic
Threshold	0.5 m/s or better
Response time	< 0.25 sec or immediate (being ultrasonic)

Wind Direction

Range (Operation)	0 to 359 Degrees (no dead band)
Accuracy	± 2 degrees@15m/s or better
Resolution	1 deg.
Sensor Type	Ultrasonic
Threshold	0.5 m/s or better
Response time	< 0.25 sec or immediate (being ultrasonic)

4.b.iii. HEATED RAIN AND SNOW GAUGE

The rain gauge shall be **weighing or Tipping type**, calibrated to provide direct measurement of precipitation amount and intensity. Each increment of precipitation shall be recorded by the sealed load cell sensor, processed into impulses or digital output. The writing device shall be directly activated from the weighing mechanism and will record each impulse or digital signal. The Bidder shall propose the method employed for accurate measurements.

It shall be possible to connect transmission systems directly to the instrument. The weighing bucket shall be fixed securely and shall be easily removable for cleaning purposes. Rain gauge in accordance with **WMO norms (Manual No. 8)** and **UNI 11452:2012 Class A**. Collecting area **400 cm²**, measuring capacity **750 mm**, with flange for mounting on poles ømax 59/80 mm. Complete with **Calibration Report** (available with cable and support).

The main technical features of the Rain Gauge Sensor shall be:

- **Sensor Type:** Weighing rain gauge (sealed load cell)
- **Measurement Range:** 0–50 mm/min (0–3000 mm/h)
- **Accuracy:** ±0.1 mm or ±1% of measured value (amount & intensity)

-
- **Supply Voltage Range:** 10–30 V DC (supports mains, solar, or battery operation)
 - **Operating Temperature:** –40 to +70 °C (with rim heater options)
 - **Resolution:** 0.01 mm (digital output); pulse output configurable at 0.05/0.1/0.2 mm
 - **Humidity Range:** 0–100%
 - **Material:** Robust protective housing; stainless steel/aluminum construction
 - **Interfaces:** SDI-12, RS-485, Pulse, USB port for configuration and monitoring
 - **Calibration:** Lifetime factory calibration, drift-free, MTBF ~100 years
 - **Heater Modes:** 4 intelligent rim heater modes (constant, time-controlled, solid precipitation controlled, temperature range controlled)
 - **Certification:** WMO compliance, EMC certified, factory acceptance test report

4.b.iv. SNOW DEPTH SENSOR

The snow depth sensor shall be laser-based opto-electronic type, calibrated to provide direct measurement of snow depth with millimeter accuracy. Each measurement shall be indicated by digital output signals. The writing device shall be directly activated from the laser emission and will record each impulse or continuous scan. The Bidder shall propose the method employed for accurate measurements.

It shall be possible to connect transmission systems directly to the instrument. The sensor shall be fixed securely and shall be easily operable with automatic inclination angle compensation. Snow depth sensor in accordance with WMO norms for solid precipitation measurement. Measuring range up to 15 m height, with millimeter accuracy. Complete with Calibration Report, mounting accessories, and communication interface.

MAIN TECHNICAL FEATURES OF THE SNOW DEPTH SENSOR

- Sensor Type: Laser-based opto-electronic snow depth sensor
- Measurement Range: Up to 15 m (height)
- Accuracy: Millimeter precision
- Supply Voltage Range: Standard DC supply (via RS interfaces)
- Operating Temperature: Suitable for all weather conditions (–40 °C to +70 °C typical)
- Resolution: Millimeter level
- Humidity Range: 0–100% (maintenance-free operation)
- Material: Rugged outdoor housing, weatherproof design
- Interfaces: RS485, RS232 with Modbus RTU, UMB, UMB-ACII 2.0, SDI-12 protocol
- Installation: Automatic inclination angle compensation for easy setup
- Certification: WMO compliance, EMC certified

4.b.v CCTV CAMERA FOR STATION

The surveillance camera shall be **IP network type**, calibrated to provide high-resolution video capture with smart detection features. Each observation shall be indicated by digital video output, accessible via Ethernet or onboard storage. The Bidder shall propose the method employed for accurate monitoring and recording.

It shall be possible to connect transmission systems directly to the instrument via PoE or DC/AC power supply. The camera housing shall be fixed securely and shall be vandal-resistant, weatherproof, and operable in extreme temperatures. Complete with **Calibration Report**, mounting accessories, and warranty.

Main Technical Features

- **Resolution:** 1920 × 1080 (Full HD) up to 60 fps; 4MP (2560 × 1440) for PTZ models
- **Video Compression:** H.265+/H.265/H.264+/H.264/MJPEG
- **Interfaces:** Ethernet (10/100/1000M), Audio I/O, Alarm I/O, CVBS analog output, MicroSD storage up to 128 GB
- **Operating Temperature:** -40 °C to +70 °C (with optional smart heater)
- **Protection:** IP66 weatherproof, IK10 vandal-resistant, anti-surge, anti-static
- **Power Supply:** DC12V/AC24V/PoE+

4.b.v. PYRANOMETER

The sensor should be capable for the measurement of solar irradiance to World Meteorological Organization and ISO 9060:1990 standards. The proposed Pyranometer should be fully compliant with ISO 9060:1990 specification for first class Pyranometer. It should have following features:

Global Solar Radiation Sensor with thermopile,	
Slope	200000 [W/m ²]/V
Offset	0 or better
Response time (95%)	15s or better
Zero offset	
(a) thermal radiation (200 W/m ²)	<10 W/m ² or better
(b) temperature change (5k7hr)	<5 W/m ² or better
Non-linearity (0 ... 1000 W/m ²)	<1% or better
Temperature dependence of sensitivity	<3% (-10 ... +40 °C) or better
Sensitivity	5 ... 20 μV/W/m ² or better
Level accuracy	0.1°
Expected Daily Accuracy:	±2% or better
Operating temperature	-40 ... +80 °C
Spectral range (50% points)	285 ... 2800 nm
Typical signal output for atmospheric	0 ... 20 mV

applications	4÷20mA
Max. irradiance	2000 W/m ²
Cable length	10+ meter
Delivery should include calibration certificate and 5m cable, optional support.	

Note: Optional features available with the sensors may also be clearly specified by the bidder.

4.c. Tools & Accessories including Equipment for Testing & Measurement

4.c.i. Hand held Latest GPS

The device should be new and of standard brand and have following specifications:

- Water rating of device should be IPX7 (Withstands incidental exposure to water of up to 1 meter for up to 30 minutes)
- Rechargeable Battery NiMH pack
- Transflective color TFT touch-screen
- 240 x 400 pixels resolution
- GPS Accuracy: Position: Less than 20 meters Velocity: Less than 0.1 m/s
- Minimum 4GB built-in memory along with 32GB SD card
- high-speed USB and NMEA 0183 compatible interface
- minimum 10000 Waypoints/favorites/locations, 250 Routes, track log of minimum 20,000 points, 250 saved tracks and TOPO preloaded maps.
- The device should be Geocaching-friendly and Custom maps compatible
- Sun & Moon Information
- Built-in 8MP camera with autofocus; digital zoom and flashlight
- Wireless compatibility like Wi-Fi, Bluetooth and ANT+ etc.
- The device should include Rechargeable battery pack, USB cable, AC adapter, Carabineer clip, Documentation, Hard-shell Carrying Case etc.

4.c.ii. HAND HELD WEATHER METER

The device should be new and of standard brand and have following specifications:

- The device should have Bluetooth LINK work with PC/Mac via Dongle and have Bluetooth LINK to Smartphone / Mobile / Android / IOS.
- High resolution screen for any lighting (even sunlight) and easy on your eyes.
- Language: English
- Scratch and breakage-resistant window
- Should have vane mount option
- The device should have Digital Compass, Wind Direction, Crosswind and Headwind / Tailwind options etc. and it should measure Wind speed, Ambient Temperature, Relative Humidity, Air Pressure etc.

- Rugged (drop tested to MIL-STD-810G standards), waterproof (sealed to IP67 standards & NEMA-6) and floats.
- Operating Temp range -20...60 °C
- The product should include Neck Lanyard, AA Lithium Battery (Average Life 400 Hours), Protective Drawstring Pouch, Certificate of Conformity (with complete specifications), Instruction Manual etc.
- Specifications

Sensor	Accuracy	Resolution	Measurement Range
Wind Speed	± 3%	0.1 m/s 1 ft/min 0.1 km/h 0.1 mph 0.1 knot	0.5 to 40 m/s 110 to 7874 ft/min 2 to 144 km/h 1 to 90 mph 1 to 78 knots
Ambient Temp	± 0.9 °F ± 0.5 °C	0.1 °F 0.1 °C	- 20 to 160 °F - 30 to 70 °C
Relative Humidity	± 2% RH	0.1% RH	10 to 90% 25 °C non-condensing
Compass	± 3%	1°	0 to 360°

4.c.iii. RAIN GAUGE CALIBRATION KIT

The rain gauge calibration kit should be brand new & of standard brand as per WMO standards. It should be designed to simplify the field verification and calibration procedures for tipping bucket rain gauges.

Field verification should be standardized by providing a controlled water volume at a constant flow rate. To verify that gauge operation is within the specified accuracy, compare the output count of tips to the calibration chart.

4.c.iv. RELATIVE HUMIDITY INDICATOR

The device should be digital, new, of standard brand as per WMO standard & site requirements and have following specifications:

Temperature	-20°C to 60°C (-4°F to 140°F) or better
Temperature accuracy	0°C to 45°C (±0.5°C) -20°C to 0°C & 45°C to 60°C (±1.0°C) 32°F to 113°F (±1.0°F) -4°F to 32°F and 113°F to 140°F (±2.0°F)
Resolution	0.1°C / 0.1°F or better
Temperature update rate	500 ms
Temperature sensor type	NTC

Relative humidity range	5% to 95% RH
Relative humidity accuracy	10% to 90% RH @ 23°C (73.4°F) (±2.5% RH) (< 10%, > 90%RH @ 23°C (73.4°F) (±5.0% RH)
Humidity sensor	Electronic capacitance polymer film sensor.
Data storage capacity	99 points or better
Response time (humidity)	For 90% of total range - 60 s with 1 m/s air movement
Operating temperature	Temperature: -20°C to 60°C Humidity: 0°C to 55°C
Storage temperature	-20°C to 60°C at < 80% R.H. (with battery removed)
Battery type	4 AAA alkaline batteries
Battery Life	200 hours or better

4.c.v. LASER RANGE FINDER

The range finder shall be laser type, calibrated to provide direct measurement of distance to flagstick, hazards, and terrain features. Each measurement shall be indicated by a digital display in yards/meters. The writing device shall be directly activated from the laser emission and will record each impulse or continuous scan. The Bidder shall propose the method employed for accurate measurements.

It shall be possible to connect transmission systems directly to the instrument via optical output. The range finder shall be fixed securely and shall be easily operable with one hand. Range finder in accordance with IEC60825-1 Class 1M Laser Product and FDA/21 CFR Part 1040.10 Class I Laser Product. Measurement range 6–800 yards (5–730 m). Complete with Calibration Report and warranty.

Main Technical Features of the Range Finder

- Sensor Type: Laser rangefinder
- Measurement Range: 6–800 yards (5–730 m)
- Accuracy: ±1 yard (under 100 yd), ±2 yards (100 yd and over)
- Supply Voltage Range: 3 V DC (CR2 lithium battery x 1)
- Operating Temperature: –10 °C to +50 °C (14 °F to 122 °F)
- Resolution: 1 yard/meter increments
- Humidity Range: Rainproof (JIS/IEC Class 4, IPX4 equivalent)
- Material: Compact body, approx. 130 g (4.6 oz), dimensions 91 × 73 × 37 mm
- Optics: 6x monocular, multilayer coating, 20 mm objective diameter, 6° field of view, 16.7 mm eye relief
- Modes: First Target Priority (flagstick detection), continuous measurement up to 8 seconds
- Certification: IEC60825-1 Class 1M, FDA Class I, FCC Part 15 SubPart B, EU EMC directive, RoHS compliant

4.c.vi. **CORDLESS DRILL MACHINE**

The drill machine shall be **cordless type**, calibrated to provide direct torque and speed control for drilling and fastening operations. Each operation shall be indicated by mechanical rotation and digital battery status. The writing device shall be directly activated from the trigger mechanism and will record each impulse or continuous rotation. The Bidder shall propose the method employed for accurate torque and speed measurements.

It shall be possible to connect transmission systems directly to the instrument via interchangeable bits and accessories. The drill chuck shall be fixed securely and shall be easily removable for cleaning and replacement purposes.

4.c.vii. **STREAM ICE DRILL**

The ice drill shall be **steam-powered type**, calibrated to provide direct penetration through ice layers by thermal melting. Each operation shall be indicated by controlled steam injection and borehole formation. The writing device shall be directly activated from the steam generator and will record each impulse or continuous operation. The Bidder shall propose the method employed for accurate borehole creation and ice thickness measurement.

It shall be possible to connect transmission systems directly to the instrument for water level sensors or sampling equipment. The drill head shall be fixed securely and shall be easily removable for cleaning and replacement purposes. Steam ice drill in accordance with **hydrological field standards for ice penetration**. Borehole diameter typically **50–100 mm**, depth capacity up to **2 m** (depending on ice thickness). Complete with **Calibration Report**, steam generator, hoses, and safety accessories.

Portable Steam Drill System suitable for glacier, permafrost, and high-altitude field applications comprising the following components:

1. Frame (portable, corrosion-resistant)
2. Aluminum casing (protective enclosure)
3. Circular bowl (water holding unit)
4. Boiler (pressurized steam generation unit)
5. Safety valve (pressure relief)
6. Filler cap (leak-proof)
7. Manometer (pressure gauge)
8. Piezo-ignitor (manual ignition system)
9. Steam valve (flow control)
10. Gas burner (high-efficiency)
11. Gas pressure regulator
12. Connector socket for gas hose
13. Gas hose
14. Gas cartridge
15. Cartridge container
16. Length adjustable legs
17. Drainage hose
18. Bore hose (steam delivery)
19. Drilling pipe (modular/extendable)

Technical Requirements

- Steam generation within ≤ 10 minutes
- Water Capacity: 3–5 liters
- Operating pressure: 2–6 bar (minimum)
- Gas Consumption: 150–300 g/hour
- Continuous operation: 30–60 minutes
- Maximum drilling depth is 13 m in ice and 30 m in firm
- Hole diameters range from 25 to 45 mm.
- Mean drilling time is 16 min for 6 m, 35 min for 12 m in ice
- High-temperature resistant materials (stainless steel/aluminum)
- Suitable for operation in temperatures from -20°C to +40°C
- Portable system (maximum weight: 15–20 kg)

Safety & Compliance

- Certified pressure vessel (boiler)
- Safety valve for overpressure protection
- Leak-proof gas system
- Heat-insulated external surfaces
- Compliance with applicable international safety standards

Deliverables

- Complete assembled system
- User and maintenance manuals
- Standard accessories and toolkit
- Warranty (minimum 24 months)

4.c.viii. Sign Board for Respective Site

Each site should have a good quality metal sign board (Size: Height 4ft x width 3ft) as depicted below, which is painted in English, with the following information

Government of Pakistan

Water and power development authority

Glacier Monitoring Research Centre WAPDA

AUTOMATIC WEATHER STATION

(Name of the station)

Contact- PD GMRC WAPDA

Phone No-+92-99202409

(Property of Govt. Trespassers will be prosecuted)

UPS Online (05 KVA) along with 10 No. Batteries

The Online UPS and Batteries shall meet the following minimum specifications:

INPUT SPECIFICATIONS	Voltages	220 V _{AC}
	Voltage Range	-20% to +15%
	Frequency	Slew rate of 2 Hz/sec
	Protection	Input circuit breaker provided protection to the unit, load and personnel. Input Circuit Breaker will be higher interruption rated (10, 42, and 65 KAIC)
	Input Current Sinusoidal	0.95 PF under all line/load conditions
	Number of Wires	2 Wires Plus Ground
OUTPUT SPECIFICATION	Available Output Ratings (KVA or KW)	5.0 KVA / 3.5 KW
	Output Voltages (All voltages are standard and present on all systems with output transformer)	220V
	Voltage Regulations	± 3% No Load to Full Load, High Line to Low Line
	Frequency	50 Hz +/-0. 5 HZ (when on inverter)
	Output Wave Form	Sine Wave
	Harmonic Distortion	<5%THD,; <3% Single Harmonic
	Crest Factor	3 to 1
	Overload	125% for Ten (10) Minutes; 150% Surge for 10 seconds
	Protection	Internal electronic overload protection. Circuit breaker provides inherent overload protection. Factory selectable voltage 120, 208, 240, or 277 for input or output voltage
	Efficiency	90% typical

	Isolation	Complete from line. Output neutral bonded to ground
	Number of Wires	2 Wires Plus Ground
BATTERY SPECIFICATIONS	Battery Type	Minimum 12V dc 100AH Spill proof maintenance free battery Standard Brand
	Charger Ampacity	≤ 10 times discharge
	Float Voltage	2.25 Volts per Cell
	Protection	Fuses, DC Disconnect or Circuit Breaker
	External Batteries	Provisions for hardwire connection of optional external 10 No. batteries. The minimum requirement for UPS working will be at least 4 to 8 hours.
	Packaging	NEMA 3R Anodized Aluminum with customized coating or Stainless Steel
MONITORING AND COMMUNICATION	Indicators	Internal Liquid Crystal Display for all alarms
	Local Display	160-Character LCD Display
	Computer communications	RS-232 Interface Port RS-485 Interface Port
ENVIRONMENTAL SPECIFICATIONS	Temperature	0° to + 50°C (Operating) -20° to +40°C (Storage)
	Relative Humidity	0 to 95% Non-Condensing
OTHER SPECIFICATIONS	Static Bypass Switch	

At the minimum, UPS will have to power up the following equipment:

- 1 no. Central server/Master Station Computer
- 01 no. computer for data analysis.
- 01 no. LaserJet Printer
- LAN Equipment
- 5-6 Tube lights
- 02 no. wall mounted Fans.
- Fire Alarm System

Three (3) communication ports should be provided. One port shall provide dry contact closures for the following parameters:

- Low Battery
- On Bypass
- Summary Alarm
- Input Fail
- UPS On

The second and third ports should be based upon the RS-232 / RS485 protocol. Operating parameters, including input and output data and UPS status, shall be available for remote monitoring via the RS-232/RS485 ports.

4.c.ix. Equipment for Testing and measurements

The device should be new and of standard brand and have following specifications:

4.c.x.i Latest Digital Multimeter

The device should be new and of standard brand and have following specifications:

- Operating Temperature -20 °C to +55 °C
- Storage Temperature -40 °C to + 60 °C
- Humidity (without condensation) 0% – 90% (0°C – 35°C)
0% – 70% (35°C – 55°C)
- Display: Digital: 6000 counts updates 4/sec, Analog: 33 segments, updates 40/sec. Frequency: 19,999 counts, updates 3/sec at > 10 Hz
- Fuse protection for mA or μ A inputs: 44/100 A, 1000 V FAST Fuse
- Fuse protection for A input: 11 A, 1000 V FAST Fuse
- Shock: 1 Meter drop per IEC 61010-1:2001
- Vibration Per MIL–PRF–28800 for a Class 2 instrument
- Safety: Complies with ANSI/ISA S82.01-2004, CSA 22.2 No. 1010.1:2004 to 1000 V Overvoltage Category III, IEC 664 to 600 V Overvoltage Category IV. UL listed to UL3111-1. Licensed by TÜV to EN61010-1.
- Altitude:
Operating: 2000 m
Storage: 10,000 m
- Battery type: 9 V zinc, NEDA 1604 or 6F22 or 006P
- Battery life: 400 hours typical with alkaline (with backlight off)
- The product should include:
Test Leads, Alligator Clips, Holster, 9V Battery (Installed), Temperature Probes etc.
- **Accuracy Specifications**

Voltage DC	Maximum voltage	1000 V
	Accuracy	$\pm(0.05\% + 1)$
	Maximum resolution	10 μ V
Voltage AC	Maximum voltage	1000 V

	Accuracy $\pm(0.7\% + 2)$ True RMS AC bandwidth: 20 kHz with low pass filter; 3 db @ 1 kHz Maximum resolution 0.1 mV
Current DC	Maximum amps 10 A (20 A for 30 seconds maximum) Amps accuracy $\pm(0.2\% + 2)$ Maximum resolution 0.01 μ A
Current AC	Maximum amps 10 A (20 A for 30 seconds maximum) Amps accuracy $\pm(1.0\% + 2)$ True RMS Maximum resolution 0.1 μ A
Resistance	Maximum resistance 50 M Ω Accuracy $\pm(0.2\% + 1)$ Maximum resolution 0.1 Ω
Capacitance	Maximum capacitance 9,999 μ F Accuracy $\pm(1\% + 2)$ Maximum resolution 0.01 nF
Frequency	Maximum frequency 200 kHz Accuracy $\pm(0.005\% + 1)$ Maximum resolution 0.01 Hz
Duty cycle	Maximum duty cycle 99.9% Accuracy $\pm(0.2\% \text{ per khz} + 0.1\%)$ Maximum resolution 0.1%
Temperature measurement	–200.0°C – 1090°C –328.0°F – 1994.0°F excluding probe
Temperature probe	–40.0°C – 260°C –40.0°F – 500°F, 2.2°C or 2% whichever is greater
Conductance	Maximum conductance 60.00 nS Accuracy $\pm(1.0\% + 10)$ Maximum resolution 0.01 nS
Diode	Range 3 V Resolution 1 mV Accuracy $\pm(2\% + 1)$
Duty cycle range	Accuracy Within $\pm(0.2\% \text{ per kHz} + 0.1\%)$

4.c.vii.i. Detail of Tool Kit Items

All the tool kit items should be new and of standard Brand. The detail of items is as under:

- 1) Adjustable Wrenches (sizes 12", 10", 8" & 6")
- 2) Locking Adjustable Pliers (size 10")
- 3) 13 Pcs (8-20 mm) Professional Grade Combination wrench set Metric (1 side ring & 1 side open)
- 4) 22 PC HEX key set (1 side Ball ended)
- 5) Straight Pipe Wrenches (size 18", 14" & 10")
- 6) 15 PCs star folding Hex Key Set
- 7) 70 PCs socket set with Ratchets
- 8) 02 no. 10 PCs Precision Screwdriver Set
- 9) 10 PC Multi Bit Ratcheting Screwdriver Set
- 10) 9 way Screwdriver Set
- 11) 10 PCs Metric Nut Driver Set
- 12) 11 PCs Grip Screw Driver Set
- 13) Locking Pliers (Curved Jaw, Straight Jaw, Long Nose Jaw)
- 14) 8-In Wire Stripper/Cutter/Crimper
- 15) Crimping Pliers Tool
- 16) Groove Joint Pliers (sizes 12", 10" & 8")
- 17) Slip joint Pliers (sizes 8" & 6")
- 18) Technician's Tool Kit Professional Electronics Hand Tools Set, Multimeter, Screw Driver Set, Electronics Pliers Electrician Set etc. (minimum 50 PCs)
- 19) Linesman Multi-function Pliers (size 8")
- 20) Linesman Pliers (sizes 9.5", 8" & 6")
- 21) Long Nose Pliers with Cutter (sizes 8" & 6")
- 22) Diagonal Cutting Pliers (sizes 7", 6" & 5")
- 23) End Cutter Pliers (size 6.5")
- 24) Curved Jaw Cable Cutter (size 8")
- 25) Long Nose Locking Pliers (size 8.5")
- 26) Bent Long Nose Pliers with Cutter (size 6")
- 27) Cable Tie Tension Tool
- 28) Snip Crimper Tool
- 29) High Tension Hacksaw (size 12")
- 30) Hammer (16 OZ weight minimum)
- 31) Files of different shapes & Types
- 32) 02 no. Knife Snap-off with 10 no. blades
- 33) Contractor Grade Riveter (size 10")
- 34) 100 No. Steel Rivets (1/8" x 1/2")
- 35) 100 No. Steel Rivets (1/8" x 1/4")

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- 36) 100 No. Steel Rivets (1/8" x 1/8")
 - 37) 100 No. Steel Back-up Plates (size 1/7")
 - 38) Trigger- Feed Standard Dual-melt Glue Gun (size 8.5")
 - 39) 50 no. woodworking Glue sticks (size 7/16" x 4")
 - 40) 50 no. dual Temperature Glue sticks (size 7/16" x 4")
 - 41) Blower
 - 42) Soldering Sucker
 - 43) Soldering Iron
 - 44) 03 no. Solder Wick
 - 45) Professional Torch having 500 lumen bright beam, completely waterproof, with an IPX8 rating. Should be Powered by a single rechargeable CR123A battery having run time of above 600 hours,
 - 46) 8-Way Surge Protected 13A/250V AC non-rewireable extension socket with 2 USB Charger (10 Meter long) Standard : BS 5733
 - 47) Latest Hammer Drill machine including all accessories of standard Brand alongwith set of drill bits (different sizes)
 - 48) Inverter 1KVA 12 Volt of Standard Brand
 - 49) 50 feet long Hanging Rope Ladder
 - 50) 01 no. Life Jacket
 - 51) 01 no. Life Saving Belt
 - 52) Working Gloves
 - 53) Hard Hat
 - 54) Standard Tool Box

Accessories

- Hard carrying case for portable meters
- Soft carrying case for portable meters
- Armor for portable meters, includes electrode holders for pH, conductivity and DO probes
- pH electrode holder for armor
- Conductivity and DO probe holder for armor
- Optional universal power adapter, 100-240 V, 50/60 Hz
- ROSS Triode 3-in-1 pH/ATC probe, gel-filled, 3m cable
- pH 4.01 buffer pouches, 10/pk
- pH 7.00 buffer pouches, 10/pk
- pH 10.01 buffer pouches, 10/pk
- pH rinse solution pouches, 10/pk
- Dura Probe conductivity cell with 1.5m cable, 4-cell, K=0.475
- DuraProbe conductivity cell with 3m cable, 4-cell, K=0.475

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- DuraProbe conductivity cell with 6m cable, 4-cell, K=0.475
 - DuraProbe conductivity cell with 10m cable, 4-cell, K=0.475
 - conductivity standard, 100 μ S/cm, 5x60 mL bottles
 - conductivity standard pouches, 1413 μ S/cm, 10/pk
 - conductivity standard pouches, 12.9 mS/cm, 10/pk
 - conductivity calibration resistor kit
 - RDO optical DO probe, 3m cable with stainless steel guard and calibration sleeve
 - RDO optical DO probe, 6m cable with stainless steel guard and calibration sleeve
 - RDO optical DO probe, 10m cable with stainless steel guard and calibration sleeve
 - RDO optical DO probe, 15m cable with stainless steel guard and calibration sleeve
 - RDO optical DO probe, 30m cable with stainless steel guard and calibration sleeve
 - polarographic DO probe, 1.5m cable
 - polarographic DO probe maintenance kit
 - polarographic DO probe electrolyte solution, 60 mL
 - Calibration sleeve for Orion polarographic DO probes
 - Replacement calibration sleeve for RDO optical probes
 - Replacement optical cap for RDO probes
 - high-performance ammonia ISE
 - standard ammonia ISE
 - Ammonia standard, 1000 ppm, 475 mL
 - Low-level ammonia ISA
 - Ammonia ISA, 475 mL
 - Fill solution for high-performance ammonia ISE, 60 mL
 - Fill solution for standard ammonia ISE, 60 mL
 - Ammonia ISE storage solution
 - fluoride combination ISE
 - Fluoride standard, 1 ppm with TISAB II, 475 mL
 - Fluoride standard, 2 ppm with TISAB II, 475 mL
 - Fluoride standard, 10 ppm with TISAB II, 475 mL
 - TISAB II, 1 gallon
 - ROSS sodium combination ISE

4.d. Establishment of Data Processing Centre/Master Station Room and Client Workstation Rooms

4.d.i. Provision of Equipment/Allied Accessories for establishment of Data Processing Centre and Main Master Station with available space in GMRC Office.

A standard Data Processing Centre shall be established in the office of GMRC office. Bidder is responsible for the following key considerations for establishment of Data Center:

- Establishing Proper Floor tiling keeping in view the Total Load Capacity of Servers and other necessary accessories, Wall Paneling and False-ceiling etc.
- Making proper cable trays for laying Power Supply cables and Network cables alongwith installation of Moisture/water sensors etc.
- Installation of Rack's arrangements for Master Station Server and other allied accessories etc. with aluminum partitioning's as directed by Engineer/Employer.
- Provision of 03 nos. Workstations including Tables, Racks, computer chairs & other furnishing accessories etc. alongwith necessary allied accessories for operators as directed by Engineer/Employer.
- Proper Arrangements (Installation of Separate Power Distribution Board, Change-Over for Wapda & Generator Supplies) for provision of Wapda Power Supply and Backup Supply (Generator)
- Installation of power supply boards & light plugs, lighting arrangements, and wiring etc.
- Installation of Surge Arrestors for safety of costly equipment from Voltage Spikes
- According to NFPA (National Fire Protection Association) 75 "Standard for the Protection of Electronic Computer/Data Processing Equipment", an emergency power off switch must be placed at every point of entry to the data center and on the two other places inside the Data Centre. These switches must cut power to every computer system, UPS and Air Conditioner. It must be clearly labeled and unobstructed.
- Redundant AIR CONDITIONING system of standard brand having capacity (2 or 1.5 ton as per requirements) each will be installed by the bidder keeping in the view the space/size of Data Processing Centre.
- Bidder is responsible for establishment of Local Area Network through 24-port unmanaged Gigabit Ethernet switch & Network cables comprising mix of Fibre optics cable and Cat6a rated standard UTP cables. Bidder will have to provide 2000 ft Cat6a standard UTP cable (pure copper).

Features of 24-port Unmanaged Gigabit switch to be installed for LAN are as under:

Number of Ports	Twenty-four 10/100/1000 Gigabit ports
Switching Capacity	32Gbps
Standards	IEEE 802.3 10BASE-T Ethernet IEEE 802.3u 100BASE-TX Fast Ethernet IEEE 802.3ab 1000BASE-T Gigabit Ethernet ANSI/IEEE 802.3 NWay auto-negotiation IEEE 802.3x Flow Control

	IEEE 802.3az Energy Efficient Ethernet (EEE)
Data Transfer Rates	Gigabit Ethernet: 2000 Mbps (full duplex)
Network Cables	100BASE-TX, 1000BASE-T: UTP CAT 5/5e/6a (100 m minimum) EIA/TIA-568 100-ohm STP (100 m minimum)
Media Interface Exchange	Auto MDI/MDIX adjustment for all ports
Transmission Method	Store-and-forward
MAC Address Table	16K
MAC Address Learning	Automatic update
MAC Address Filtering/ Forwarding Rates	Ethernet: 14,880 pps per port Fast Ethernet: 148,800 pps per port Gigabit Ethernet: 1,488,000 pps per port
RAM Buffer	Minimum 3.5Mbits
Jumbo Frames	9216 Bytes
MTBF	Minimum 336,072 hours
Operating Temperature	32 to 104 °F (0 to 40 °C)
Storage Temperature	14 to 158 °F (-10 to 70 °C)
Storage Humidity	5% to 90% non-condensing
Certifications	C-Tick Class A CB cUL

- Local Area Network should support Redundant Internet Connections provided by different network providers (one is Land-line/Fiber 12 Mb & 2nd is wireless 4G Broadband/GSM)
- Bidder is responsible for establishment of NETWORK OPERATIONS CENTER (Server Room) (Aluminium Partitioning) inside the Data Processing Centre for supervision, monitoring and maintaining. It should be the central point for troubleshooting, software distribution and updating, router management, and performance monitoring. Bidder will be responsible to install a Table, racks, computer chairs & other furnishing accessories etc. in Network Operation Centre for troubleshooting, software distribution and updating, router management, and performance monitoring of the climate control systems, UPS, Generators etc." Air conditioning of standard brand having capacity 2 or 1.5 ton as per requirement will be installed by the bidder in the Network Operation Centre.
- Bidder is responsible for provision/Installation of 03 no. 65" LED (UHD 4K Flat Smart TV) in Data Centre to display Meteorological Data.
- Installation of 10kg (5kg x 2) Polished Aluminium Co2 Fire Extinguishers and 10kg (5kg x 2) dry powder stored pressure Stainless Steel Fire Extinguishers in the Data Processing Centre.
- Installation of Fire alarm system alongwith Smoke & Heat Detection sensors in Data Centre.

Minimal requirements of Fire Alarm System is as under:

1. Smoke / Heat Detectors (Fire Detectors)

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2. Fire Alarm Panels (Control and Indicating Equipment)
 3. Alarm Bells (Fire Alarm Devices)
 4. Manual Call Points
 5. Charger/Battery (Power Supply Equipment)

4.d.ii. Provision of Equipment/Allied Accessories for establishment of Client Workstation Rooms.

A standard Client Workstation room for monitoring of Meteorological Data shall be established. Some of the key considerations for a Client Workstation Center that should be addressed are:

- Establishing of False-ceiling.
- Making proper cable trays for laying Power Supply cables and Network cables alongwith installation of Moisture/water sensors etc.
- Installation of Rack's arrangements for Client Workstation Computers alongwith other allied accessories etc. with aluminum partitioning as directed by Engineer/Employer.
- Proper Arrangements (Installation of Separate Power Distribution Board, Change-Over for UPS & Generator Supplies) for provision of Wapda Power Supply and Backup Supply (UPS & Generator)
- Installation of power supply boards & light plugs, lighting arrangements, 02 no. wall-mounted Fan and wiring etc.
- Installation of Surge Arrestors for safety of costly equipment from Voltage Spikes
- According to NFPA (National Fire Protection Association) 75 "Standard for the Protection of Electronic Computer/Data Processing Equipment", an emergency power off switch must be placed at every point of entry to the data center and on the two other places inside the Client Workstation Centre. These switches must cut power to every computer system and UPS etc. It must be clearly labeled and unobstructed.
- Provision of Internet Connection (4MB).
- Installation of 5kg Polished Aluminium Co2 Fire Extinguishers and 5kg dry powder stored pressure Stainless Steel Fire Extinguishers in the Client workstation room.
- Installation of Fire alarm system alongwith Smoke & Heat Detection sensors in the Client workstation Centre.

Minimal requirements of Fire Alarm System is as under:

1. Smoke / Heat Detectors (Fire Detectors)
2. Fire Alarm Panels (Control and Indicating Equipment)
3. Alarm Bells (Fire Alarm Devices)
4. Manual Call Points
5. Charger/Battery (Power Supply Equipment)

SITE PREPARATION DETAILS FOR AWS/WFT

1. AWS Enclosure

Area of the AWS/WFT Site Enclosures should be ideally 6m x 8 m or as per site requirements/specifications provided by Engineer/Employer. The approach to the AWS/WFT Platform should be made free of obstacles like bushes etc. and a suitable cement path form must be laid to approach the site.

Imp Note: "In case of any practical problem regarding the site preparation, the decision of GMRC WAPDA official will be final & binding".

- Mast/Tower has already installed at the existing 16 Nos. AWS Sites

2. Fencing for the AWS/WFT

- The height of the fencing for the AWS/WFT enclosure must be 2 meters from the ground level.
- Fencing angle should be of size 50mm x 50mm x 6mm and pre coated with redoxide. Length of the angle shall be 2.8 meters i.e. (2.0m above ground level + 0.8m below ground level).
- Each fencing angle must be erected over a concrete pillar of dimension 1'x1'x2'9". The pillar must be 2' below the ground & 9" above the ground. Fencing angles must be mounted within the concrete and chain-link fixed around it.
- Two MS angles must be used diagonally at each of the four corner angles of the sites. 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.
- Distance between each fencing angle should be not more than 1m.

3. 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.
- An iron 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 angle should be of 50 mm x 50mm x 6mm & should have suitable length (so that it can be easily connected between two consecutive fencing angles).

4. GATE

- Dimensions: 2 m X 1 m X 6 mm (Length x Width x Thickness) with locking facility.
- The gate must be fabricated by MS Angle whose dimensions should be minimum 30mm X 30mm X 6mm.
- Suitable locking facility with 3 keys for safety purposes is mandatory. Standard

-
- rust-proof locks like Godrej or substantially equivalent shall be used.
- iv. Make sure that tower foundation and the gate are in a straight line.
 - v. Gate and MS Angle must be well painted with white / silver color.
 - vi. Gate should have proper support of MS Angles with additional support of crossed MS Angles.

5. Rain Gauge foundation

The rain gauge foundation must be dimensions 1.5 ft X 1.5 ft (length X width) and 3 ft deep. The raised platform should be six inches above the ground level. The base plate of rain gauge should be 1.0 ft above ground level. In the case of flood prone areas the base plate on which the rain gauge is mounted should be placed 1.0 meter above ground level. Such locations are to be decided based on the suggestion of GMRC office or as per site requirement. The rain gauge should be mounted on a GI Pipe of internal diameter 1.5" & thickness 3mm. It should have minimum length of 3.5' which may be increase as per requirement in flood prone areas. 2.5' will remain inside the ground & remaining 1 will remain outside the ground. On the lower end of the pipe, a rod of length 6" & diameter 0.5" should be welded at an angle of 90 degree. On the upper end where the rain gauge will be installed, a plate of diameter 9" & thickness 4mm should be welded in the middle of the GI pipe to make a suitable platform for the rain gauge.

EARTHLING AND LIGHTENING PROTECTION FOR EQUIPMENT SUPPORT STRUCTURE

All support structures shall be adequately protected against lightning strokes by installation of a lightning discharge rod, connected directly to the top of the structure. The structure shall be properly grounded by means of copper grounding rings brazed to copper ground rods, Crow footing, or counterpoise method, so that the ground resistance at no time shall exceed 5 ohms, at the proposed location. A barbed wire fence, at least 2.5 meter high, or suitable protection means shall be provided around the equipment support structure at each station for protection against vandalism.

SITE PREPARATION

Details of Site Preparation and Civil Works are attached at **Annexure-III**.

4. Drawings

These Bidding Documents includes no drawings. However existing Flow Forecasting Section / Server Room Attached at **Annexure- V**. Furthermore, the bidder shall submit a detailed schedule/plan for the installation and commissioning of equipment at all 16 AWS stations as part of its bid, indicating the proposed sequence and timeline for completion of the works.

5. Inspections and Tests

The following inspections and tests shall be performed:

1. **Inspection:**

All equipment covered by these specifications and the inspection thereof by the Contractor shall be subject to surveillance and/or further inspection by the Employer/Employer's Representatives.

Site Acceptance Criteria

Site acceptance test will be as per GMRC Wapda criteria and firm has to show at the site whatever specification indicated in this document regarding system test and sensor specification with manual validation at their own cost. Procedure for site acceptance will have to be done on mutually agreed conditions as envisaged in the document.

3. **On Site Reliability Testing and Warranty Period**

Upon completion of the installation, the Contractor shall adjust, align and test (On Site Reliability Test (OSRT)) the system to verify the overall system performance. After satisfactory completion of the OSRT, the Employer will provisionally accept the system. The Contractor shall submit an outline of the OSRT, schedule to the Employer for approval at least two weeks prior to commencement of such tests and shall conduct all the tests after approval of the Employer. Following provisional acceptance of the System, a two-month Reliability Test shall commence. The Warranty Period shall commence upon successful completion and acceptance of the OSRT and shall not include the period of the OSRT. The system shall demonstrate a continuous availability of not less than 95%. Down time will be accumulated by the Purchaser on a loss of function basis and will be reported to the Contractor on agreed by periods. During the continuous 2-months warranty period, the availability (A) shall be calculated as: A (%)

$$A (\%) = (1440 - \text{loss of function time in hours}) \times 100/1440$$

Loss of function is defined as the inability of the system to perform the data collection and data processing functions due to a failure of component(s) in the system. Failure of any component of the system that does not affect data collection and data processing will not be counted as loss time in, availability calculation.

Any repairs, servicing, trouble shooting, testing etc. requested by the Employer, or initiated

by the Contractor during the 2-month reliability period shall be performed by the Contractor at his expenses.

If at any time during the 2-month reliability tests, the accumulated loss of function time exceeds 5 %, the system will have failed the reliability test. At this time the system shall be repaired, retested, - etc. as required. Once the system is put back in operation, a new 2-month reliability test shall commence.

Upon successful completion of the 2-month reliability test, the system will be formally accepted by the Purchaser.

The entire cost of maintenance support during the OSRT Period shall be included in the basic price of the Contract, and no separate payment over and above the Contract shall be made for OSRT services.

The Contractor shall assist the Employer to maintain a complete inventory of spares required to keep the system functional in its stores. If at any time, a certain spare is not available with the Purchaser which is needed for repair, the same shall be supplied by the Contractor within a maximum period of one week by air freighting or other feasible means (without cost to the Employer). All spares that have been consumed during a repair operation shall also be promptly replaced by the Contractor within a period of two weeks, without any cost to the Employer.

Prior to Final Acceptance, the Contractor shall replace at his own cost, all spares that have been consumed during the OSRT Period so that the original inventory of spares supplied is completely restored. The defective components/modules shall become the property of the Contractor after they have been replaced.

Warranty and Maintenance

The bidder is responsible to provide the suitable solution with the guidance of the GMRC office which includes but not limited to the formulating design, installation and Maintenance for 1 year against requirements stated in this document will carry 1-year warranty from the date of acceptance and taking over by GMRC WAPDA. It is evident that, any complex system requires maintenance support. Corrective maintenance is required for component failures. To minimize corrective maintenance and to increase the performance of AWS Stations, well-organized preventive maintenance is recommended. Preventive maintenance is required for all system components, not only cleaning and lubricating the mechanical parts. In view of the increasing reliability of the electronic components, preventive maintenance, including services and sensor calibration, will become the controlling factor in maintenance. Since the maintenance of a network of automatic stations is often a grossly underestimated task, it is essential to organize maintenance according to a rational plan that details all the functions and arranges them so

as to minimize costs without adversely affecting performance. The modular structure of many modern automatic stations allows maintenance to take place in the field, or at central centre.

- Servicing and routine maintenance of field equipment including upkeep of the site shall be done by the bidder at least two (02) visits during the warranty period, with each visit to be conducted at an interval of six (06) months. A penalty of Rs. 50,000/= per site per visit will be imposed on the bidder in case of failure to perform the above-mentioned works. The maintenance work must be done in the presence of authorized GMRC officer/official. Reports of each maintenance visit shall be submitted to GMRC, WAPDA, Lahore, within seven (07) days of completion of the respective visit.
- WAPDA, Lahore, within seven (07) days of completion of the respective visit.
- Analysis of the data quality with a co-located meteorological observatory, if available, should be submitted. Hand-held digital standard Meters for air temperature, relative humidity etc. should be compulsorily available with the firm and taken to the AWS Stations, by the maintenance party to compare and evaluate the data quality. The hand held digital standards must be calibrated with standards available in WAPDA. Hand-held GPS (Global Positioning System) should be carried to the sites to get the correct geographical coordinates of the sites.
- If any part of the AWS Station's system is to be carried away for repairs then it should be replaced with a working part.
- In case of accidental damage, theft, or defect of any equipment during the Warranty period, the Bidder shall be responsible for the repair/rectification or replacement of the affected defective equipment/spare within fifteen (15) days. In case the Bidder fails to complete the required repair or replacement within the stipulated period of fifteen (15) days, the penalty as specified above for failure to perform the required maintenance works shall be imposed per affected AWS per occurrence until the defective equipment is duly repaired/rectified or replaced.

I. SYSTEM DESIGN REVIEW

After award of contract a detailed design review meeting will be conducted where full technical details of the system will be mutually discussed between GMRC nominated experts and supplier's engineers. A detailed design review document needs to be provided by the supplier. The full technical details of GSMGPRS/Satellite/Meteosat Communication System based Automatic Weather Stations will be discussed and finalized in the Design Review Meeting. Test plan and general test procedures will also be discussed during this review.

II. SPECIAL PROVISION

Quality of the work

The quality of the Data Sites has to be ensured at each & every stage. Some important steps are:

- Site Level- the AWS Data site must be installed as per the established norms.
- Sensor Level- All the sensors must be installed as per the norms specified
- Data Logger Level- The data logger must check the quality of the data before it is sent to the transmitter.
- Power supplies shall have suitable input noise and transient filtering electronic
- The circuits shall have L.E.D. indicators to indicate normal and alarm states. Self-diagnostic features shall be provided, as much as possible. ICs shall be installed with sockets wherever technically possible.
- It shall be ensured that all operating controls are kept at ground potential. Operating voltages exceeding 100 V, the equipment shall be labeled accordingly and shielded for accidental contact.
- The Equipment for the Automatic Weather Stations shall be designed for ease of maintenance.

5. TRAINING

i. General

The Contractor shall arrange and undertake a comprehensive training programme for the Employer's personnel to ensure that they shall acquire a good working knowledge of the installation, operation, maintenance and repair of all the equipment to be supplied under the Contract.

ii. Training in Pakistan

The Contractor will have just to take into account costs relative to:

- Hall rental.
- Computer rental (If necessary)
- Training organization

The training will take place in Lahore and the exact place of training would be decided by WAPDA and the Contractor. The logistics for the training with respect to place of training and arrangements for trainees would be the responsibility of the Contractor. The material to be supplied to the trainees would be prepared by the Contractor and would be included as a part of the full training package. Time table for the training would be prepared by the Contractor in consultation with the Purchaser

iii. Codes

Therefore, depending on the case, training shall appeal to:

- a specialized Instrument Engineer from the Electromechanical Division (in the following description, the reference code IE is used for such training sessions),
- Managers (code M), • Electronic Technicians (code ET),
- Operators using front end computer and supervisory system (code O), Training to be planned is as presented hereafter.

5. INSTRUMENTATION SYSTEM

Instrumentation System refers here to the sensors to be installed to monitor the automation system.

Training planned should allow skilled staff, according to their level of responsibility, to:

- be familiar with the equipment used,
- manage the equipment on a daily basis, and therefore handle maintenance,
- interpret certain measurements furnished by the system, and adjust them if needed.

5.1 General Knowledge of Sensors

This training session will allow managers to be aware of the type of sensors installed, the measurements they furnish, and their reliability

This basic training session is designed for as large an audience as possible: (codes: EH, M, ET, O).

Minimum duration: 1 day

Number of persons: 05

5.2 Sensor Maintenance

This training session shall give the Instrument Engineer and maintenance staff the opportunity to gain more in-depth knowledge of instrument operation: calibration procedures, preventive maintenance requirements also provide the source code for the system installed.

This training session is coded ET and EH.

Minimum duration: 2 days

Number of persons: 5

5.3 Measurement Interpretation

This training session, geared particularly to operators, gives trainees a critical approach to measurements carried out, prescribing instrument inspection.

This session is coded ET, EH, M, O.

Minimum duration: 1 day

Number of persons: 5

Eventually, these training sessions could be tailored according to the sensors installed, by organizing a short session per type of sensor.

6. **Remote Transmitter**

Acquisition equipment's Data Loggers and their associated man/machine interface equipment, handling all local operations are concerned. Training planned should allow skilled staff, according to their level of responsibility, to:

- be familiar with the equipment used,
- manage the systems on a daily basis,
- program outstation,
- master the protocol used for communication between outstations,
- carry out hardware and software maintenance for the systems,
- be able to define subsequent improvements to be made on the system.

Therefore, depending on the case, training shall appeal to:

- a System Engineer belonging to the task force assembled within the Electromechanical Division (in the following description, the reference code SE is used for such training sessions).
- a System Technician belonging to this same task force (code ST),
- Managers (code M),
- Electronic and hydrological Technicians (code ET, EH)
- Supervision Operators (code O).

Training to be planned is as follows:

6.1 **Basic Knowledge of Data Logger**

This training session will allow managers to be familiar with outstations, to know what to expect from them, their conception (assembly of boards, programming language), to be familiar with their extension possibilities and to know their limits.

This is a M, SE, ET and EH coded session.

Minimum duration: 1 day

Number of persons: 8

6.2 **In-depth Knowledge of Data Logger**

This training session should allow Electronic Technicians responsible for maintenance to gain in-depth knowledge of the Data Logger and telecommunication installed, to carry out trouble shooting, make common repairs (changing boards), and carry out all preventive maintenance tasks on the associated control cabinets.

It is a ET, SE coded session.

Minimum duration: 2 days

Number of persons: 5

5.3 **Telecommunication Equipment**

This training session should allow specialists to carry out all testing and maintenance processes on telecommunication equipment.

It is a SE coded session.

Minimum duration: 2 days

Number of persons: 5

Summary of training

Local Training in Pakistan	Days	Persons
General Knowledge of Sensors	2	8
Sensor Maintenance	1	5
Measurement Interpretation	1	5
Basic Knowledge of Data Loggers	1	5
In-depth Knowledge of Data Loggers	1	5
Telecommunication Equipment	1	5
Total	7 days	41 man/days

7. Language of Training

The entire training, including written and oral communication between the Contractor and Purchaser personnel shall be in English language.

INSTALLATION AND COMMISSIONING

AWS will be located in a fenced plot of land as per WMO standards/site requirements having adequate exposure for sensors. During all transportations, proper insurance shall be arranged by the bidder.

Installation, Testing & commissioning of “Up-Gradation of Existing 16 No. AWS Stations will be carried out keeping in view the WMO standards and site requirements. During all transportations, proper insurance shall be arranged by the bidder.

PART 3 - Contract

Section VIII. General Conditions of Contract

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Section VIII. General Conditions of Contract

1. Definitions

1.1 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 therefrom, 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 the country specified in the Special Conditions of Contract (SCC).
- (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, 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 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 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 and Fraudulent Practices

- 3.1 The Bank requires compliance with its policy in regard to corrupt and fraudulent practices as set forth in Appendix 1 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 thereunder shall be as prescribed by Incoterms.

(b) The terms EXW, CIP, FCA, CFR 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 written in the language specified in the **SCC**. 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 the language specified, 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 Purchaser’s Country, unless otherwise specified in the **SCC**.
- 9.2 Throughout the execution of the Contract, the Supplier shall comply with the import of goods and services prohibitions in the Purchaser’s country when
- (a) as a matter of law or official regulations, the Borrower’s country prohibits commercial relations with that country; or
- 9.2 (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 from that country or any payments to any country, person, or entity in that country.

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 Pursuant to paragraph 1.16 (e) of Appendix 1 to the General Conditions of Contract, the Supplier shall permit and shall cause its agents (where declared or not), subcontractors, subconsultants, service providers, suppliers, and personnel, to permit, the Bank and/or persons appointed by the Bank to inspect the site and/or the accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have such accounts, records and other documents audited by auditors appointed 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 Clause 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 Schedule of Requirements.
- 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.
- 14.2 The Supplier, including its Subcontractors, shall not employ or engage forced labor or persons subject to trafficking, as described in GCC Sub-Clauses 14.3 and 14.4.
- 14.3 Forced labor consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements.
- 14.4 Trafficking in persons is defined as the recruitment, transportation, transfer, harbouring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.
- 14.5 The Supplier, including its Subcontractors, shall not employ or engage a child under the age of 14 unless the national law specifies a higher age (the minimum age).
- 14.6 The Supplier, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical,

mental, spiritual, moral, or social development.

14.7 Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:

- (a) with exposure to physical, psychological or sexual abuse;
- (b) underground, underwater, working at heights or in confined spaces;
- (c) with dangerous machinery, equipment or tools, or involving handling or transport of heavy loads;
- (d) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or
- (e) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.

14.8 The Supplier shall comply, and shall require its Subcontractors if any to comply, with all applicable health and safety regulations, laws, guidelines, and any other requirement stated in the Technical Specifications.

14.9 The Supplier shall comply with additional obligations as **specified in the SCC.**

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 currencies in which payments shall be made to the Supplier under this Contract shall be those in which the bid price is expressed.

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 For goods manufactured outside the Purchaser's Country, the Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside the Purchaser's Country.

17.2 For goods Manufactured within the Purchaser's country, the Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Purchaser.

17.3 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in the Purchaser's Country, the Purchaser shall use its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent.

**18. Performance
Security**

18.1 If required as specified in the **SCC**, the Supplier shall, within twenty-eight (28) 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, if required, shall be denominated in the currency(ies) of the Contract, or in a freely convertible currency acceptable to the Purchaser; and shall be in one of 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. Notification by the Supplier, for addition of any Subcontractor not named in the Contract, shall also include the Subcontractor's declaration in accordance with Appendix 2 to the GCC- Sexual exploitation and Abuse (SEA) and/or Sexual Harassment (SH) Performance Declaration. 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 VI, 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—in a freely convertible currency from an eligible country—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
and 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 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 the place of the Purchaser's country 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
Time**

of

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 Appendix 1 to the GCC, 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.

**37. Export
Restriction**

37.1 Notwithstanding any obligation under the Contract to complete all export formalities, any export restrictions attributable to the Purchaser, to the country of the Purchaser, or to the use of the products/goods, systems or services to be supplied, which arise from trade regulations from a country supplying those products/goods, systems or services, and which substantially impede the Supplier from meeting its obligations under the Contract, shall release the Supplier from the obligation to provide deliveries or services, always provided, however, that the Supplier can demonstrate to the satisfaction of the Purchaser and of the Bank that it has completed all formalities in a timely manner, including applying for permits, authorizations and licenses necessary for the export of the products/goods, systems or services under the terms of the Contract. Termination of the Contract on this basis shall be for the Purchaser's convenience pursuant to Sub-Clause 35.3.

APPENDIX 1

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.⁹ 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;¹⁰
 - (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;¹¹
 - (iii) “collusive practice” is an arrangement between two or more parties

⁹ In this context, any action to influence the procurement process or contract execution for undue advantage is improper.

¹⁰ 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.

¹¹ 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.

designed to achieve an improper purpose, including to influence improperly the actions of another party;¹²

(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;¹³

(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,

¹² 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.

¹³ For the purpose of this sub-paragraph, “party” refers to a participant in the procurement process or contract execution.

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,¹⁴ 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 nominated¹⁵;
- (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.”

¹⁴ 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.

¹⁵ 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.

APPENDIX 2

Sexual Exploitation and Abuse (SEA) and/or Sexual Harassment (SH) Performance Declaration for Subcontractors

[The following table shall be filled in by each subcontractor proposed by the Supplier, that was not named in the Contract]

Subcontractor's Name: *[insert full name]*

Date: *[insert day, month, year]*

Contract reference *[insert contract reference]*

Page *[insert page number]* of *[insert total number]* pages

SEA and/or SH Declaration
We: ☐ (a) have not been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. ☐ (b) are subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. ☐ (c) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations, and were removed from the disqualification list. An arbitral award on the disqualification case has been made in our favor.
<i>[If (c) above is applicable, attach evidence of an arbitral award reversing the findings on the issues underlying the disqualification.]</i>
Period of disqualification: From: _____ To: _____

Name of the Subcontractor _____

Name of the person duly authorized to sign on behalf of the Subcontractor _____

Title of the person signing on behalf of the Subcontractor _____

Signature of the person named above _____

Date signed _____ day of _____,

Countersignature of authorized representative of the Supplier:

Signature: _____

Date signed _____ day of _____,

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(i)	The Purchaser's country is: <i>Pakistan</i>
GCC 1.1(j)	The Purchaser is: Pakistan Water & Power Development Authority represented by General Manager (Hydro Resources Management) WAPDA or any other representative authorized by the Employer to represent from time to time
GCC 1.1 (o)	The Project Site Final Destination: initially at the Supplier/Bidder warehouse/premises afterwards as per Location Maps attached at Annexure-I Section VII. Schedule of Requirements
GCC 1.1 (p)	The term SEA/SH where used in the Contract has the following meaning: • “Sexual Exploitation and Abuse” “(SEA)” means the following: Sexual Exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. Sexual Abuse is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions. • “Sexual Harassment” “(SH)” is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by contractor's personnel with other contractor's, subcontractors' or employer's personnel.
GCC 4.2 (a)	The meaning of the trade terms shall be as prescribed by Incoterms. If the meaning of any trade term and the rights and obligations of the parties thereunder shall not be as prescribed by Incoterms, they shall be as prescribed by: <i>refer to other internationally accepted trade terms.</i>

GCC 4.2 (b)	The trade term DDP shall be governed by the latest edition of Incoterms published by the International Chamber of Commerce (ICC), Paris, France, available at the time of bid submission deadline.
GCC 5.1	The language shall be: <i>English</i>
GCC 8.1	For <u>notices</u>, the Purchaser's address shall be: 1) General Manager (Hydro Resources Management), WAPDA Street Address: Room # 228 WAPDA House, Sharah-e-Quaid-e-Azam City: Lahore ZIP Code: 54000 Country: Pakistan Telephone: +92-42-99202631, 99202211/2291 Electronic mail address: gmpndwater@gmail.com, pdgmrcwapda@gmail.com 2) Attention: Project Director-GMRC, WAPDA Street Address: 197- WAPDA House Lahore City: Lahore ZIP Code: 54000 Country: Pakistan Telephone: +92-42-35245490 Facsimile number: +92-42-99202409
GCC 9.1	The governing law shall be the law of: <i>Islamic Republic of Pakistan</i>
GCC 10.2	The rules of procedure for arbitration proceedings pursuant to GCC Clause 10.2 shall be as follows: In the case of a dispute between the Purchaser and a Supplier who is a national of the Purchaser's country, the dispute shall be referred to adjudication or arbitration in accordance with the laws of the Purchaser's country. All disputes arising in connection with the present contract shall be finally settled under the Arbitration Act 1940, Islamic Public of Pakistan. The Place of arbitration shall be Lahore, Pakistan.

GCC 13.1	Details of Shipping and other Documents to be furnished by the Supplier are <i>a negotiable bill of lading, a non-negotiable sea way bill, an airway bill, a railway consignment note, a road consignment note, insurance certificate, Manufacturer's or Supplier's warranty certificate, inspection certificate issued by nominated inspection agency, Supplier's factory shipping details etc.</i> The above documents shall be received by the Purchaser before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses.
GCC 14.9	<i>"Not Applicable"</i>
GCC 15.1	The prices charged for the Goods supplied and the related Services performed <i>"shall not,"</i> be adjustable.
GCC 16.1	A) Payment of Goods Supplied: i. On Delivery: Forty (40%) percent payment of equipment & Goods shipped shall be paid within 60 days on receipt of the Equipment /Goods after issuance of joint inspection certificate by the inspection committee constituted by the Purchaser and upon submission of the following documents or specified in GCC Clause 16. a. Bill in triplicate supported by sales tax invoice. b. Warranty Certificate c. Certificate to the effect that the billed amount has not been claimed or received earlier d. Copy of GST Paid Challan e. Copy of sales Tax Return f. Certificate regarding Active Tax Payer of F.B.R g. Affidavit that Sales Tax Return covers such GST amount h. Certificate regarding Filer towards Income Tax ii. On Completion: Forty (40%) percent payment of Equipment /Goods shall be paid to the Supplier within Sixty (60) days after completion / installation of equipment certified by the post inspection by committee constituted by the Purchaser. iii. On Acceptance: Fifteen (15%) percent payment of the Equipment / Goods shall be paid to the Supplier within Sixty (60) days after the date of acceptance certificate for the respective delivery/services issued by the purchaser and the submission of the documents above. Remaining Five (05%) percent payment of Equipment / Goods shall

	be paid after completion of Warranty period / DLP. B) Payment for Services supplied from within the Purchaser's country: i. Advance Payment: Ten (10%) percent payment of the contract (Services) shall be paid within sixty (60) days of the signing of the contract against simple receipt and a bank guarantee for the equivalent amount and in the form of provided in the bidding documents which will be released within 28 days after the issuance of acceptance certificate to the contractor. ii. On Completion: Seventy (70%) percent payment of contract value (Services) shall be paid on the completion of Services after issuance of joint inspection certificate by the inspection committee constituted by the Purchaser and upon submission of the following documents specified in GCC Clause 16. a. Bill in triplicate supported by sales tax invoice. b. Warranty Certificate c. Certificate to the effect that the billed amount has not been claimed or received earlier d. Copy of GST Paid Challan e. Copy of sales Tax Return f. Certificate regarding Active Tax Payer of F.B.R g. Affidavit that Sales Tax Return covers such GST amount h. Certificate regarding Filer towards Income Tax iii. On Acceptance: The fifteen (15%) percent payment of contract value (local Component) shall be paid to the Supplier within Sixty (60) days after the date of the acceptance certificate for the respective services provided, issued by the Purchaser. Remaining Five (05%) percent payment of Services shall be paid after completion of Warranty period / DLP. Note: Acceptance certificate will be issued by the Employer to the contractor only after the successful completion of the On-Site Reliability Test for all sites.
GCC 16.5	N/A

GCC 17.2	Renumber the General Condition of Contract and add the following sub-clauses 17.2 (a) Local Direct Taxes: It is implied that the Consultant has taken all the risks into account while submitting the proposed price. The Employer (WAPDA) shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax, WHT, Turnover Tax, Super Tax etc.) payable by the Consultant, his/her experts and other employees. Any increase or decrease in the rates of all local direct taxes, or introduction of new tax on the Income of the Consultant, experts and other employees in connection with the performance of the contract, will be the liability of the Consultant as these taxes are levied on the income earned by the Consultant from the Contract and the Employer (WAPDA) will not compensate to the Consultant 17.2 (b) Local Indirect Taxes: All local indirect taxes i.e. sales taxes, custom duty, VAT, levies, other charges or similar taxes levied on the Consultant's invoice, shall be borne and reimbursed by the Employer (WAPDA), subject to withholding law, on the basis of actual amount of indirect taxes paid by the Consultant at the prevailing tax rates supported by the documentary evidence of such payment of indirect taxes by the Consultant. These indirect taxes shall be mentioned as a separate line item on the Consultant's invoice. Information of the Consultant's tax obligations in the Employer (WAPDA) country can be found from Federal Board of Revenue, Pakistan. (www.fbr.gov.pk) & relevant Provincial Tax Authorities.
GCC 17.3	If any tax exemptions, reductions, allowances or privileges may be available to the Supplier/Contractor in the country where the Site is located, the Employer (WAPDA) shall facilitate the Supplier/Contractor as per law to the allowable extent.
Addl. GCC 17.4	(a) Advance Income Tax: All payments (gross) as payable to the Supplier/Contractor/subcontractor will be subject to Withholding Tax/Advance Tax at the prescribed rate at the time of payment. The deduction of withholding income tax from the gross payable bills shall be made in accordance with prevalent Income Tax Laws of the Government of Pakistan. These deductions shall be deposited in the Government Treasury by the employer to the account of the Supplier/Contractor within prescribed period. The employer shall

	within 28 days of making any such deduction, provide to the contractor a certificate of tax deducted and deposit in to the Government Treasury. (b) Provincial Sales Tax Withholding: Subject to the relevant provision of the Provincial Sales Tax Act on Services, all payments (gross) as payable to the Supplier/Contractor/Sub-contractors in relation to Services will be subject to withholding sales tax at the prevailing rates at the time of payments.
GCC 18.1	A Performance Security <i>“shall” be required.</i> <i>“The amount of the Performance Security shall be: 10% of the currency of the Contract Price”</i> in the form of Bank Guarantee of any Schedule bank of Pakistan. If the Supplier is in Joint Venture, the performance security shall be in the name of JV.
GCC 18.3	The Performance Security shall be in the form of: “CDR or Bank Guarantee in Pak Rupees (PKR)” as per attached format in the favor of GM (HRM) Wapda House Lahore. Guarantees from Insurance, Bonding or Security Companies shall not be permitted.
GCC 18.4	Discharge of the Performance Security shall take place after successful completion of Contractor's obligations under the contract including Warranty Period as mention in the GCC Clause 28.
GCC 23.2	The packing, marking and documentation within and outside the packages shall be: as per <i>Standards for shipment of equipment.</i> The packing, marking and documentation within and outside the packages shall be: Case No, Gross Weight & Dimensions (Length, Breadth & Height) and Marking Label in the name of Consignee. If the Supplier fails to comply with above instructions, he shall be held responsible for any loss or demurrage etc. occurring due to wrong/nil/insufficient marking of package etc.

GCC 24.1	The Supplier shall, at its own cost, arrange and maintain comprehensive “All Risks” insurance coverage for the Goods from the time of dispatch from the Supplier’s premises until delivery at the final destination specified in the Contract. The insurance shall cover, as a minimum, loss of or damage to the Goods during loading, transportation, transit, storage incidental to transportation, unloading and delivery, including international and inland transportation, as applicable. The amount of insurance coverage shall be not less than 110% of the value of the Goods, or such higher amount as may be necessary to ensure full replacement of lost or damaged Goods, in a freely convertible currency.
GCC 25.1	Responsibility for transportation of the Goods shall be as specified in the Incoterms and <i>“The Supplier is required under the Contract to transport the Goods to a specified place of final destination within the Purchaser’s country, defined as the Project installation Sites, transport to such place of destination in the Purchaser’s country, including insurance and storage, as shall be specified in the Contract, shall be arranged by the Supplier, and related costs shall be included in the Contract Price”</i>
GCC 25.2	The Supplier shall provide all services as specified at (a), (b), (c), (d), (e) under GCC clause 25.2.
GCC 26.1	The inspections and tests shall be: As recommended by Manufacturer.
GCC 26.2	The Inspections and tests shall be conducted at: 1st Inspection: Before delivery to the site, at the Supplier’s premises 2nd/Post Inspection: The Post Inspection, tests and commissioning shall be conducted after installation at sites by the representatives of Supplier and committee as per WAPDA laid down procedure. All related expenditures of pre shipment inspection and inspection shall be borne by the Supplier.
GCC 26.3	Supplier shall bear all of costs and expenses incurred in connection with inspection including, but not limited to, all traveling, boarding and lodging expenses etc.

GCC 27.1	The liquidated damage shall be: 0.1% of contract price per day. The maximum number of liquidated damages shall be: 10%.
GCC 28.3	The period of validity of the Warranty shall be 01 Year after successful commissioning of equipment / issuance of Acceptance certificate duly supported with successful of On Site Reliability Test (OSRT) For purposes of the Warranty, the place(s) of final destination(s) shall be: As per maps attached at Annexure-I at Section VII. Schedule of Requirements
GCC 28.5	Upon receipt of notice, the Supplier shall repair or replace the defective field equipment or parts, not more than fifteen (15) days and immediate for central server. Penalty on the Supplier as specified in Section VII – Technical Specifications under Warranty and Maintenance will be imposed if he fails to repair or replace the defective field equipment or parts ie data logger, transmitter or sensors. GSM/GPRS and satellite modems within fifteen (15) days. Cost of AWS data shall be calculated and imposed on the Supplier to compensate loss of crucial data.
GCC 31.1	In addition to GCC 31.1 add the following in the General Condition of Contract 31.1 (a) However, any change (increase/decrease) in the rate of Direct Taxes i.e. Income Tax/WHT, Turnover Tax, Super Tax etc. and Indirect Taxes i.e. sales taxes, custom duty, VAT, levies, other charges or similar taxes shall be dealt as per Clause 17.2 of GCC.

Section X. Contract Forms

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Letter of Acceptance

[letterhead 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 and name of currency]***, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the 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

Contract Agreement

[The successful Bidder shall fill in this form in accordance with the instructions indicated]

THIS AGREEMENT 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”), of the one part, 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”), of the other part :

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

The Purchaser and the Supplier agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other contract documents.
 - (a) the Letter of Acceptance

- (b) the Letter of Bid
 - (c) the Addenda Nos. _____ (if any)
 - (d) Special Conditions of Contract
 - (e) General Conditions of Contract
 - (f) the Specification (including Schedule of Requirements and Technical Specifications)
 - (g) the completed Schedules (including Price Schedules)
 - (h) any other document listed in GCC as forming part of the Contract
3. In consideration of the payments to be made by the Purchaser to the Supplier as specified in this Agreement, 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]*

Performance Security

Option 1: (Bank Guarantee)

[The bank, as requested by the successful Bidder, shall fill in this form in accordance with the instructions indicated]

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[insert name and Address of Purchaser]*

Date: *_ [Insert date of issue]*

PERFORMANCE GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *_ [insert name of Supplier, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the supply of *_ [insert name of contract and brief description of Goods and related Services]* (hereinafter called "the Contract").

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

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]*

(*_____*) *[insert amount in words]*,¹ such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without the Beneficiary needing to prove or to show grounds for

¹ The Guarantor shall insert an amount representing the percentage of the Accepted Contract Amount specified in the Letter of Acceptance, and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the Beneficiary.

your demand or the sum specified therein.

This guarantee shall expire, no later than the Day of, 2...², and any demand for payment under it must be received by us at this office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

² Insert the date twenty-eight days after the expected completion date as described in GC Clause 18.4. The Purchaser should note that in the event of an extension of this date for completion of the Contract, the Purchaser would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Purchaser might consider adding the following text to the form, at the end of the penultimate paragraph: “The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary’s written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.”

Advance Payment Security

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[Insert name and Address of Purchaser]*

Date: *[Insert date of issue]*

ADVANCE PAYMENT GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Supplier, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called “the Applicant”) has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of *[insert name of contract and brief description of Goods and related Services]* (hereinafter called “the Contract”).

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[insert amount in figures]* () *[insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* (_____) *[insert amount in words]*¹ upon receipt by us of the Beneficiary’s complying demand supported by the Beneficiary’s statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand,

¹ The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Purchaser.

stating either that the Applicant:

- (c) has used the advance payment for purposes other than toward delivery of Goods; or
- (d) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*.

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, has been certified for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*, whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

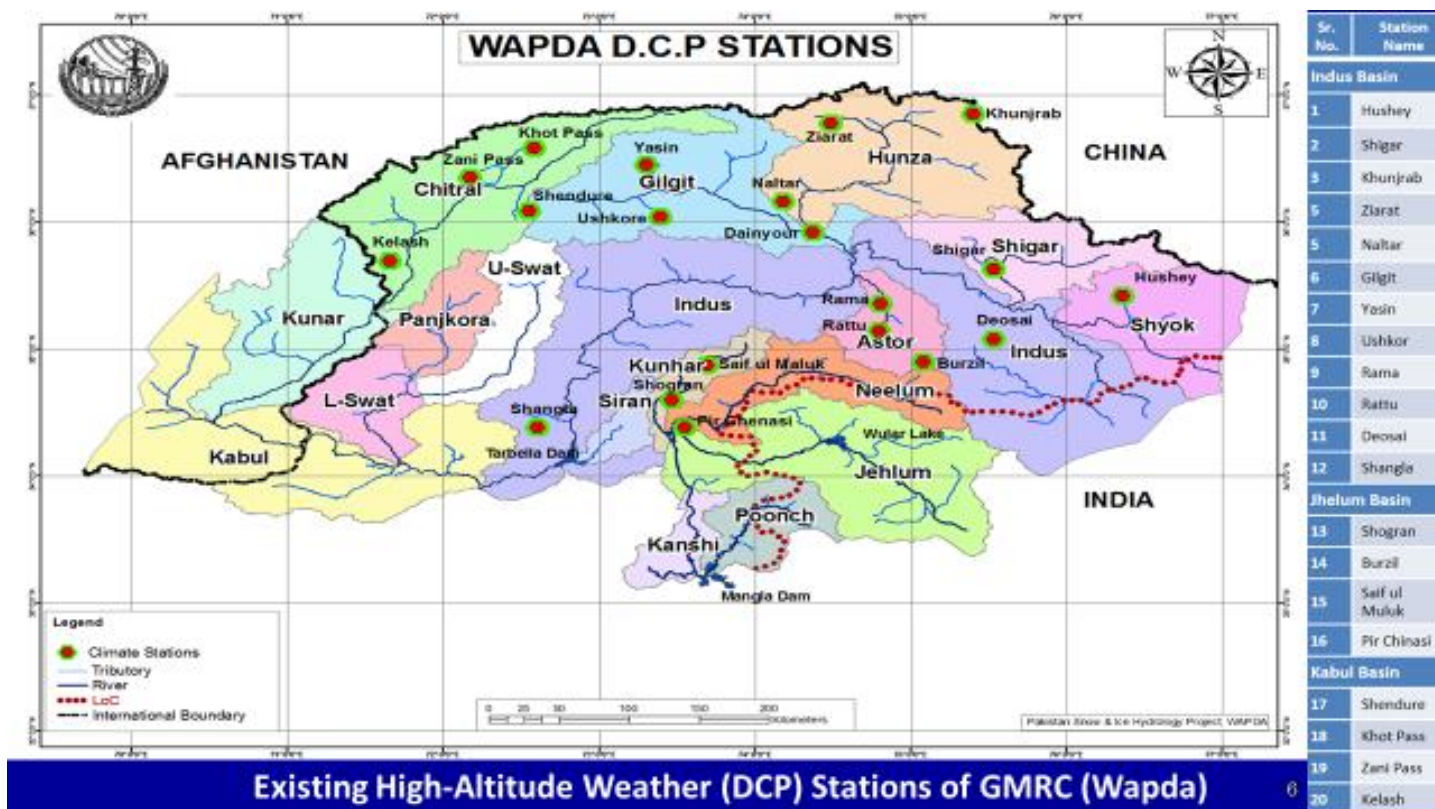
This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No.758, except that the supporting statement under Article 15(a) is hereby excluded.

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

ANNEXTURES

ANNEXTURE-I



List of 16 Existing Stations to be Up-graded

List of 16 Existing Stations to be Up-graded						
Sr. No	Name Existing Stations to be Up-Graded	Type of Station	Coordinates		Elevation m.a.s.l	GSM Availability
			Degree Decimal			
1.	Shigar	Automatic Weather Station	35.539	75.633325	2367	Available
2.	Rattu	Automatic Weather Station	35.15014167	74.79976389	2718	Available
3.	Rama	Automatic Weather Station	35.36047222	74.81408611	3179	Not Available
4.	Naltar	Automatic Weather Station	36.16111667	74.18362778	2898	Available
5.	Ushkor	Automatic Weather Station	36.039625	73.39882222	3051	Not Available
6.	Hushey	Automatic Weather Station	35.42237778	76.36021944	3075	Available
7.	Yasin	Automatic Weather Station	36.40120556	73.49999444	3280	Not Available
8.	Ziarat	Automatic Weather Station	36.82987222	74.42713333	3020	Not Available
9.	Deosai	Automatic Weather Station	35.08026944	75.53005833	4149	Not Available
10	Khunjerab	Automatic Weather Station	36.83934444	75.40506389	4730	Not Available
11	Burzil	Automatic Weather Station	34.90113611	75.17182778	4239	Available
12	Saif ul Muluk	Automatic Weather Station	34.881425	73.69266389	3230	Not Available
13	Khot Pass	Automatic Weather Station	36.51670833	72.59998056	3624	Not Available
14	Shendure	Automatic Weather Station	36.075175	72.51201111	3712	Not Available
15	Kelash	Automatic Weather Station	35.71581667	71.66612778	2920	Not Available
16	Zani Pass	Automatic Weather Station	36.34435278	72.18102778	3839	Available

ANNEXURE-II

1. Central Management Master Station

i. Central Server Hardware for Master Station

CPU Intel i7/Xeon quad-core or hexa-core
Mother Board : Intel original Motherland
Latest Registered version of Operating System
Hard Disk : 20 TB in RAID
RAM : 32 GB DDR4
Display : 24" color LED
Keyboard : 104 keys
Optical mouse (three button)
Speakers : In-built/320 W with multimedia compatibility
DUAL Layer DVD Writer
GeForce GPU compatible with OpenGL 3.2 and 2 GB RAM or better
56KBPS modem or better
6 USB Ports(at least two on front)
01 no. printer Parallel port
01 no. RS232 serial port
Redundant power supply & fans
Central Server Hardware must be Rack Mounted.

ii. Central Station Data Management Software with Tools and utilities with customized displays and reports

The installed Server/Data collection application Software have below mentioned features.

i. Central System

- Installation of the Data Management Server in as per site requirement, server should be in running condition before the installation of the sensors.
- Renovation of the room data centers as per site requirement or as per instructions of the GMRC officers.
- The central management software is capable to manage different transmission systems that are common in the hydrological and meteorological stations.
- It can implement network with more than 500 stations.
- It can implement network with the existing Hydro-Metrological stations.
- The software is capable of level-based flow measurement of each Hydrological site by incorporating rating tables of each Hydro-Metrological site. Furthermore, there is a provision in the software that it can calculate and display flow measurements of the sites by manually incorporating level of those sites.

- The software is capable to generate automatically reports with tables and graphics with different format CSV and Excel format.
- In the software it implements a validated command for managing stochastic data with formulas.
- Capable visualize images from CCTV Camera installed on the stations.
- The central system can provide centralized data collection, QA/QC, database management, statistical analysis, and archiving and publication capability.
- The central system can allow remote monitoring and diagnostics of the hydrological and meteorological stations' health and it should be possible to conduct routine online testing functionality of the stations.
- The central system is running on fault tolerant server with redundant components. It have the provision to upgrade the system to high availability cluster architecture capable of managing regional / national scale environment monitoring and early warning system.
- User interface for the central system is web based through a multi-level secure access control policy.

Note: International references from meteorological authorities for this software implementation are mandatory.

ii. Unified Data Collection

- The unified data collection in addition to WMO standards, have the capability to support and interface proprietary protocols and formats for communication with environmental monitoring stations as well as for data distribution and exchange of data with other stakeholders.
- The data collection is based on Windows or **open Linux platform** and can support standard WMO codes SYNOP, METAR/SPECI, CLIMAT, GRIB, BUFR, and is open for the support of proprietary/national codes.

iii. Database Management

The database system is based on WMO recommended practices for climatologically data processing (WMO1 Guide No. 100). The database system supported hot-standby mode to provide high availability solution. The central system is scalable to operate and maintain large networks of the marine stations. The number of stations which can be interfaced to the system should be limited only by the used communication infrastructure.

iv. Quality Control

The system have the capabilities for detailed quality control and verification of measured met data including textual, graphical and map-based analysis.

v. Data processing and visualization

The central system has capabilities for data processing, recalculations, and statistics and have real-time displays with visualization of measured data in multiple formats like; Text / Table / Graphic representation & displays / Time series / Statistics.

vi. Data export

The system has data archiving and export to various standard text form (ASCII, CSV, Excel, Access, log-files et c.) for export of data. The system have automatic / manual creating of standard WMO codes (BUOY, SYNOP etc.) as well as national / proprietary code forms with data verification.

vii. Alarms & Notification

An alarm notification is sent by the system via SMS or email in case of events like;

- User-defined thresholds and limits for met parameters
- Station component failure
- Communication errors
- Battery low

2. Client Workstations

Client workstation have the following hardware and software properties:

Hardware

(latest version i7)

Client computer i7, 16GB RAM DDR4 or better, 1TB SSD, 32" LED display, Latest version of Windows, Intel original Motherland, DUAL Layer DVD Writer, 56 kbps modem or better, 1000VA UPS

HSDPA GSM gateway (10/100 BaseT Ethernet port, GSM/ GPRS/ EDGE/ UMTS/ HSPA)
GSM antenna Client Workstation Hardware must be Rack mounted

Software

IMS 4.0 Lite software is capable to display Metrological data and to generate reports for all the AWS Stations and Integration with Main Master Station

3. Laptops for site commissioning of standard brand

Laptop for site commissioning of standard brand have the following hardware and software properties:

Brand	Any Leading Brand (Dell, HP, Lenovo etc.) or equivalent
Generation	At least 13th Generation or better
Processor Type	Intel® Core™ i7 or better
Installed RAM	At least 16 GB or better
Hard drive size	At least 512 GB NVMe™ SSD or better
Graphic Series	At least 4 GB Dedicated Graphic Card (AMD or NVIDIA) or better
Dedicated graphics	Yes
Type of graphics memory	Discrete
Backlight	LED
Screen size	At least 15.6'' or better
Screen surface	IPS, Amoled, anti-glare.
Screen resolution	At least 1920x1080 or better
Operating System	Windows 11 Home

Bluetooth	BT 5.0 or better
LAN	Yes
Speed	Network interface Integrated 10/100/1000 GbE LAN
Wireless/Wifi	Yes
Type	Intel® Wi-Fi 6 or better
Ports	USB Type-C, USB A, HDMI-out
HDMI	1 HDMI-out 2.1
Camera	Yes, 720p or better

Annexure-III

SITE PREPARATION DETAILS FOR AWS AND EXISTING FFT STATIONS**1. AWS ENCLOSURE**

Area of the AWS enclosure should be ideally 6 m x 8 m. The approach to the AWS Platform should be made free of obstacles like bushes; etc. and a suitable cement path for snow depth sensor must be laid on the site.

Imp Note: "In case of any practical problem regarding the site preparation, the decision of GMRC WAPDA official will be final & binding".

2. Fencing for the AWS SITE

- i. The height of the fencing for the AWS enclosure must be 2 meters from the ground level.
- ii. Fencing angle should be of size 50mm x 50mm x 6mm and pre coated with red-oxide. Length of the angle shall be 2.8 meters i.e. (2.0m above ground level+ 0.8m below ground level)
- iii. Each fencing angle must be erected over the concrete pillar of dimension 1' X 1' X 2' 9". The pillar must be 6 feet below the ground level and 9 inch above ground level. Fencing angles must be mounted within the concrete and chain link fixed around it.
- iv. Two MS angles must be used diagonally at each of the four corner angles of the sites. 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.
- v. Distance between each fencing angle should be not more than 1m.

3. Chain-link

- i. Dimensions of GI Chain-link: 3 inches x 3 inches and of gauge: 10 (3 mm diameter)
- ii. GI chain-link mesh must be stretched and welded/fixed properly on the fencing angles.
- iii. An iron 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 angle should be of 50mm x 50mm x 6mm & should have suitable length (so that it can be easily connected between two consecutive fencing angles).

4. GATE

- i. Dimensions: 2 m X 1 m X 6 mm (length x Width x Thickness) with locking facility.
- ii. The gate must be fabricated by MS Angle whose dimensions should be minimum 30mm X 30mm x 6mm.
- iii. Suitable locking facility with 3 keys for safety purposes is mandatory. Standard rust-proof locks like Godrei shall be used
- iv. Make sure that tower foundation and the gate are in a straight line.
- v. Gate and MS Angle must be well painted with white/silver color.
- vi. Gate should have proper support of MS angles with additional Support of cross. MS angles.

5. Local Earthing

- i. The lightning arrestor rod is mounted on the top of the mast (Length: 1m , Diameter 12mm. It must be pointed at the upper end)
- ii. A copper wire should be welded to the lightening arrestor rod (Length: 15m. Diameter 8mm)
- iii. The other end of the copper wire should be welded earthing rod (Length: 1.8m. Diameter: 15mm) The other end of the earthing rod should be welded in the middle of the copper plate (Dimension: 1'x 1'x0.5)

Earthing Procedure

- i. The earthing pit must be at least of 1.9 m depth & at least 2'x2' wide at bottom & 4'x4. wide at the top... it should be leveled & the copper plate should be buried in the earthing pit.
- ii. The copper rod should be in the middle of the pit. The earthing pit has to be filled in the sequence of "6 inches of salt + 6 inches of charcoal + 6 inches of sand". This sequence has to be repeated till the pit is filled to the top.
- iii. A GI Pipe of internal diameter 1" thickness 3 mm & length 2m (bent at 30° at lower end at 6" from the end) must be buried parallel to the Copper rod (At some distance from it), to pour water inside the pit during dry season.

Note. The earthing of the tower & the instrument must be done separately.

6. Painting

- i. The AWS Tower is painted in equal sections of alternate colors of red and white.
- ii. The fencing angles, chain-link fencing and gate should be properly painted in silver color to avoid rusting. All concrete foundation shall be painted using white cement.

GENERAL GUIDELINES FOR SELECTION OF AN AWS SITE

The contract involves the up-gradation of sixteen (16) existing AWS high-altitude stations installed in the Upper Indus Basin. Therefore, relocation of the existing sites is generally not required. However, in cases where GSM signal availability is inadequate at the current location, additional GSM/GPRS module needs to be installed to establish a link to ensure reliable communication and data transmission

Norms for site selection

1. The AWS is to be located on a level piece of ground, covered with natural earth approximately 15 meters X 12 meters in dimension.
2. The proposed AWS sit must be free from obstructions like tall buildings. Trees, etc.
3. The site should be free from any encumbrance.
4. Surroundings should be assessed for potential obstruction to selected sensors. Potential sensor contaminants (e.g. water and dust sources) should be identified)
5. Security aspect has to be given due consideration so as to avoid theft of AWS equipment
6. The site should preferably be located on the same level as the surrounding area of the station.
7. The distance between the fencing of the site and the existing AWS should be at least 15 feet (5 meters). This distance is recommended to minimize the effect of the fence on the sensors readings especially when weeds and/or debris on the fence act as a horizontal obstruction. Obstructions like tall buildings, trees etc

Conditions to be AVOIDED

1. Location of the site on the edge of a slope, hillocks, cliff or inside a valley
2. Large industrial heat sources
3. Location near high-tension power lines.
4. Rooftops, steep slopes, sheltered hollows, high vegetation, shaded areas or swamps should be avoided.
5. Low-lying places holding standing water after rains should be avoided.
6. Underground obstructions like buried cables or conduits should be avoided.
7. Pollution influence from surrounding farms and towns should be avoided.

PREPARATION OF CONCRETE FOR FOUNDATIONS:

Concrete Pillar foundation for AWS Fencing angle rods, gate, flooring for snow depth sensors should be mate as follows:

Concrete for Foundation and Flooring: 1:2:4
Plastering: 1:4



Figure-I: Sample for fencing and concrete base for the station.

ANNEXURE-IV

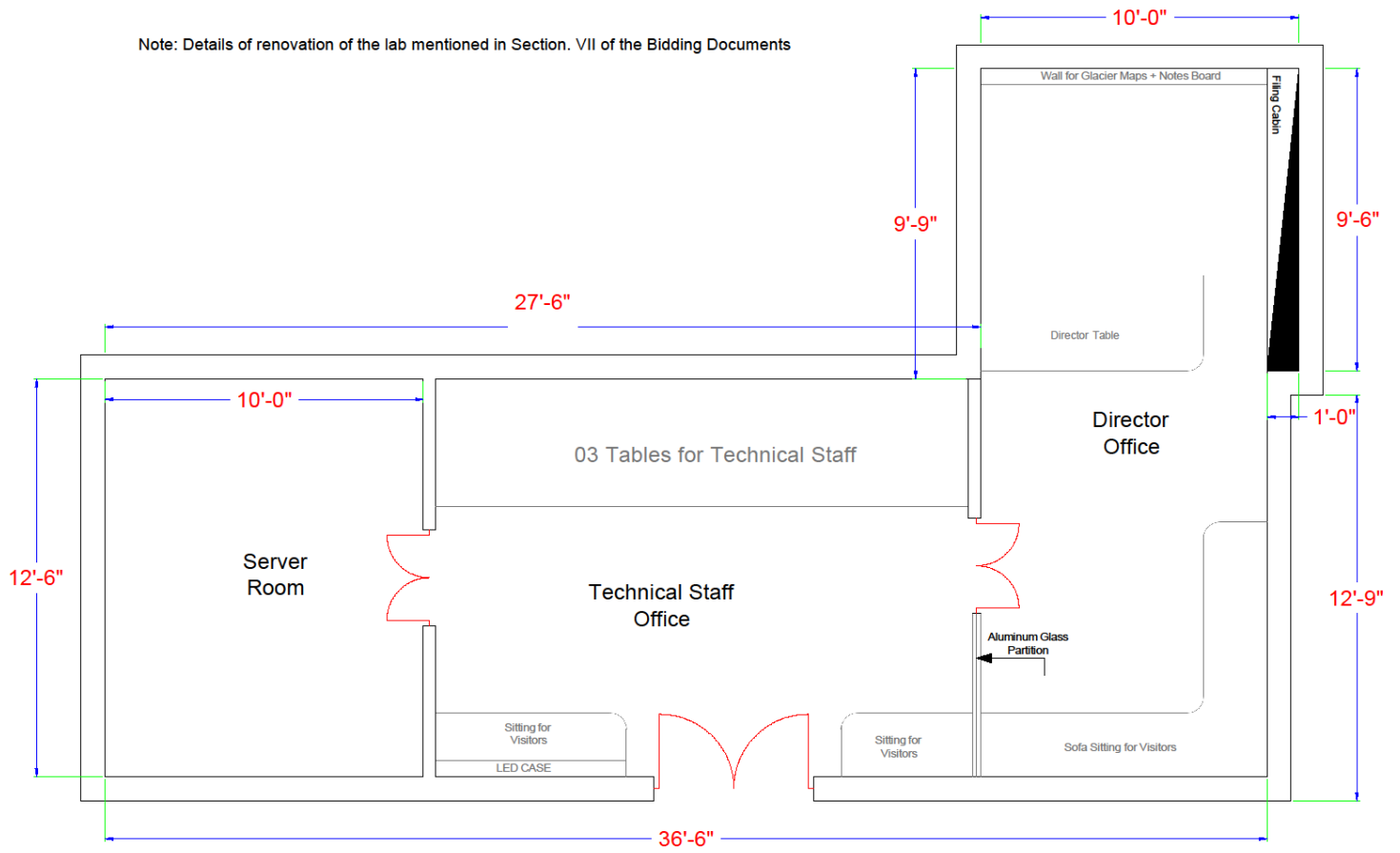
ABBREVIATIONS

AWS	Automatic Weather Station
BDS	Bid Data Sheet
BOQ	Bill of Quantities
CDR	Call Deposit Receipt
CIP	Carriage and Insurance Paid To
DDP	Delivered Duty Paid
EPADS	Electronic Pakistan Acquisition and Disposal System
EXW	Ex Works
FAT	Factory Acceptance Test
GMRC	Glacier Monitoring and Research Centre
HRM	Hydro Resources Management
IBRD	International Bank for Reconstruction and Development
ICB	International Competitive Bidding
IDA	International Development Association
IFB	Invitation for Bids
NCB	National Competitive Bidding
GSM	Global System for Mobile Communications
GPRS	General Packet Radio Service
M2M	Machine to Machine
WMO	World Meteorological Organization
SYNOP	Surface Synoptic Observations
BUFR	Binary Universal Form for the Representation
LED	Light-Emitting Diode
AWS	Automatic Weather Station
UTC	Universal Time Coordinated
EMC	Electromagnetic Compatibility
LVD	Low Voltage Directive
CCTV	Closed circuit TV
ARM	Advanced RISC Machines
SRAM	Static Random Access Memory
RTC	Real-Time Clock
UMTS	Universal Mobile Telecommunications System
SIM	Subscriber Identity Module
TDMA	Time Division Multiple Access
FDMA	Frequency Division Multiple Access
NOCT	Nominal Operating Cell Temperature

EVA	Ethylene Vinyl Acetate
NEMA	National Electrical Manufacturer Association
POM-C	Polyacetal (copolymer)
PUR	Polyurethane
SLC	Single-Level Cell
MTBF	Mean time between failures
MAC	Media Access Control
A/D	Analog to Digital
SDI	Serial digital interface
MPPT	Maximum Power Point Tracker
IP	Internet Protocol
IP	Ingress Protection
RTU	Remote Terminal Unit
NEMA	National Electrical Manufacturers Association
UV	Ultra-Violet
UNI	Italian National Unification
OEM	Original Equipment Manufacturer
OSRT	On Site Reliability Test

ANNEXURE-V

Note: Details of renovation of the lab mentioned in Section. VII of the Bidding Documents





INVITATION FOR BIDS (Single Stage – One Envelope)

Country: PAKISTAN
 Name of Project: Glacier Monitoring Research Centre, 197-WAPDA House, Lahore
 Loan No.: IBRD-86460
 Contract Title: Procurement of Supply, Installation, Testing and Commissioning of Equipment for Up-gradation of 16 Existing Weather Stations of GMRC in Upper Indus Basin under Dam Safety Component of Approved PC-I of T-5 HPP
 Reference No. PK-AF-TARBELA 4TH-571307-GO-RFB

1. The Water and Power Development Authority through Islamic Republic of Pakistan has received financing from the World Bank jointly with Wapda towards the cost of the T5 Hydropower Project and intends to apply part of the proceeds toward payments under the contract for "Procurement of Supply, Installation, Testing and Commissioning of Equipment for Up-gradation of 16 Existing Weather Stations of GMRC In Upper Indus Basin" under Dam Safety Component of Approved PC-I of T5 HPP.
2. The General Manager (HRM), WAPDA now invites sealed bids from eligible bidders having valid registration with Pakistan Engineering Council in C6 Category or above with specialization field of EE-04 (Telecommunication)/EE-06 (Instrumentation & Control/Electronics, registered with Income Tax and Sales Tax Departments and who are on Active Taxpayers List (ATL) of the Federal Board of Revenue, for the NCB NO. PK-AF-TARBELA 4TH-571307-GO-RFB, for procurement of "Supply, Installation, Testing and Commissioning of Equipment for Up-Gradation of 16 Existing Weather Stations of GMRC In Upper Indus Basin" The contract shall be completed in 365 days.
3. Bidding will be conducted through National Competitive Bidding (NCB) procedures as specified in the World Bank's Guidelines: Procurement of Goods, Works and Non-Consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers (January 2011, Revised July 2014) and is open to all eligible bidders/vendors/manufacturers etc as defined in the Procurement Guidelines. In addition, please refer to paragraphs 1.6 and 1.7 setting forth the World Bank's policy on conflict of interest.
4. Interested eligible Bidders may obtain further information from the O/o GM (HRM), WAPDA House, Lahore and inspect the bidding documents during office hours (0900 to 1600 hours) at the address given below (Serial-8)
5. A complete set of bidding documents in English may be obtained/collected by interested eligible Bidders upon the submission of a written application to the address below and upon payment of a non-refundable fee of Rs. 2500/-. The method of payment will be Cash Deposit/Pay Order/Demand Draft in favor of General Manager (HRM), WAPDA House, Lahore. Bidding documents can also be downloaded from (www.wapda.gov.pk.com) free of cost.
6. Sealed Bids must be delivered to the address below (Serial-8) on or before 21st October 2026 up to 11:00 hours. Electronic Bidding will not be permitted. Late Bids will be rejected. Bids will be publicly opened in the presence of the Bidder's designated representatives and anyone who chooses to attend at the address below (Serial- 8) on 21st October, 2026 at 11:30 hours.
7. All Bids must be accompanied by a Bid Security of Rs 8,000,000/- in the form of Unconditional Bank Guarantee issued by a scheduled Bank in Pakistan or in the form of Call Deposit Receipt (CDR) in favor of General Manager HRM WAPDA House Lahore.
8. The address referred to above is:
9. Attn: Mr. Gohar Zaman Bhabha
 General Manager (HRM) WAPDA
 O/O General Manager (Hydro Resources Management) WAPDA, Room # 241WAPDA House, Sharah-e-Quaid-e-Azam, Lahore, Pakistan. Postal Code: Lahore (54000), Pakistan.
 Tel: +92-42-99202631, 99202211/2291
 Fax: +92-42-99202795

Electronic mail address: gmpndwater@gmail.com or pdgmrcwapda@gmail.com

**GENERAL MANAGER (HRM)
228- WAPDA HOUSE LAHORE**

PID(L)

Website: www.wapda.gov.pk

PRD(L): WAPDA/078(2026-27)

20cm x 4col.