



**PMU SHRIMP AQUACULTURE,  
AQUACULTURE & FISHERIES DEPARTMENT,  
GOVERNMENT OF THE PUNJAB, LAHORE**



# **Tender Document**

**Procurement No: PD(PMUSAP)SES-5/2025-26**

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## **ELECTRICAL & POWER INFRASTRUCTURE WORKS SHRIMP ESTATE AT CHAK 58-NB, SARGODHA**

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**January, 2026**

**Submission Date for E-Bids: On or before February 16, 2026, 11:00 AM**  
9-A, Bahawalpur Road, Chauburji, Lahore – Pakistan  
email: [dfshrimpaqua@gmail.com](mailto:dfshrimpaqua@gmail.com) | Phone: 042-99211584 | Website: [punjabfisheries.gov.pk](http://punjabfisheries.gov.pk)

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## Section-I: Invitation to Bids

### 1.1 INVITATION TO BIDDERS

Bids/proposals are invited by the PMU Shrimp Aquaculture Punjab, Lahore from the bidders / EPC contractors for a Turn-Key project of “**Electrical & Power Infrastructure Works at Sargodha under the development project Establishment of Shrimp Estate with Value Chain Component at Chak 58-NB, Tehsil & District, Sargodha**”. All interested and eligible bidders are requested to go through the tender document carefully and provide relevant information along with the supporting documents mentioned in the tender document and submit online through EPADS portal.

							
<b>Invitation to Bid for Electrical &amp; Power Infrastructure Works</b>							
<p>PMU Shrimp Aquaculture Punjab, Aquaculture &amp; Fisheries Department, Government of Punjab, Lahore invites bids under <b>single stage two envelope</b> bidding procedure from well-reputed, experienced and the tax registered bidders / EPC contractors for a Turn-Key project of “<b>Electrical &amp; Power Infrastructure Works at Sargodha under the development project Establishment of Shrimp Estate with Value Chain Component at Chak 58-NB, Tehsil &amp; District, Sargodha</b>”. The interested bidders can download the bidding document containing details with evaluation criteria and terms &amp; conditions from EPADS Portal of Punjab PPRA (<a href="http://punjab.eprocure.gov.pk">punjab.eprocure.gov.pk</a>), PPRA website (<a href="http://ppra.punjab.gov.pk">ppra.punjab.gov.pk</a>), and Aquaculture &amp; Fisheries Department website (<a href="http://punjabfisheries.gov.pk">punjabfisheries.gov.pk</a>).</p>							
Sr. No.	Description	Procurement No.	Total Tenure of Contract	Bid Submission Deadline (Date & Time)	Technical Bid Opening Date & Time	Bid Security (% of Estimated Price) (PKR)	Estimated Price (PKR)
1	Electrical & Power Infrastructure Works with commissioning and one-year operational services	PD(PMUSAP) SES-5/2025-26	1 year & (02) two Months (Extendable)	On or before 16 February, 2026, 11:00 AM	February 16, 2026, at 11:30 AM	20,473,720	1,023,686,000
<p><b>Important Information:</b></p> <ul style="list-style-type: none"> <li>Bids submitted only through <b>EPADS</b> Portal of Punjab shall be accepted, submission by other means shall not be acceptable.</li> <li>The Bids will be opened in the presence of the bidder’s’ representatives who may choose to be present at the address below on the date and time stated above.</li> <li>The bidding procedure shall be strictly in accordance with the national competitive bidding procedure of Punjab Procurement Rules 2014.</li> </ul>							
<p><b>PMU Shrimp Aquaculture, Aquaculture &amp; Fisheries Department, Punjab</b> 9-A, Bahawalpur Road, Chauburji, Lahore – Pakistan. email: <a href="mailto:dfshrimpaqua@gmail.com">dfshrimpaqua@gmail.com</a>   Phone: 042-99211584   Website: <a href="http://punjabfisheries.gov.pk">punjabfisheries.gov.pk</a></p>							

## Section-II: Instructions to Bidders (ITB)

**Note:- All the procurement procedures shall be conducted in accordance with Punjab Procurement Authority Act-2009 and Punjab Procurement Rules-2014, Amended till date of advertisement. In case of any conflict between the provision of this document and PPRA Act-2009/ PPRA Rules-2014, the later shall prevail.**

## **2.1. Introduction**

### **2.1.1 Scope of Bid**

- i) The Procuring Agency (PA), as indicated in the Bid Data Sheet (BDS) invites Bids for the provision of Goods as specified in the Section-IV Bid Data Sheet (BDS) and Section III - Technical Specifications & Section VII- Schedule of Requirements. The successful Bidders will be expected to deliver, install/ commissioning) the goods within the specified period and timeline(s) as stated in the BDS.

### **2.1.2 Source of Funds**

- i) The Procuring Agency named in the Bid Data Sheet has received budget from the Government of Punjab. The Procuring Agency intends to apply the provided funds/ a portion of this budget to make eligible payments under the contract for which the Invitation to bids has been issued.

### **2.1.3 Eligible Bidders**

- i) The Invitation to Bids is open to all suppliers i.e. association of firms/companies/sole proprietor/ general order suppliers/ JVs, registered with relevant Registration Authorities and Tax Departments/ Authorities (Income Tax, Sales Tax & Punjab Sales Tax etc.) **[as specified in Section-IV Bid Data Sheet (BDS)]**, except as provided hereinafter.
- ii) Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consultancy services for the preparation of the design, specifications, and other documents to be used for the procurement of the goods to be purchased under this Invitation to Bids [if applicable].
- iii) Government-owned enterprises may participate only if they are duly/legally authorized in this regard by the respective/relevant competent forum/authority.
- iv) Bidders shall not be under a declaration of blacklisting by the Procuring Agency.

- v) In the case of a Joint Venture, Consortium, or Association, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The Joint Venture, Consortium, or Association shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture, consortium, or association during the Bidding process, and in case of award of contract, during the execution of contract.
- vi) The appointment of Lead Member in the Joint Venture, Consortium, or Association shall be confirmed by submission of a valid JV or Consortium agreement to the Procuring Agency.
- vii) Any agreement that form a Joint Venture, Consortium or Association shall be required to be submitted as part of the Bid and shall be attested.
- viii) Any bid submitted by the Joint Venture, Consortium or Association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated or post qualified with respect to its contribution only and the responsibilities of each party and shall not be substantially altered without prior written approval of the Procuring Agency and in line with any instructions issued by the Authority.
- ix) The invitation for Bids is open to all prospective Supplier, Manufacturers or Authorized Agents/Dealers/Distributors subject to any provisions or licensing/regulatory requirements issued by the respective National/ Provincial Professional Statutory Body established for that particular trade or business as mentioned in bid data sheet.
- x) A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be Non-Responsive. A Bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if they:
  - a) Are associated or have been associated for the procurement of the goods to be purchased under this Invitation for Bids, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consulting services for the preparation

of the design, specifications and other documents to be used.

- b) Have controlling shareholders in common; or
- c) Receive or have received any direct or indirect subsidy from any of them; or
- d) Have the same legal representative for purposes of this Bid; or
- e) Have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Agency regarding this Bidding process; or

xii) A Bidder may be ineligible if –

- (a) The Bidder is declared bankrupt or, in the case of company or firm, insolvent;
- (b) Payments in favor of the Bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting, in accordance with the national laws, in the total or partial loss of the right to administer and dispose of its property;
- (c) Legal proceedings are established against such Bidder involving an order suspending payments and which may result, in accordance with the national laws, in a declaration of bankruptcy or in any other situation entailing the total or partial loss of the right to administer and dispose of the property;
- (d) The Bidder is convicted, by a final judgment, of any offence involving professional conduct;
- (e) The Bidder is debarred and blacklisted due to involvement in corrupt and fraudulent practices in accordance with the provision of section 17A of PPRA Act, 2009 and Rule-21, read with Schedule appended with, Punjab Procurement Rules, 2014.
- (f) The Bidder is debarred and blacklisted in general (i.e. to the extent of all public procurement) due to consistent performance failure in accordance with the section 17A of PPRA Act, 2009 and Rule-21, read with Schedule appended with, Punjab Procurement Rules, 2014.

- (g) The firm, supplier and contractor is blacklisted/ debarred by any international organization.
- xiii) Bidders shall provide to the Procuring Agency evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.
- xiv) Bidders shall provide such evidence of their continued eligibility satisfactory to the Procuring Agency, as the Procuring Agency shall reasonably request.
- xv) Bidders shall submit proposals relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract amounting to more than ten percent of the Bid price is envisaged.

**2.1.4. Eligible Goods and Services**

- i) All goods and related services to be supplied under the Contract shall have their origin in eligible source countries, defined in the *Bid Data Sheet (BDS/Technical Specification)*, and all expenditures made under the contract will be limited to such goods and related services.
- ii) For purposes of this clause, “origin” means the place where the goods are mined, grown, or produced, or the place from which the related services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially-recognized product is obtained that is substantially different in basic characteristics or in purpose or utility from its components.
- iii) The origin of goods and services is distinct from the nationality of the Bidder. *In any case, the requirements of Rules 10 & 26 of PPR-14, shall be followed.*

**2.1.5. Cost of Bidding**

- i) The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Procuring Agency named in the Bid Data Sheet, hereinafter referred to as “the Procuring Agency,” will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding process.

**2.1.6. One person one bid**

- i) As per Rule 36A of Punjab Procurement Rules 2014, a Bidder shall submit only one Bid in the same bidding process, either

individually as a Bidder or as a member in a joint venture or any similar arrangement.

- ii) No Bidder can be a sub-contractor while submitting a Bid individually or as a member of a joint venture in the same Bidding process.
- iii) A Bidder, if acting in the capacity of sub-contractor in any Bid, shall not submit bid for the same.

## **2.2. The Bidding Documents**

### **2.2.1. Content of Bidding Documents**

- i) The goods required, Bidding procedures, and contract terms are prescribed in the Bidding documents. The Bidding documents, inter alia, include:
  - (a) Invitation to Bids
  - (b) Instructions to Bidders (ITB)
  - (c) Technical Specifications
  - (d) Bid Data Sheet
  - (e) General Conditions of Contract (GCC)
  - (f) Special Conditions of Contract (SCC)
  - (g) Schedule of Requirements
  - (h) Bid Form
  - (i) Manufacturer's Authorization Form
  - (j) Bidder Profile Form
  - (k) General Information Form
  - (l) Affidavit
  - (m) Bid Security Form
  - (n) Technical Bid Form
  - (o) Contract Form

- (p) Financial Bid Form / Price Schedule
  - (q) Performance Guarantee Form
  - (r) Check List
- ii) The Bidder is required to examine all instructions, forms, terms, and specifications in the Bidding documents. Failure to furnish all information as required by the Bidding documents or to submit a Bid not responsive to the Bidding documents in every respect will be at the Bidder's risk and may result in the rejection of its Bid.
  - iii) In case of discrepancies between the Invitation to Bid and the Bidding Documents listed in **ITB 2.2.1 (i)** above, the said Bidding Documents, not in conflict with any provision of PPR-14, will take precedence.
  - iv) The Procuring Agency is not responsible for the completeness of the Bidding Documents and their addenda, if they were not obtained directly from the Procuring Agency or from its website or website of PPRA. Re-confirming from the Procuring Agency that all pages/ contents have been properly and clearly received is the prime responsibility of the Bidder.

**2.2.2. Clarification of Bidding Documents**

- i) A prospective Bidder requiring any clarification of the Bidding documents may notify the Procuring Agency in writing or by email at the Procuring Agency's address indicated in Invitation to Bid/ Tender Notice/ Advertisement. The Procuring Agency will respond in writing to any request for clarification of the Bidding documents which it receives no later than seven (7) days prior to the deadline for the submission of Bids prescribed in the Bid Data Sheet. Written copies of the Procuring Agency's response (including an explanation of the query but without identifying) will be sent to all prospective Bidders that have received the Bidding documents.
- ii) A prospective Bidder requiring any clarification of the Bidding Documents may notify the Procuring Agency in writing or in electronic form that provides record of the content of communication at the Procuring Agency's address indicated in the **BDS**.

- iii) The Procuring Agency will within three (3) working days after receiving the request for clarification, respond in writing or in electronic form to any request for clarification provided that such request is received not later than seven (7) days prior to the deadline for the submission of Bids. As prescribed in **ITB 2.2.2 (i), above**. However, this clause shall not apply in case of alternate methods of Procurement.
- iv) Copies of the Procuring Agency's response will be uploaded on the website of procuring agency on given date and forwarded to identified Prospective Bidders through an expeditious identified source of communication, e.g.: e-mail etc., including a description of the inquiry, but without identifying its source.
- v) Should the Procuring Agency deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so following the procedure under **ITB 2.2.3**.
- vi) If indicated **in the BDS**, the Bidder's designated representative is invited at the Bidder's cost to attend a pre-Bid meeting at the place, date and time mentioned **in the BDS**. During this pre-Bid meeting, prospective Bidders may request clarification of the schedule of requirement, the Evaluation Criteria or any other aspects of the Bidding Documents.
- vii) Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be transmitted promptly to all prospective Bidders who have obtained the Bidding Documents and by uploading same on the website of the procuring agency. Any modification to the Bidding Documents that may become necessary as a result of the pre-Bid meeting shall be made by the Procuring Agency exclusively through the use of an Addendum pursuant to ITB 2.2.3. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

**2.2.3. Amendment of Bidding Documents**

- i) At any time prior to the deadline for submission of Bids, but not later than three (3) days before the closing date of the submission of Bid, the Procuring Agency, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, may modify the Bidding documents by amendment. Any such change/amendment in the Bidding documents shall be provided in a timely manner,

preferably through electronic means also, not later than three (3) days, and on equal opportunity basis as per Rule-25(3) OR Rule 25(4) of PPR-14 as the case may be.

- ii) In order to allow prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Procuring Agency, at its discretion, may extend the deadline for the submission of Bids, as per rule 29 of PPR-14, in the manner similar to the original advertisements, so as to avoid any inconvenience and to doubly ensure level playing field for all prospective bidders.

### **2.3. Preparation of Bids**

#### **2.3.1. Language of Bid**

- i) The Bid prepared by the Bidder, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Procuring Agency shall be written in the language specified in the Bid Data Sheet. Supporting documents and printed literature furnished by the Bidder may be in same language.

#### **2.3.2. Bid Form**

- i) The Bidder shall complete the Bid Form and the appropriate Price Schedule (Financial Bid) furnished in the Bidding documents, indicating the goods to be supplied, a brief description of the goods, their country of origin, quantity, and prices.

#### **2.3.3. Bid Prices**

- i) The Bidder shall indicate on form 8.10 the unit prices (where applicable) and total Bid price of the goods it proposes to supply under the contract.
- ii) Prices indicated on the Price Schedule shall be item wise.
- iii) The Bidder's separation of price components in accordance with ITB Clause 2.3.3(ii) above will be solely for the purpose of facilitating the comparison of Bids by the Procuring Agency and will not in any way limit the Procuring Agency's right to contract on any of the terms offered.
- iv) 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 Bid Data Sheet. A

Bid submitted with an **adjustable price quotation** will be treated as non-responsive and may be rejected.

**2.3.4. Bid Currencies**

- i) Prices shall be quoted in **Pak Rupees** for local/DDP items unless otherwise specified in the Bid Data Sheet.

**2.3.5. Documents Establishing Bidder's Eligibility and Qualification**

- i) Pursuant to ITB Clause 2.1.3, the Bidder shall furnish, as part of its Bid, documents establishing the Bidder's eligibility to Bid and its qualifications to perform the contract if its Bid is accepted.
- ii) The documentary evidence of the Bidder's eligibility to Bid shall establish to the Procuring Agency's satisfaction that the Bidder, at the time of submission of its Bid, is eligible as defined under ITB Clause 2.1.3.
- iii) The documentary evidence, of the Bidder's qualifications to perform the contract if its Bid is accepted, shall establish to the Procuring Agency's satisfaction:
  - (a) that, in the case of a Bidder offering to supply goods under the contract which the Bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the goods' Manufacturer [*Manufacturer's Authorization form No. 8.3*] or producer to supply the same in Pakistan;
  - (b) that the Bidder has the financial, technical, and production capability necessary to perform the contract;
  - (c) that, in the case of a Bidder not doing business within Pakistan, the Bidder is or will be (if awarded the contract) represented by an Agent in that 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
  - (d) that the Bidder meets the qualification criteria listed in the Bid Data Sheet.

**2.3.6. Documents Establishing Goods' Eligibility and Conformity to Bidding Documents**

- i) Pursuant to ITB Clause 2.1.4, the Bidder shall furnish, as part of its Bid, documents establishing the eligibility and conformity to the Bidding documents of all goods and related services which the Bidder proposes to supply under the contract.

- ii) The documentary evidence of the eligibility of the goods and services shall consist of a statement in the Price Schedule/Financial Bid Form of the country of origin of the goods and services offered which shall be confirmed by a **Certificate of Origin** issued at the time of shipment.
- iii) The documentary evidence of conformity of the goods and services to the Bidding documents may be in the form of literature, drawings, data and shall consist of:
  - (a) a detailed description of the essential technical and performance characteristics of the goods;
  - (b) 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 for a period to be specified in the Bid Data Sheet, following commencement of the use of the goods by the Procuring Agency; and
  - (c) an item-by-item commentary on the Procuring Agency's Technical Specifications demonstrating **responsiveness** of the goods and services to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications.
- iv) For purposes of the commentary to be furnished, the Bidder shall note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated by the Procuring Agency in its Technical Specifications, are intended to be descriptive only and not restrictive.
- v) Where a sample(s) is required by a procuring agency, the sample shall be:
  - (a) submitted as part of the bid, in the quantities, dimensions and other details requested in the **BDS**;
  - (b) carriage paid;
  - (c) received on, or before, the closing time and date for the submission of bids; and
  - (d) Evaluated to determine compliance with all characteristics listed in the **BDS**.

*{However, the procuring agency may also opt to ask for samples after submission of technical bids (where require)}*

- vi) The Procuring Agency may retain the sample(s) of the successful Bidder till the successful delivery of the goods. A Procuring Agency may reject the Bid if the sample(s)-
  - (a) do(es) not conform to all characteristics prescribed in the bidding documents; and
  - (b) is/are not submitted within the specified time clearly mentioned in the Bid Data Sheet.
- vii) Where it is not possible to avoid using a propriety article as a sample, a Bidder shall make it clear that the propriety article is displayed only as an example of the type or quality of the goods being Bided for, and that competition shall not thereby be limited to the extent of that article only.
- viii) Samples made up from materials supplied by a Procuring Agency shall not be returned to a Bidder nor shall a Procuring Agency be liable for the cost of making them.
- ix) All samples produced from materials belonging to an unsuccessful Bidder may be kept by the Procuring Agency till thirty (30) days from the date of award of contract or exhaust of all the grievance forums (including those pending at Authority's Level or in some Court of Law).
- x) **Pursuant to the requirements as indicated in ITB 2.3.6, the Bidder shall furnish, as part of its Bid, all those documents establishing the eligibility in conformity to the terms and conditions specified in the Bidding Documents for all goods and related services which the Bidder proposes to deliver.**
- xi) The Bidder shall also furnish a list giving full particulars, including available sources and current prices of goods, 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 Procuring Agency.
- xii) The required documents and other accompanying documents must be in English. In case any other language than English is used the pertinent translation attested by the embassy in

country of manufacturer into English shall be attached to the original version.

### 2.3.7. Bid Security

- i) The Bidder shall furnish, as part of its Bid, a Bid security in the amount specified in the Bid Data Sheet.
- ii) The Bid security is required to protect the Procuring Agency against the risk of Bidder's conduct which would warrant the security's forfeiture Pursuant to ITB Clause 2.3.8. (vii).
- iii) The Bid security shall be in Pakistan Rupees and shall be in one of the following forms:
  - (a) Bank Guarantee, Bank call-deposit (CDR), Demand Draft (DD), Pay Order (PO) or Banker's cheque valid for Sixty (60) Days, beyond the validity of Bid.
- iv) Any Bid not secured in accordance with ITB Clauses 2.3.8 (i) and (ii) may be rejected by the Procuring Agency as non-responsive.
- v) Unsuccessful Bidders' Bid security will be discharged or returned as promptly as possible but not later than Thirty (30) days after the expiration of the period of Bid validity prescribed by the Procuring Agency pursuant to ITB Clause 2.3.8 (ii) or along with unopened financial proposal as per rule 38(2)(a)(vii) of PPR-14, which shall take precedence, and is as under:

*“38(2)(a)(vii) the financial proposal of the Bids found technically non-responsive shall be retained unopened and shall be returned on the expiry of the grievance period or the decision of the complaint, if any, filed by the non-responsive Bidder, whichever is later:*

*provided that the Procuring Agency may return the sealed financial proposal earlier if the disqualified or non-responsive Bidder, contractor or consultant submits an affidavit, through an authorized representative, to the effect that he is satisfied with the proceedings of the Procuring Agency”.*

- vi) The successful Bidder's Bid security will be discharged upon the Bidder signing the contract, pursuant to ITB Clause 2.6.1, and furnishing the Performance Guarantee, pursuant to ITB Clause 2.6.2.
- vii) The Bid security may be forfeited:

- a. If a Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Bid Form; or
- b. In the case of a successful Bidder, if the Bidder:
  - i. Fails to sign the contract in accordance with ITB Clause 2.6.3; **or**
  - ii. Fails to furnish Performance Guarantee in accordance with ITB Clause 2.6.2; or
  - iii. If the blacklisting proceedings under Section-17A of PPRA Act, 2009 read with Rule-21 of PPR-14 are initiated and the bidder is declared blacklisted after due process of law.

**2.3.8. Period of Validity of Bids**

- i) Bids shall remain valid for the period specified in the Bid Data Sheet after the date of Bid opening prescribed by the Procuring Agency. A Bid valid for a shorter period may be rejected by the Procuring Agency as non-responsive.
- ii) In exceptional circumstances, the Procuring Agency may solicit the Bidder's consent to an extension of the period of validity (as per rule-28 of PPR-14). The request and the responses thereto shall be made in writing (or by email). The Bid security provided under ITB Clause 2.3.8 shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid security. A Bidder accepting the request will not be required nor permitted to modify its Bid.

**2.3.9. Format and Signing of Bid**

- i) The Bidder shall prepare an original and the number of copies of the Bid indicated in the Bid Data Sheet, clearly marking each "ORIGINAL BID" and "COPY OF BID," as appropriate. In the event of any discrepancy between them, the original shall prevail.
- ii) The Bidder shall authorize a person/ persons for signing, submission and further correspondence with Procuring Agency on behalf of bidder. Authority letter must be part of bid. However, in case of any issue bidder shall be responsible for all consequences.
- iii) The original and the copy or copies of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person duly authorized to bind the Bidder to the contract. All

pages of the Bid, shall be signed and stamped by the authorized person.

- iv) Any interlineation, erasures, or overwriting shall be valid only if they are initialed by the authorized person for signing the Bid.
- v) The original and the copy or copies of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or 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, shall be signed and stamped by the authorized person.
- vi) Any interlineations, erasures, or overwriting shall be valid only if they are signed by the person or persons signing the Bidder.
- vii) The Bidder shall furnish information as described in the Form of Bid on commissions or gratuities, if any, paid or to be paid to agents relating to this Bid and to contract execution if the Bidder is awarded the contract.

## **2.4. Submission of Bids**

### **2.4.1 Sealing and Marking of Bids**

- i) As per Rule 24, the Bidder shall seal the original and each copy of the Bid in separate envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." The envelopes shall then be sealed in an outer envelope.
- ii) The inner and outer envelopes shall:
  - a. be addressed to the Procuring Agency at the address given in the Bid Data Sheet; and
  - b. bear the title of procurement Activity indicated in the Bid Data Sheet, the Invitation to Bids (ITB) title and number indicated in the Bid Data Sheet, and a statement: "DO NOT OPEN BEFORE..... (time and date)," *[to be completed with the time and the date specified in the Bid Data Sheet, pursuant to ITB Clause 2.4.2.]*
- iii) The inner envelopes shall also indicate the name and address of the Bidder to enable the Bid to be returned unopened in case it is declared "late".

- iv) If the outer envelope is not sealed and marked as required by ITB Clause 2.4.1 (i), the Procuring Agency will assume no responsibility for the Bid's misplacement or premature opening.
- v) In case of Single Stage One Envelope Procedure, the Bidder shall seal the original and each copy of the Bid in separate envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." The envelopes shall then be sealed in an outer envelope securely sealed in such a manner that opening and resealing cannot be achieved undetected.  
**Note:** The envelopes shall be sealed and marked in accordance with the bidding procedure adopted as referred in Rule-38 of PPR-2014, which shall have precedence.
- vi) The inner and outer envelopes shall:
  - a) Be addressed to the Procuring Agency at the address given in the **BDS**; and
  - b) Bear the title of the subject procurement or Project name, as the case may be as indicated in the **BDS**, the Invitation to Bids (ITB) title and number indicated in the **BDS**, and a statement: "DO NOT OPEN BEFORE," to be completed with the time and the date specified in the **BDS**, pursuant to **ITB 2.4.2**.
- vii) In case of Single Stage Two Envelope Procedure, The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Proposal and the other Financial Proposal. Both envelopes to be enclosed together in an outer single envelope called the Bid. Each Bidder shall submit his bid as under:
  - a) Bidder shall submit his **TECHNICAL PROPOSAL** and **FINANCIAL PROPOSAL** in separate inner envelopes and enclosed in a single outer envelope.
  - b) **ORIGINAL** and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such.
  - c) The envelopes containing the **ORIGINAL** and copies will be put in one sealed envelope and addressed / identified as given in **BDS**.
- viii) The inner and outer envelopes shall:
  - a) be addressed to the Procuring Agency at the address provided in the **BDS**;

- b) bear the name and identification number of the contract as defined in the BDS; and provide a warning not to open before the time and date for bid opening, as specified in the BDS, pursuant to ITB 2.4.2;
- c) In addition to the identification required in Sub- Clause (b) hereof, the inner envelope shall indicate the name and address of the Bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to ITB.2.4.3.

ix) If all envelopes are not sealed and marked as required by **ITB 2.4.1** or incorrectly marked, the Procuring Agency will assume no responsibility for the misplacement or premature opening of Bid.

**2.4.2 Deadline for Submission of Bids**

- i) Bids must be received by the Procuring Agency at the address specified under BDS no later than the time and date specified in the Bid Data Sheet. Bids received through courier services shall not be entertained.
- ii) The Procuring Agency may, at its discretion and as per rule 29 of PPR-14, extend this deadline for the submission of Bids by amending the Bidding documents in accordance with ITB Clause 2.2.2 & 2.2.3 in which case all rights and obligations of the Procuring Agency and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

**2.4.3. Late Bids**

- iii) Bids shall be received by the Procuring Agency at the address specified under **BDS** no later than the date and time specified in the **BDS**.
- i) Any Bid received by the Procuring Agency after the deadline for submission of Bids prescribed by the Procuring Agency pursuant to ITB Clause 2.4.2 will be rejected and returned unopened to the Bidder.
- ii) The Procuring Agency shall not consider for evaluation any Bid that arrives after the deadline for submission of Bids.
- iii) Any Bid received by the Procuring Agency after the deadline for submission of Bids shall be declared late, recorded, rejected and returned unopened to the Bidder.

**2.4.4. Modification and Withdrawal of Bids**

- i) The Bidder may modify or withdraw its Bid after the Bid's submission, provided that written notice of the modification,

including substitution or withdrawal of the Bids, is received by the Procuring Agency prior to the deadline prescribed for submission of Bids.

- ii) The Bidder's modification or withdrawal notice shall be prepared, sealed, marked, and dispatched in accordance with the provisions of Clause (i) A withdrawal notice may also be sent by email, but followed by a signed confirmation copy, postmarked not later than the deadline for submission of Bids.
- iii) No Bid may be modified after the deadline for submission of Bids.
- iv) No Bid may be withdrawn 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 Bid Form. Withdrawal of a Bid during this interval may result in the Bidder's forfeiture of its Bid security (along with other remedies available under PPR-14), pursuant to the ITB Clause 2.3.8 (vii).
- v) A Bidder may withdraw its Bid after it has been submitted, provided that written notice of the withdrawal of the Bid, is received by the Procuring Agency prior to the deadline for submission of Bids.
- vi) Revised bid may be submitted after the withdrawal of the original bid before the deadline for submission of Bids.

## **2.5. Opening and Evaluation of Bids**

### **2.5.1. Opening of Bids by the Procuring Agency**

- i) The Procuring Agency will open all Bids, in public, in the presence of Bidders' or their representatives who choose to attend, and other parties with a legitimate interest in the Bid proceedings at the place, on the date and at the time, specified in the **BDS**. The Bidders' representatives present shall sign a register/attendance sheet as proof of their attendance.
- ii) First, envelopes marked "WITHDRAWAL" shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding Withdrawal Notice contains a valid authorization to request the withdrawal and is read out at bid opening-

- iii) Second, outer envelopes marked “SUBSTITUTION” shall be opened. The inner envelopes containing the Substitution Bid shall be exchanged for the corresponding Original Bid being substituted, which is to be returned to the Bidder unopened. No envelope shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.
- iv) Next, outer envelopes marked “MODIFICATION” shall be opened. No Technical Proposal and/or Financial Proposal shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at the opening of the Bids. Any Modification shall be read out along with the Original Bid except in case of Single Stage Two Envelope Procedure where only the Technical Proposal, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Financial Proposal, both Original and Modification, will remain unopened till the prescribed financial bid opening date.
- v) Other envelopes holding the Bids shall be opened one at a time, in case of Single Stage One Envelope Procedure, the Bidders names, the Bid prices, the total amount of each Bid, the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring Agency may consider appropriate, will be announced by the Procurement Evaluation Committee.
- vi) In case of Single Stage Two Envelope Procedure, the Procuring Agency will open the Technical Proposals in public at the address, date and time specified in the **BDS** in the presence of Bidders` designated representatives who choose to attend and other parties with a legitimate interest in the Bid proceedings. The Financial Proposals will remain unopened and will be held in custody of the Procuring Agency until the specified time of their opening.
- vii) The envelopes holding the Technical Proposals shall be opened one at a time, and the following read out and recorded: (a) the name of the Bidder; (b) the presence of a Bid Security, if required; and (c) Any other details as the Procuring Agency may consider appropriate.

- viii) Bidders are advised to send in a representative with the knowledge of the content of the Bid who shall verify the information read out from the submitted documents. Failure to send a representative or to point out any un-read information by the sent Bidder's representative shall indemnify the Procuring Agency against any claim or failure to read out the correct information contained in the Bidder's Bid.
- ix) No Bid will be rejected at the time of Bid opening except for late Bids which will be returned unopened to the Bidder, pursuant to **2.4.3 (i)**.
- x) The Procuring Agency shall prepare minutes of the Bid opening. The record of the Bid opening shall include, as a minimum: the name of the Bidder and whether or not there is a withdrawal, substitution or modification, the Bid price if applicable.
- xi) The Bidders' representatives who are present shall be requested to sign on the attendance sheet. The omission of a Bidder's signature on the record shall not invalidate the contents and affect the record.
- xii) Minutes of the Financial Bid Opening shall be recorded and uploaded by the procuring agency on its website or shared to all bidders through e-mail.

**2.5.2.  
Confidentiality**

- i) Information relating to the examination, clarification, evaluation and comparison of Bids and recommendation of contract award shall not be disclosed to Bidders or any other persons not officially concerned with such process until the time of the announcement of the respective evaluation report in accordance with the requirements of rule 37 of PPR-14.
- ii) Any effort by a Bidder to influence the Procuring Agency processing of Bids or award decisions may result in the rejection of its Bid.
- iii) Notwithstanding **ITB Clause 2.2.2** from the time of Bid opening to the time of contract award, if any Bidder wishes to contact the Procuring Agency on any matter related to the Bidding process, it should do so in writing or in electronic forms that provides record of the content of communication.

### **2.5.3. Clarification of Bids**

- i) As per rule 33(2) of PPR-14, to assist in the examination, evaluation and comparison of Bids and post-qualification of the Bidders, the Procuring Agency may, at its discretion, ask any Bidder for a clarification of its Bid including breakdown of prices to determine its reasonability. Any clarification submitted by a Bidder that is not in response to a request by the Procuring Agency shall not be considered.
- ii) The request for clarification and the response shall be in writing or in electronic forms that provide record of the content of communication. In case of Single Stage Two Envelope Procedure, no change in the prices or substance of the Bid shall be sought, offered, or permitted. Whereas in case of Single Stage One Envelope Procedure, only the correction of arithmetic errors discovered by the Procuring Agency in the evaluation of Bids should be sought in accordance with ITB Clause 2.5.6.
- iii) The alteration or modification in The Bid which in any way affect the following parameters will be considered as a change in the substance of a bid:
  - a) Evaluation & qualification criteria;
  - b) Required scope of work or specifications;
  - c) All securities requirements;
  - d) Tax requirements;
  - e) Terms and conditions of bidding documents.
  - f) Change in the ranking of the Bidder
- iv) From the time of Bid opening to the time of Contract award if any Bidder wishes to contact the Procuring Agency on any matter related to the Bid it should do so in writing or in electronic forms that provide record of the content of communication.

### **2.5.4. Preliminary Examination**

- i) The Procuring Agency will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order.
- ii) Arithmetical errors will be rectified on the following basis:-
  - a. If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price

and quantity, the unit price shall prevail, and the total price shall be corrected. If the Supplier does not accept the correction of the errors, its Bid may be rejected, and its Bid security may be forfeited.

- b. If there is a discrepancy between words and figures, the amount in words will prevail.
  
- iii) Prior to the detailed evaluation, the Procuring Agency will determine the responsiveness of each Bid to the Bidding documents, pursuant to ITB Clause 2.5.5. For purposes of these Clauses, a responsive Bid is one which conforms to all the terms and conditions of the Bidding documents without material deviations. Deviations from, or objections or reservations to critical provisions, **such as** those concerning **Bid Security** (ITB Clause 2.3.8), **Applicable Law** (GCC Clause 30), **Taxes and Duties** (GCC Clause 32) & mandatory Registrations/ Renewals will be deemed to be a material deviation. The Procuring Agency's determination of a Bid's responsiveness is to be based on the contents of the Bid itself without recourse to extrinsic evidence.
  
- iv) If a Bid is not responsive, it will be rejected by the Procuring Agency and may not subsequently be made responsive by the Bidder by correction of the non-conformity.
  
- v) Prior to the detailed evaluation of Bids, the Procuring Agency will determine whether each Bid:
  - a) Meets the eligibility criteria defined in **ITB 2.1.3** and **ITB 2.1.4**;
  - b) Has been prepared as per the format and contents defined by the Procuring Agency in the Bidding Documents;
  - c) Has been properly signed;
  - d) Is accompanied by the required securities; and
  - e) Is responsive to the requirements of the Bidding Documents.

The Procuring Agency's determination of a Bid's responsiveness will be based on the contents of the Bid itself.

**2.5.5. Examination of Terms and Conditions;**

- i) The Procuring Agency shall examine the Bid to confirm that all terms and conditions specified in the **GCC** and the **SCC** have

**Technical Evaluation**

been accepted by the Bidder without any material deviation or reservation.

- ii) The Procuring Agency shall evaluate the technical aspects of the Bid submitted to confirm that all requirements specified in **Section III-Technical Specifications, Section VII – Schedule of Requirements & Evaluation Criteria as provided in BDS**, have been met without material deviation or reservation.
- iii) If after the examination of the terms and conditions and the technical evaluation, the Procuring Agency determines that the Bid is not responsive in accordance, it shall reject the Bid.

**2.5.6. Correction of Errors**

- i) Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -
  - a) If there is a discrepancy between unit prices and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected, unless in the opinion of the Procuring Agency there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;
  - b) If there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; and
  - c) Where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.
  - d) Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bid, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.
- ii) The amount stated in the Bid will, be adjusted by the Procuring Agency in accordance with the above procedure for the correction of errors. The concurrence of the Bidder shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, its Bid will then be rejected, and the Bid Security may be forfeited or the Bid Securing Declaration may be executed in accordance with **ITB 2.3.8**.

**2.5.7. Conversion to Single Currency**

- i) As per rule 32(2) of PPR-14, to facilitate evaluation and comparison, the Procuring Agency will convert all Bid prices

expressed in the amounts in various currencies in which the Bid prices as follows:

For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate, prevailing on the date of opening of (financial) bids specified in the bidding documents, as notified by the National Bank of Pakistan on that day, in case of holiday in National Bank of Pakistan on the day of opening financial bids, then previous working day's ex-change rates will prevail.

**2.5.8. Post-  
Qualification &  
Evaluation of Bids**

- i) In the absence of **prequalification**, the Procuring Agency will determine to its satisfaction whether the Bidder is qualified to perform the contract satisfactorily, in accordance with the evaluation criteria listed in BDS & pursuant to ITB Clause 2.1.3.
- ii) The determination will take into account the Bidder's financial, technical, and production/ supplying capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB Clause 2.3.6, as well as such other information required for eligibility/qualification expressed in Bid Data Sheet as the Procuring Agency deems necessary and appropriate.
- iii) The Procuring Agency will **technically evaluate** and compare the Bids which have been determined to be responsive, pursuant to ITB Clause 2.5.5, as per Technical Specifications required.
- iv) The **financial evaluation** of a Bid will be on the basis of form of Price Schedules/ Financial Bid Form 8.10 to be decided by the Procuring Agency which must include clear cut instruction regarding item wise or package wise evaluation inclusive of prevailing taxes, duties, fees etc.

**2.5.9. Contacting  
the Procuring  
Agency**

- i) Subject to ITB Clause 2.5.3, no Bidder shall contact the Procuring Agency on any matter relating to its Bid, from the time of the Bid opening to the time the evaluation report is made public i.e. 10 days before the contract is awarded. If the Bidder wishes to bring additional information or has grievance to the notice of the Procuring Agency, it should do so in writing.

**2.5.10. Grievance Redressal**

- ii) Any effort by a Bidder to influence the Procuring Agency during Bid evaluation, or Bid comparison may result in the rejection of the Bidder's Bid.
- i) As per Rule-67 of PPR-14, Procuring Agency shall constitute a Grievance Redressed Committee (GRC) comprising of odd number of persons with proper powers and authorization to address the complaints. The GRC shall not have any of the members of the Procurement Evaluation Committee. The Committee may preferably have one subject specialist depending upon the nature of the procurement in addition to one person with legal background as per their availability to the Procuring Agency.
- ii) Any Bidder feeling aggrieved can file its written complaint against the eligibility parameters or any other terms and conditions prescribed in the Bidding documents found contrary to provision of Rule 33, and the same shall be addressed by the Procuring Agency well before the proposal submission deadline.
- iii) Any party can file its written complaint against the eligibility parameters or any other terms and conditions prescribed in the bidding documents found contrary to provision of Rule 34 and the same shall be addressed by the Procuring Agency well before the proposal submission deadline.
- iv) Any Bidder feeling aggrieved by any act of the Procuring Agency after the submission of his Bid may lodge a written complaint concerning his grievances not later than ten days after the announcement of the Final evaluation reports. In case of single stage - two envelope bidding procedure any bidder feeling aggrieved from technical evaluation may file a grievance within 5 days of announcement of the technical evaluation report. After completion of the technical evaluation process, the procuring agency shall immediately upload the technical evaluation report on the website of PPRA and Procuring Agency for obtaining/ receiving grievance petitions from the prospective bidders (if any).
- v) In case, the complaint/grievance is filed after the issuance of the final evaluation report, the complainant cannot raise any objection on technical evaluation of the report. Provided that

the complainant may raise the objection on any part of the final evaluation report in case where single stage one envelop bidding procedure is adopted.

- vi) The GRC shall investigate and decide upon the complaint within fifteen days of the receipt of the complaint. Mere fact of lodging of a complaint shall not warrant suspension of the procurement process.

## **2.6. Award of Contract**

### **2.6.1. Notification of Award**

- i) Prior to the expiration of the period of Bid validity, the Procuring Agency will notify the successful Bidder in writing by registered letter and by email to be confirmed in writing by registered letter, that its Bid has been accepted.
- ii) The notification of award will constitute the formation of the Contract.
- iii) Upon the successful Bidder's furnishing of the Performance Guarantee pursuant to ITB Clause 2.6.2 (i), the Procuring Agency will promptly notify each unsuccessful Bidder and will discharge its Bid security, pursuant to ITB Clause 2.3.8 (v).

### **2.6.2. Performance Guarantee**

- i) Within fifteen (15) days of the receipt of notification of award from the Procuring Agency, the successful Bidder shall furnish the Performance Guarantee in accordance with the Conditions of Contract, in the Performance Guarantee Form provided in the Bidding documents, or in another form acceptable to the Procuring Agency.
- ii) Failure of the successful Bidder to comply with the requirement of ITB Clause (i) above or ITB Clause 2.6.3 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid security along with other remedies available under PPR-14. After that, the Procuring Agency may decide to award the contract to the next lowest evaluated Bidder, keeping in view the Bid validity time, or call for new Bids keeping in view the concept of value for money as defined under rule-2(ae) read with Principles of Procurement as enunciated in rule-4 of PPR-14.

### **2.6.3. Signing of Contract/**

- i) At the same time as the Procuring Agency notifies the successful Bidder that its Bid has been accepted, the Procuring

**Issuance of  
Purchase Order**

Agency will send the Bidder the Contract Form provided in the Bidding documents, incorporating all agreements between the parties or will issue the purchase order.

- ii) Under rule-63 of PPR-14, where the Procuring Agency requires formal signing of contract, **within fifteen (15) days of receipt of the Contract Form**, the successful Bidder shall sign and mention date of the contract and return it to the Procuring Agency.
- iii) Where no such formal signing is required by the procuring agency, the procuring agency shall issue purchase order after the receipt of required performance guarantee, as per rule 55 of PPR-14.

**2.6.4. Award  
Criteria**

- i) Subject to ITB Clause 2.6.2, under rule-55 of PPR-14, the Procuring Agency will award the contract to the successful Bidder whose Bid has been determined to be responsive and has been determined to be the lowest evaluated Bid, provided that the Bidder has been determined to be qualified to perform the contract satisfactorily.

**2.6.5. Procuring  
Agency's Right to  
Vary Quantities at  
Time of Award**

- i) The Procuring Agency reserves the right at the time of contract award to increase or decrease the quantity of goods and services originally specified in the Schedule of Requirements without any change in unit price or other terms and conditions, on the analogy of rule-59 (c)(iv) of PPR-14 (not more than 15%).

**2.6.6. Procuring  
Agency's Right to  
Accept or Reject  
All Bids**

- i) As per rule 35 of PPR-14, the Procuring Agency reserves the right to accept or reject all Bids or proposals (and to annul the Bidding process) at any time prior to the acceptance of any Bid or proposal, without thereby incurring any liability towards the Bidders.
- ii) The Bidders shall be promptly informed about the rejection of the Bids, if any
- iii) The Procuring Agency shall upon request communicate to any Bidder, the grounds for its rejection of all Bids or proposals, but shall not be required to justify those grounds.

### **2.6.7. Re-Bidding**

- i) If the Procuring Agency rejects all the Bids under rule 35, it may proceed with the process of fresh Bidding but before doing that it shall assess the reasons for rejection and may, if necessary, revise specifications, evaluation criteria or any other condition for Bidders.

### **2.6.8. Corrupt or Fraudulent Practices**

- i) The Procuring Agency Bidders, Suppliers, and Contractors observe the highest standard of ethics during the procurement and execution of contracts.

“Corrupt practices” in respect of procurement process, shall be as given in S-2 (d) of PPRA, Act, 2009, which is as follows:

*“(d) “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official, bidder or Contractor in the procurement process or in Contract execution to the detriment of the procuring agency; or misrepresentation of facts in order to influence a procurement process or the execution of a Contract, collusive practices among bidders (prior to or after bid submission) designed to establish bid prices at artificial, noncompetitive levels and to deprive the procuring agency of the benefits of free and open competition and any request for, or solicitation of anything of value by any public official in the course of the exercise of his duty; it may include any of the following:*

- i. Coercive practice by impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence the actions of a party to achieve a wrongful gain or to cause a wrongful loss to another party;*
- ii. Collusive practice by arrangement between two or more parties to the procurement process or Contract execution, designed to achieve with or without the knowledge of the procuring agency to establish prices at artificial, noncompetitive levels for any wrongful gain;*
- iii. Offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence the acts of another party for wrongful gain;*
- iv. 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;*
- v. Obstructive practice by harming or threatening to harm, directly or indirectly, persons or their property to influence their*

*participation in a procurement process, or affect the execution of a Contract or deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements before investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; 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 acts intended to materially impede the exercise of inspection and audit process.”*

**ii) Blacklisting & Debarment:**

Blacklisted Bidders i.e. firms/companies/sole proprietor/ general order suppliers/ JVs etc. and those found involved in “Corrupt Practices” are not allowed to participate in bidding.

**Requirements & Procedure for Blacklisting & Debarment:**

As per S-17A of PPRA, Act, 2009:

**“17A. Blacklisting.–** (1) *A procuring agency may, for a specified period and in the prescribed manner, debar a bidder or Contractor from participating in any public procurement process of the procuring agency, if the bidder or Contractor indulges in corrupt practice or any other prescribed practice.*

(2) *The Managing Director may, in the prescribed manner, debar a bidder or Contractor from participating in any public procurement process of all or some of the procuring agencies for a specified period.*

(3) *Any person, aggrieved from a decision of a procuring agency, may within prescribed period prefer a representation before the Managing Director.*

(4) *A procuring agency or any other person, aggrieved from a decision of the Managing Director, may within prescribed period prefer a representation before the Chairperson whose decision on such representation shall be final.]*

As per rule 21 of PPR-14:

**21. Blacklisting.–**(1) *A procuring agency may, for a specified period, debar a bidder or Contractor from participating in any public*

*procurement process of the procuring agency, if the bidder or Contractor has:*

*(a) acted in a manner detrimental to the public interest or good practices;*

*(b) consistently failed to perform his obligation under the Contract;*

*(c) not performed the Contract up to the mark; or*

*(d) indulged in any corrupt practice.*

*(2) If a procuring agency debars a bidder or Contractor under sub-rule (1), the procuring agency:*

*(a) shall forward the decision to the Authority for publication on the website of the Authority; and*

*(b) may request the Authority to debar the bidder or Contractor for procurement of all procuring agencies.*

*(3) The Managing Director may debar a bidder or Contractor of any procuring agency from participating in any public procurement process of all or some of the procuring agencies for such period as the Managing Director may determine.*

*(4) Any person aggrieved by a declaration made under rule 20 or a decision under sub-rule (1) of this rule may, within thirty days from the date of the publication of the information on the website of the Authority, file a representation before the Managing Director and the Managing Director may pass such order on the representation as he may deem fit.*

*(5) Any person or procuring agency aggrieved by an order under sub-rule (3) or (4) may, within thirty days of the order, file a representation before the Chairperson and the Chairperson may pass such order on the representation as he may deem appropriate.*

*(6) The mechanism or process for barring a bidder or Contractor from participating in procurement process of a procuring agency, procuring agencies and a representation under this rule is specified in the Schedule appended to these rules.*

*As per Schedule appended with PPR-14:*

#### **SCHEDULE**

*see sub-rule (6) of rule 21*

#### **BLACKLISTING MECHANISM OR PROCESS**

- 1. The procuring agency may, on information received from any resource, issue show cause notice to a bidder or Contractor.*
- 2. The show cause notice shall contain:*

- (a) *precise allegation, against the bidder or Contractor;*
  - (b) *the maximum period for which the procuring agency proposes to debar the bidder or Contractor from participating in any public procurement of the procuring agency; and*
  - (c) *the statement, if needed, about the intention of the procuring agency to make a request to the Authority for debarring the bidder or Contractor from participating in public procurements of all the procuring agencies.*
3. *The procuring agency shall give minimum of seven days to the bidder or Contractor for submission of written reply of the show cause notice.*
  4. *In case, the bidder or Contractor fails to submit written reply within the requisite time, the procuring agency may issue notice for personal hearing to the bidder or Contractor/ authorize representative of the bidder or Contractor and the procuring agency shall decide the matter on the basis of available record and personal hearing, if availed.*
  5. *In case the bidder or Contractor submits written reply of the show cause notice, the procuring agency may decide to file the matter or direct issuance of a notice to the bidder or Contractor for personal hearing.*
  6. *The procuring agency shall give minimum of seven days to the bidder or Contractor for appearance before the specified officer of the procuring agency for personal hearing.*
  7. *The procuring agency shall decide the matter on the basis of the available record and personal hearing of the bidder or Contractor, if availed.*
  8. *The procuring agency shall decide the matter within fifteen days from the date of personal hearing unless the personal hearing is adjourned to a next date and in such an eventuality, the period of personal hearing shall be reckoned from the last date of personal hearing.*
  9. *The procuring agency shall communicate to the bidder or Contractor the order of debarring the bidder or Contractor from participating in any public procurement with a statement that the bidder or Contractor may, within thirty days, prefer a representation against the order before the Managing Director of the Authority.*

10. *The procuring agency shall, as soon as possible, communicate the order of blacklisting to the Authority with the request to upload the information on its website.*
11. *If the procuring agency wants the Authority to debar the bidder or Contractor from participating in any public procurement of all procuring agencies, the procuring agency shall specify reasons for such dispensation.*
12. *The Authority shall immediately publish the information and decision of blacklisting on its website.*
13. *In case of request of a procuring agency under para 11 or representation of any aggrieved person under rule 21, the Managing Director shall issue a notice for personal hearing to the parties and call for record of proceedings of blacklisting. The parties may file written statements and documents in support of their contentions.*
14. *In case of representation of any aggrieved person or procuring agency under rule 21, the Chairperson shall issue a notice for personal hearing to the parties and may call for the record of the proceedings. The parties may file written statements and documents in support of their contentions.*
15. *In every order of blacklisting under rule 21, the procuring agency shall record reasons of blacklisting and also reasons for short, long or medium period of blacklisting.*
16. *The Authority shall upload all the decisions under rule 21, available with it, on its website. But the name of a bidder or Contractor shall immediately be removed from the list of blacklisted persons on expiry of period of blacklisting or order of the competent authority to that effect, whichever is earlier.*
17. *An effort shall be made for electronic communication of all the notices and other documents pursuant to this mechanism or process.”*

iii) Furthermore, Bidders must keep themselves aware of the provision stated in clause 5.4 and clause 24.1 of the General Conditions of Contract.

**2.6.9. Quantity and volume of the goods to be considered in mind**

- i) While quoting the rate in a framework contract, the Bidder must consider the following facts:
  - a. Certain volume and quantity of the goods as prescribed in Bid Data Sheet.

*[Framework  
Contract Modality]*

- b. The Bidder have to maintain the rates of the goods for the whole financial year.
- c. The Bidder should quote the rate as per Price Schedule/ Financial Bid form. In case of non-observance of prescribed format, Financial Bid may be rejected.

## **Section-III. Technical Specifications**

### **3.1. Scope of Work**

The Works under this Contract shall comprise execution of the following two integrated components under a **single contract with unified responsibility**:

#### **Component–I: Solar Power Systems for Farm Tubewells**

This component includes design, supply, installation, testing and commissioning of solar photovoltaic power systems including modules, VFDs, mounting structures, cabling, protection devices, monitoring systems and integration with the internal electrical network.

#### **Component–II: Genset & Internal Electrification with Integration**

This component includes supply, installation, testing and commissioning of diesel generator sets, internal power distribution systems, switchgear, cabling, earthing, protection systems, load balancing, integration of all three power systems having synchronization arrangements, and all associated civil and electrical works required for safe and reliable operations of ponds complex comprises 167 shrimps ponds and other associated installation as per below given, component wise BOQs/Drawings/Specifications.

The Contractor shall be fully responsible for integration, compatibility and coordinated operation of all three components.

Project Delivery Period: Commissioning time will be 60 days from the effective date of contract and further one year of operation after commissioning.

Delay in the delivery of the project will result in a penalty applicable to the bidder/contractor. The penalty shall be one (0.1%) percent per day, not exceeding a total of ten (10%) of the total value of the contract. Such penalty may be deductible from the amount secured as a Performance Guarantee / invoice from the Contractor.

- 0.1% per day delay upto 10% of contract value.

**BILL OF QUANTITIES (BOQS)  
RELATED TO 58-NB SITE,  
SARGODHA**

**RFP Package**  
**SHRIMP ESTATE AT**  
**Sargodha**  
**58NB (Phase-1+2)**

**BOQ Package**  
**Solar Systems**

SHRIMP ESTATE PROJECT						
SOLAR & STRUCTURE ESTIMATE						
SUMMARY OF COST ESTIMATE						
S. No	DESCRIPTION					AMOUNT
1	80KW FOR 4 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		27			
	58NBxPh-2 Cluster		9			
	TOTAL COST OF# CLUSTERS Including cost of applicable Taxes		36			
2	80KW FOR 2 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		4			
	58NBxPh-2 Cluster		-			
	TOTAL COST OF# CLUSTERS Including cost of applicable Taxes		4			
3	60KW FOR 1 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		13			
	58NBx Ph-2 Cluster		5			
	TOTAL COST OF #CLUSTERS Including cost of applicable Taxes		18			
3	40KW FOR 1 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		-			
	58NB-Ph-2 Cluster		5			
	TOTAL COST OF #CLUSTERS Including cost of applicable Taxes		5			



80 KW-

## 4 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>80kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier-1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC(IEC) or Equivalent; Busbar 9 or Higher	138.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>18.5KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control (≥98.5% efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be -10°C to +60°C with proper grounding (≤3 ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	4.0	Nos.		Rs -
<b>LV Panel &amp; DC combiner Box</b>					
3	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	4.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				
	Paint should be All cubical shall be painted in textured white colour.				
	Fishnet Flexible Earth Strips to be used for earthing housing of panels				

80 KW-

## 4 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Phase Separators should be used.				
	Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 24x24x8 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	Inverter Connection : 2x40 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 1x 40AFP C/O Switch				
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTs-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	4.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
4	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	4.0	Nos		Rs -
5	99.99% Pure Copper Earthing ¾" dia & 10 ft long copper rod as earth electrode , below ground level including cost of boring and lowering the rod (20ft down complete with clamp and 2x16mm2 stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover with Earth Enhancement GEM /Betonite Chemical, complete in all respects. for AC Earthing + DC Earthing + Lightning Protection	12.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less then 2% from Grid LV DB to Inverters.</i>					
6	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC (For PV Panel to DC Combiner Box Only)	700.0	Rft		Rs -
7	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC (For nearest PV System Combiner Box to Control Room)	500.0	Rft		Rs -
8	DC cables 10 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC (For 3 furthest cluser , DC Combiner to Control Room.)	1,500.0	Rft		Rs -
9	AC Cables XLPE/PVC 0.6/1kV , 4core 16mmsq for 18.5 KW Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-v)</b>	150.0	Rft		Rs -
10	AC Cables XLPE/PVC 0.6/1kV , 4core 70mmsq from 80 KW LV Combiner to Building LT Panel <b>(Mrs 24-12b-ix)</b>	200.0	Rft		Rs -
11	Earthing Cable for Inverter & LV Panel 35 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	600.0	Rft		Rs -

80 KW-

## 4 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
12	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V (Mrs 24-10-iv)	300.0	Rft		Rs -
13	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V (Mrs 24-8c-iii)	500.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
16	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement (50' each) (Mrs 24-99-i)	200.0	Rft		Rs -
17	1" Diameter PVC Pipe, Class E with sockets end (Mrs 24-03(a)-iii)	500.0	Rft		Rs -
18	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
19	Miscellaneous accessories including Nuts/bolts, screws,Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
20	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects for all 4 PV Sides	1.0	Job		Rs -
22	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
23	Total (Excl Civil Works) Including cost of all applicable Taxes				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.
- 1) Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 2) Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - 3) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
  - 4) Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

- Note:**
- 6 - Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels.  
Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file
  - Contractor shall be reponsible on provided all PPE's to its installation team including Saftey Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 80KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b>					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	4,471.20		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	320.76		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(a)-2	Cft	121.50		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	768.00		-
	<b>Steel Reinforcement</b>					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b>					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-					
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg	1,411.90		-
	<b>Steel Structure</b>					
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg	6,400.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg	6,400.00		-
						-
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.					
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent co					
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. P					
4	MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuinness certificate shall be submitted to consultant's office. MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.					
5	Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<p><b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b></p>					
6	<p>Note:                      - Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.                      - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file                      - Contractor shall be responsible on provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines</p>					

80 KW-

## 2 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>80kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier-1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC(IEC) or Equivalent; Busbar 9 or Higher	137.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>37.5KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control (≥98.5% efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be -10°C to +60°C with proper grounding (≤3 ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	2.0	Nos.		Rs -
<b>LV Panel</b>					
3	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	2.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				

80 KW-

## 2 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Paint should be All cubical shall be painted in textured white colour.				
	Fishnet Flexible Earth Strips to be used for earthing housing of panels				
	Phase Separators should be used.				
	Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 12x18x16 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	Inverter Connection : 2x75 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 2x 75AFP C/O Switch				
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTs-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
4	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	2.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
5	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	4.0	Nos		Rs -
6	99.99% Pure Copper Earthing ¾" dia & 10 ft long copper rod as earth electrode , below ground level including cost of boring and lowering the rod (20ft down complete with clamp and 2x16mm2 stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover with Earth Enhancement GEM /Betonite Chemical, complete in all respects. for AC Earthing + DC Earthing + Lightning Protection	6.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less than 2% from Grid LV DB to Inverters.</i>					
7	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	250.0	Rft		Rs -
8	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	200.0	Rft		Rs -
9	DC cables 25 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	800.0	Rft		Rs -
10	AC Cables XLPE/PVC 0.6/1kV , 4core 25mmsq for 37.5 KW Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-vi)</b>	250.0	Rft		Rs -
11	AC Cables XLPE/PVC 0.6/1kV , 4core 70mmsq from 80 KW LV Combiner to Building LT Panel <b>(Mrs 24-12b-ix)</b>	375.0	Rft		Rs -
12	Earthing Cable for Inverter & LV panel 35 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	300.0	Rft		Rs -

80 KW- 2 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
13	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V (Mrs 24-10-iv)	400.0	Rft		Rs -
14	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V (Mrs 24-8c-iii)	300.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
17	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement (Mrs 24-99-i)	200.0	Rft		Rs -
18	1" Diameter PVC Pipe, Class E with sockets end (Mrs 24-03(a)-iii)	300.0	Rft		Rs -
19	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
20	Miscellaneous accessories including Nuts/bolts, screws, Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
21	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects for all 2 PV Sides	1.0	Job		Rs -
23	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
24	<b>Total (Excl Civil Works) Including cost of all applicable Taxes</b>				<b>Rs -</b>

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.
- Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
  - Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

Note:

- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file  
Contractor shall be responsible for provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 80KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b>					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	4,471.20		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	320.76		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete (prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting, curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(á)-2	Cft	121.50		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	768.00		-
	<b>Steel Reinforcement</b>					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-					
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg	1,411.90		-
	<b>Steel Structure</b>					
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg	6,400.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg	6,400.00		-
					<b>Total :</b>	-
					including all applicable taxes	
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.					
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent co					
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. F					
4	MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office. MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.					
5	Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
6	<p>Note:</p> <ul style="list-style-type: none"> <li>- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.</li> <li>- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file</li> <li>- Contractor shall be responsible on provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines</li> </ul>					

60 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>60kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier- 1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC/IEC) or Equivalent; Busbar 9 or Higher	104.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>55KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control (≥98.5% efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be -10°C to +60°C with proper grounding (≤3 ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	1.0	Nos.		Rs -
<b>LV Panel</b>					
3	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	1.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				
	Paint should be All cubical shall be painted in textured white colour.				

60 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Fishnet Flexible Earth Strips to be used for earthing housing of panels Phase Separators should be used. Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 12x18x16 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	AC Breakers Incomer : 125 ATP MCCB , Icu RC=> 25kA				
	Inverter Connection : 2x100 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 1x 100AFP C/O Switch				
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTs-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
4	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	1.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
5	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	3.0	Nos		Rs -
6	99.99% Pure Copper Earthing ¾" dia & 10 ft long copper rod as earth electrode , below ground level including cost of boring and lowering the rod (20ft down complete with clamp and 2x16mm <sup>2</sup> stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover with Earth Enhancement GEM /Betonite Chemical, complete in all respects. for AC Earthing + DC Earthing + Lightning Protection	3.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less then 2% from Grid LV DB to Inverters.</i>					
7	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	250.0	Rft		Rs -
8	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	300.0	Rft		Rs -
9	DC cables 35 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	400.0	Rft		Rs -
10	AC Cables XLPE/PVC 0.6/1kV , 4core 35mmsq for 18.5 KW Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-vii)</b>	250.0	Rft		Rs -

60 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
11	AC Cables XLPE/PVC 0.6/1kV , 4core 50mmsq from 80 KW LV Combiner to Building LT Panel <b>(Mrs 24-12b-viii)</b>	250.0	Rft		Rs -
12	Earthing Cable for Inverter 25 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-v)</b>	250.0	Rft		Rs -
13	Earthing Cable for LV Panel 35 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	250.0	Rft		Rs -
14	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-10-iv)</b>	250.0	Rft		Rs -
15	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V <b>(Mrs 24-8c-iii)</b>	250.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
18	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement <b>(Mrs 24-99-i)</b>	200.0	Rft		Rs -
19	1" Diameter PVC Pipe, Class E with sockets end <b>(Mrs 24-03(a)-iii)</b>	300.0	Rft		Rs -
20	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
21	Miscellaneous accessories including Nuts/bolts, screws,Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
22	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects	1.0	Job		Rs -
24	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
25	Total (Excl Civil Works) <b>Including cost of all applicable Taxes</b>				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.
- Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
  - Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

**Note:**

- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels.  
Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file
- Contractor shall be reponsible on provided all PPE's to its installation team including Saftey Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 60KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual- 2025	UNIT	QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	3,353.40		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	240.57		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual- 2025	UNIT	QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(á)-2	Cft	91.13		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	576.00		-
	<b>Steel Reinforcement</b>					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-					
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg	1,058.93		-
	<b>Steel Structure</b>					
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg	4,800.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg	4,800.00		-
					<b>Total :</b>	-
					including all applicable taxes	
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.					
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact					
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furthermco					



40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>40kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier-1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC(IEC) or Equivalent; Busbar 9 or Higher	69.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>37.5KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control ( $\geq 98.5\%$ efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be $-10^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ with proper grounding ( $\leq 3$ ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	1.0	Nos.		Rs -

40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
<b>LV Panel</b>					
6	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	1.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				
	Paint should be All cubical shall be painted in textured white colour.				
	Fishnet Flexible Earth Strips to be used for earthing housing of panels				
	Phase Separators should be used.				
	Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 12x18x16 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	AC Breakers Incomer : 100 ATP MCCB , Icu RC=> 25kA				
	Inverter Connection : 1x75 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 2x 75AFP C/O Switch				

40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTS-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	1.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
7	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	3.0	Nos		Rs -
8	99.99% Pure Copper Earthing Veractor Cone / Spike Size 2" thick, 12" long as shown in drawings or ¾" dia & 10 ft long copper rod as earth electrode 100 ft or upto the water level, below ground level including cost of boring and lowering the rod (100ft / upto the water level) down. complete with clamp and 2x16mm2 stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover for AC Earthing + DC Earthing + Lightning Protection	3.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less then 2% from Grid LV DB to Inverters.</i>					
9	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	250.0	Rft		Rs -
10	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	100.0	Rft		Rs -
10	DC cables 25 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	400.0	Rft		Rs -
11	AC Cables XLPE/PVC 0.6/1kV , 4core 25mmsq Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-vi)</b>	150.0	Rft		Rs -
12	AC Cables XLPE/PVC 0.6/1kV , 4core 35mmsq LV Combiner to Building LT Panel <b>(Mrs 24-12b-vii)</b>	150.0	Rft		Rs -
13	Earthing Cable for Inverter & LV panel 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	150.0	Rft		Rs -
14	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	150.0	Rft		Rs -
15	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V <b>(Mrs 24-8c-iii)</b>	150.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
18	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement <b>(Mrs 24-99-i)</b>	100.0	Rft		Rs -

40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
19	1" Diameter PVC Pipe, Class E with sockets end <b>(Mrs 24-03(a)-iii)</b>	150.0	Rft		Rs -
20	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
21	Miscellaneous accessories including Nuts/bolts, screws, Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
22	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects	1.0	Job		Rs -
23	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
	Total (Excl Civil Works) <b>Including cost of all applicable Taxes</b>				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.
- 1)
  - 2) Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 3) Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARS.
  - 5) Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

6)

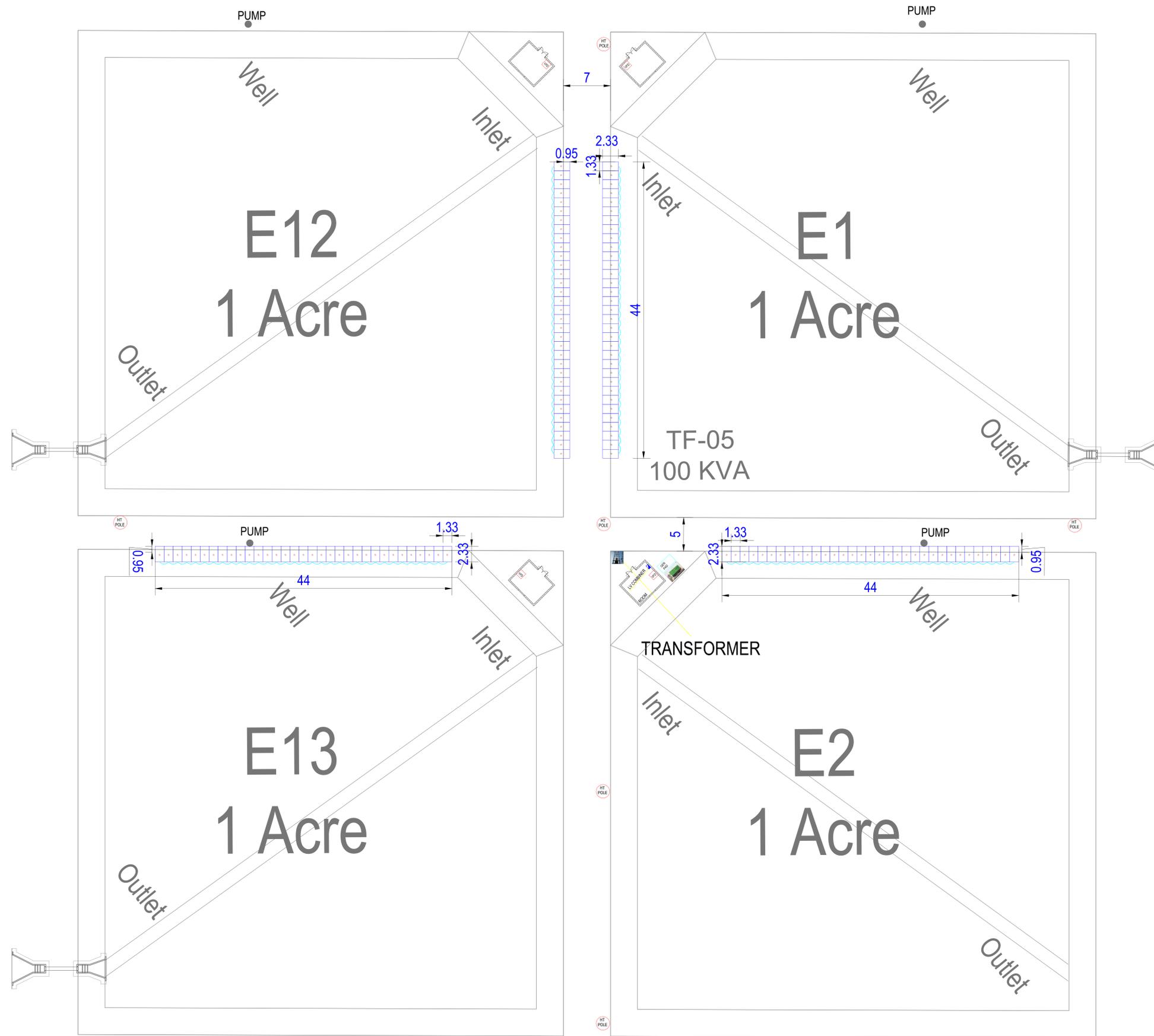
Note:

- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels.
- Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file
- Contractor shall be responsible on provided all PPE's to its installation team including Saftey Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 40KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	2,235.60		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	160.38		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(á)-2	Cft	60.75		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	384.00		-
	<b>Steel Reinforcement</b>					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT		QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.						
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-						
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg		705.95		-
	<b>Steel Strcuture</b>						
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg		3,200.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg		3,200.00		-
						<b>Total :</b>	-
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.						
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost in						
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furth						
4	MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office. MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.						
5	Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.						

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT		QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.						
6	<p>Note:</p> <ul style="list-style-type: none"> <li>- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.</li> <li>- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file</li> <li>- Contractor shall be responsible on provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines</li> </ul>						



CLIENT :  
**A D F**  
 (SWARC)

PROJECT :  
*SHRIMPESTATE SARGODHA*  
*AT CHAK-58NB*

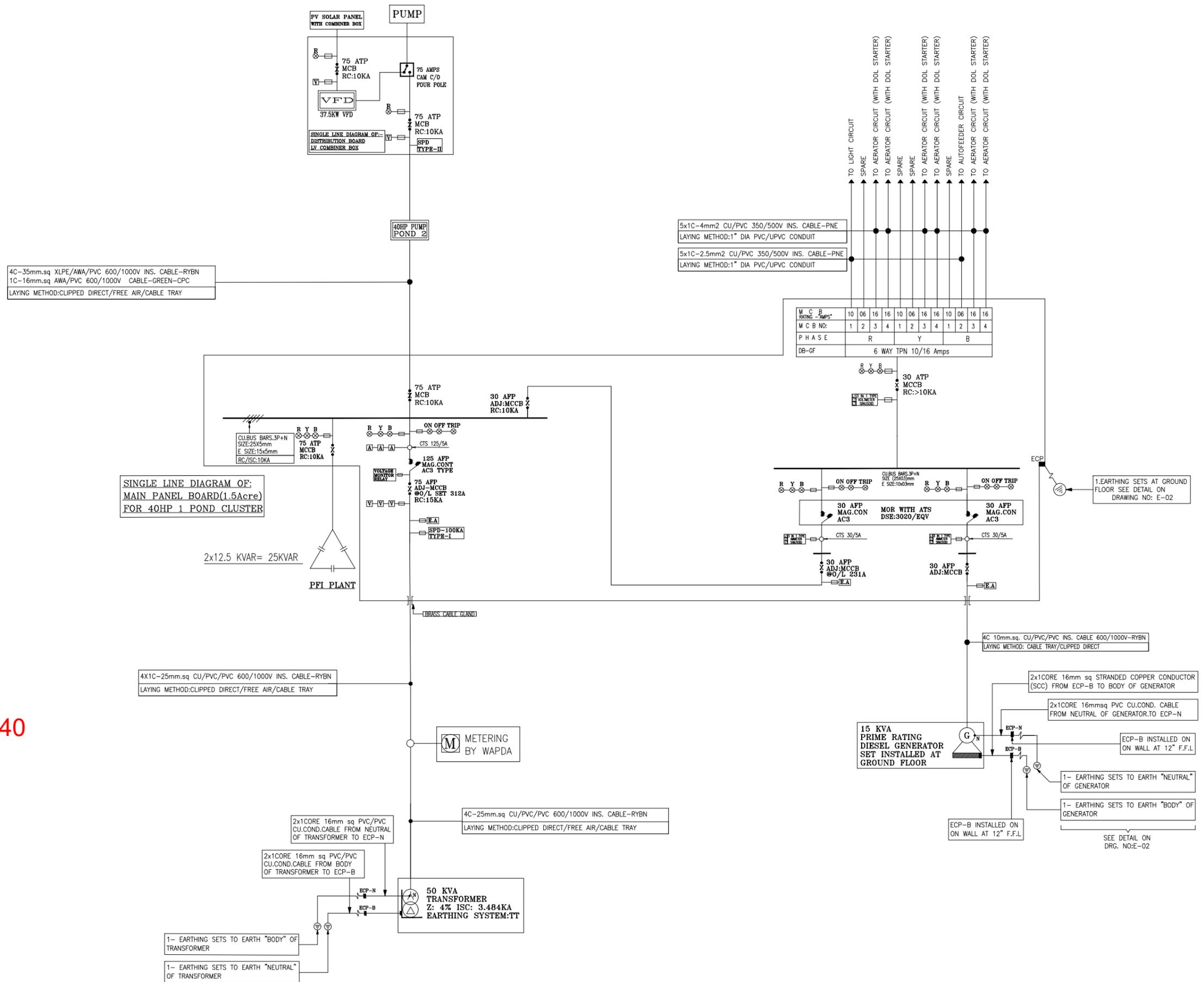
TITLE :  
**4 POND CLUSTER**

LOCATION:  
*CHAK-58NB*  
*PUNJAB*

DRAWN BY:  
 BELONGS TO:  
 SECTION:  
 ARCHITECTURE

DATE: **JAN-2026**  
 DWG NO: **SP-01**  
 PROJECT CODE: \_\_\_\_\_

# 1 Pond Cluster 40 HP











**TECHNICAL SPECIFICATIONS  
FOR SOLAR EQUIPMENT AND ALLIED ACCESSORIES**

**ENERGY DEPARTMENT**

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14TH JULY-2025

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## Minimum Technical Specifications Requirement for Solar Panel and Allied Equipment

Note- The technical specifications of the solar Panels & allied equipment must fulfil the standard requirements (PSS#ES) as per the import policy S.R.O.604 (I) /2019, Dated 28th May, 2019. Verifiable Test Certifications for the required standards must be provided with the technical proposal. In case of discrepancy, the mentioned S.R.O shall prevail.

This document provide minimum technical requirement for solar panels and allied equipment. "All products should be compliant to relevant IEC standards/ specifications; however, other equivalent, international standards may be used where, IEC relevant standard is not available, as per the project requirement, with subject to prior approval of the Project Director"

### 1 Solar PV Modules

Parameters	
Module Make	Tier 1, Brand should be verifiable
Rated Power (STC)	580 Wp or above
Cell Quality	A Grade (verifiable)
Module Efficiency	22% or Higher (Front Side)
Module Degradation	1st year power degradation no more than 1%
	Annual power degradation no more than 0.5% over 25 years & above
Mechanical Load Tolerance	5400 Pa positive load or above, 2400 Pa negative load or above
Mechanical Load	Should be verifiable through a standard lab test
Maximum System Voltage	1500V DC(IEC) or Equivalent
Power Tolerance	0 ~ + 3 to 5 W
Max. Series Fuse Rating	25 amp or above



Parameters	
Operating Temperature	-40 °C to +85 °C
Temperature Coefficient of Pmax	-0.30% / °C or less
Bypass Diode	As per design
Bus Bar	9 or higher
Product Certification	IEC 61215, IEC 61730, IEC61701 ED2 or equivalent
Management Certification	ISO 9001, ISO 14001, OHSAS 18001 or equivalent
Frame	Must Withstand 5400 PA impulse Load
Junction Box	IP 68
Cable	4 mm <sup>2</sup> , cable length up 300mm or above
Connectors	MC4 or Comparable weatherproof
Cover	3mm Front or above (Mono-facial)
	2mm Front and 2mm Back or above (Bi-facial)
Product Warranty and Guarantee	Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs.
	12 Years product material and workmanship warranty
	25 years for 80% of warranted min. power.

## 2 On-Grid Solar Inverter

Parameters	Min. Specifications required
Inverter Manufacturer	Renowned and verifiable brand having successful history in similar climatic conditions
Inverter Type	String Inverter (or as per supported design)
Max. Efficiency	≥ 98% or above
Max. Input Voltage	1500V (or as per supported design)
Max Input Current per MPPT	30A (or as per supported design)
MPPT Operating Voltage Range	140V ~ 1500V (or as per supported design)
Total Harmonic Distortion	<3%. As per relevant IEC clauses.
Power Factor Range	0.8 leading ~ 0.8 lagging



Parameters	Min. Specifications required
<b>MPPT Operating Voltage Range</b>	140V ~ 1500V (or as per supported design)
<b>Total Harmonic Distortion</b>	<3%. As per relevant IEC clauses.
<b>Power Factor Range</b>	0.8 leading ~ 0.8 lagging
<b>IP Protection</b>	IP 65 or better
<b>Protections</b>	Input-side Disconnection Device Anti-islanding AC Over current DC Reverse-polarity PV-array String Fault Monitoring (optional) DC Insulation Resistance Detection Residual Current Monitoring Unit DC Surge AC Surge Ripple Receiver Control (optional)
<b>Operating temperature</b>	-25°C to 60°C
<b>Communication</b>	With Remote Monitoring Feature, Mobile App, Web server user interface, Cloud Connected. Real Time System Monitoring. Alerts, Faults and Warning data display. System Statistics – System Parameters, Support WLAN/4G/RS485 communication
<b>Minimum Applicable Standards and Compliances</b>	IEC62109-1/-2, IEC62116, IEC60068, IEC61683, IEC 61727, EN50530, IEEE1547 or equivalent
<b>Warranty</b>	Minimum 5 Years standard warranty; and support 15 Years extended warranty.

### 3 Hybrid Solar Inverter

Parameters	Minimum Specifications Required
<b>Inverter Make</b>	Renowned and verifiable brand having successful history in similar climatic conditions.
<b>Inverter Type</b>	Hybrid inverter Grid synchronized Pure Sine wave. Net Metering option available.

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Parameters	Minimum Specifications Required
	Genset synchronization option available (variable frequency).
<b>Output Voltage Range</b>	230VAC/400 VAC $\pm 5\%$ for string inverters.
<b>Battery Charger</b>	12/24 /48VDC or above (Built-In or External)
<b>IP Rating/ Dust Proofing</b>	IP-65 (IEC 60529) or better
<b>Max. efficiency</b>	97 % or above
<b>Protections</b>	<ol style="list-style-type: none"> <li>1. Input-side Disconnection Device</li> <li>2. AC Overcurrent</li> <li>3. DC Reverse-polarity</li> <li>4. PV-array String Fault Monitoring (optional)</li> <li>5. DC Insulation Resistance Detection</li> <li>6. DC Surge</li> <li>7. AC Surge</li> <li>8. Ripple Receiver Control (optional)</li> </ol>
<b>Operating temperature</b>	-10 to 55°C
<b>Humidity</b>	10 ~ 80%RH
<b>Communication and Data Logging</b>	<ol style="list-style-type: none"> <li>1. With Remote Monitoring Feature, Mobile App, Web server user interface, Cloud Connected.</li> <li>2. Real Time System Monitoring. Alerts, Faults and Warning data display. System Statistics System Parameters</li> <li>3. PV predicted values, forecasted values, Load data, Energy</li> <li>4. Support W-Lan/4G/RS485 communication</li> </ol>
<b>Total Harmonic Distortion</b>	$\leq 3\%$ As per relevant IEC clauses.
<b>Performance guarantee</b>	Minimum 5 years comprehensive warranty of inverter ( Parts and Service)
<b>MPPT Voltage Range</b>	80-1000V or above (depend upon the selected design)
<b>MPPT input current</b>	16 amp or above
<b>Output power</b>	$\geq$ Rated Power
<b>Power Factor range</b>	0.8 leading ~ 0.8 lagging
<b>Output Wave Form</b>	Pure Sine Wave
<b>Applicable Standards and Compliances</b>	IEC62109-1/-2, IEC62116, IEC60068, IEC61683, IEC 61727, EN50530 Or equaling with supporting documents

#### 4 Solar Pump Inverter/ Solar Pump Variable Frequency Device (VFD)

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Item/Feature	Specification
<b>Application</b>	Converts D.C. voltage to A.C. voltage and regulates the functionality of Pump
<b>Standard Compliance</b>	IP 65 complying VFDs conforming IEC/EN 62109-1, IEC61683, IEC/EN 62109-2/equaling.
<b>Grid Connectivity</b>	As per Requirement. In case of Grid Input option, dv/dT or Sine Filters between VFD and Motor be installed as per Manufacturer/Design recommendations.
<b>Rated Conversion Efficiency</b>	96 % or above
<b>MPPT Efficiency</b>	98.5% or above
<b>Mounting Type</b>	Wall mounted,
<b>Free warranty period</b>	03 year or more comprehensive service warranty, from the date of certification/ commissioning as provided by manufacturer.
<b>Built-in functions</b>	Variable Frequency Drive. Automatic Start and Stop with any input power (solar, Grid and Generator). Self-diagnostic and self-Protection. Dry run protection detection. Should have advanced auto MPPT (Maximum Power Point Tracking) controller. Should have RS 232/485, etc. communication port for monitoring.
<b>Protections</b>	The proposed controller unit must have adequate technological features to protect itself and the pumping machinery from all type of accidental short circuit, Reverse Polarity protection, overload protection, low rpm protection (less than 30 Hz, or as per pump characteristic curve, pump stop motor operation), Lightning induced transients'

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Item/Feature	Specification
	<p>protection, dry source protection / well probe sensor, float switch, sun switch and overheating Protection.</p> <p>The proposed controller shall have built in feature to switch pumping unit ON/OFF automatically w.r.t adequacy of solar irradiance.</p> <p><b>External Surge Protector:</b> Type 2 of applicable system voltage range</p> <p><b>No Load Protection:</b> Well Probe or equal methodology for avoidance of no-load operation</p>
Temperature range	-10 to + 60 degree Celsius or better
Rated output voltage	A.C. and D.C. rated voltage (single/three phase)/rated voltage matching with the motor.
Grounding/ Earthing	The VFD drive body shall be separately earthed with maximum resistance of 3 ohms.
Documentation	All import related documents must be available that include kit as well as other relevant components

## 5 Lithium ion battery

Nominal Voltage	12 Volts to 600 Volts/equaling as per system design
Nominal Capacity (Wh)	Value should be written as actual
Voltage	Ensure the voltage matches your inverter's requirements and the overall system design
Usable Capacity (Wh)	>85% of rated value
Depth of Discharge (DoD)	85–100%
Communication Port	RS232, RS485, CAN/ equaling
Working Temperature°C	-5 to 45

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Storage Temperature °C	-10 to 60
Authentication Level	TUV / CE / UN38.3
Design Life	≥10 Years (25°C )
Cycle Life	≥6000, 25°C at 80% DoD
Humidity	25%~ 80% RH
Charge temperature	0 to 45°C
Discharge temperature	-5 to 45°C
Case and Cover	Electric shock proof powder coated metal sheet
Internal resistance	≤ 200mΩ
Storage life	Minimum 6 months maintenance charge interval in storage
Production Date	Must not be older than 2 year
Battery Management System (BMS)	Batteries come with BMS for multi-battery parallel system, with features of self cell balancing, temperature control, protecting against short-circuit with alarm function, over-charge/discharge conditions SoC-DoD-SoH reporting / setting, device events, battery parameters and storage. Compliance with safety standards such as UL 1973, IEC 62619, or equivalent Low & high Voltage Disconnect
Warranty	Comprehensive ≥ 5 Years

## 6 PV Mounting Standard Structure

### 6.1 Hot Dipped Galvanized Mild Steel

Description	Requirement
Tentative outlines, design will be site dependent and may varies	
Structure material and Protection	Supply and installation of solar panel structure of suitable type with minimum 12 Gauge with minimum size of 2 x 1 inch. Galvanized Iron



Description	Requirement
	material shall be hot dipped with protective zinc layer and should not be less than 80 microns. All bolts, nuts, fasteners should be stainless steel. Double washers should be used in sequence of SS Flat Washer and Rubber Washer (panel side and GI contact side). Flat washer of SS304 or SS316, 1.5-2 mm thickness, matching bolt size and rubber washer of Neoprene or EPDM, UV-resistant, 2-3 mm thickness. SS Rawal Bolt of minimum 8 mm thickness and minimum 3 inches in length. SAP Analysis or equivalent report should be approved by the Engineer in-charge before execution. Solar Panel should be secured using Clamps (stainless steel/Aluminum).
<b>Wind loading</b>	Mounting system should be able to allow air circulation for cooling in high temperature and withstand minimum wind speed of 150 Km/hour.
<b>Angle adjustment</b>	Seasonal adjustment optional as per requirement.

## 6.2 Aluminum Structure

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
<b>Structure material and Protection</b>	Supply and installation of solar panel structure of suitable type with minimum 2.5 mm with minimum size of 2 x 1 inch Aluminum material. Mounting structure should be pure aluminum and shall be as per SAA type II. All bolts, nuts, fasteners shall be stainless steel. Double washers should be used in

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Description	Requirement
	sequence of SS Flat Washer and Rubber Washer (panel side and GI contact side). Flat washer of SS304 or SS316, 1.5-2 mm thickness, matching bolt size and rubber washer of Neoprene or EPDM, UV-resistant, 2-3 mm thickness. SS Rawal Bolt of minimum 8 mm thickness and minimum 3 inches in length. SAP Analysis or equivalent report should be approved by the Engineer in-charge before execution. Solar Panel should be secured using Clamps (stainless steel/Aluminum).
<b>Wind loading</b>	Mounting system should be able to allow air circulation for cooling in high temperature and withstand minimum wind speed of 150 Km/hour.
<b>Angle adjustment</b>	Seasonal adjustment optional as per requirement.

**Note: Civil Work for rooftop structure**

- Structure should support the existing roof top.
- To avoid the drilling in roofs, use appropriate arrangements for strengthen the structure without damage the roofs.
- Pointed dead loads on rooftop surface is not recommended.
- Additional beams can be casted to avoid drilling on roofs.
- Existing Water drainage must not be disturbed;
- In-case of Ground, Slope should be maintained properly to allow access water drainage.
- A concrete pad of minimum one-cubic ft. and minimum 65 kg comprising of 1 : 1.5 : 3 (Cement, Sand, Crush) shall be formed on the roof and  $\geq 2.5$  inches of drill to be done on the concrete pad on which structure shall be mounted.

**For Soft Ground L(x\*) Structure**

- The pit size for concrete works should be minimum 1.5 x 1.5 x 3 feet for each individual leg or 1.5 x 2.5 x 3 for double leg and the concrete should be extended at least 1 foot above the ground. A concrete pad of minimum 3-cubic ft. comprising of 1 : 1 : 3 (Cement, Sand, Crush) shall be formed on the ground.

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- Array fasteners (nut/bolts/washers) between PV Module and Structure shall be stainless steel. Washers should be installed on both sides of Module frame.
- All other array fasteners Structure shall be stainless steel or galvanized steel that provides the required mechanical strength.
- The minimum space between two PV Modules should be 2.54 cm (1 inch), to avoid air push over PV Modules.
- Due to land Non-availability or Limited Roof Space, Structure design can be modified as per site requirement. Pole Mounted or manual Tracker Structure can be provided as per client requirement and approval of Engineer In-charge.

## 7 DC Cable

- a. The DC cables should be made of 99.9% copper strands and flexible.
- b. XLPO/XLPE insulated sheathed, Tin Coated, Double Insulated. (Conforming preferably to EN 50618 or IEC FDIS 62930) be used suitable for minimum 1500 V<sub>DC</sub> transmission.
- c. Cables shall be clearly labelled with essential electrical parameters including manufacturer name, Voltage Range, standards etc.
- d. All DC Wiring shall be aesthetically neat and clean, over all wiring/connection losses shall not exceed 1% of the total rated output power.
- e. All wires/cables should be in standard flexible UV-Resistant conduits / HDPE/GI cable tray (as per design) for outdoor installation & (2-3 feet deep) for underground wiring / Cabling and PVC ducts for indoor installation (as per design).

## 8 Protection Device

### 8.1 DC Breaker

- a. DC circuit breakers (not fuse) of  $\geq$  Voc of String Voltage and suitable ampere rating (Greater than 1.1 Times of Rated Current & less than the fuse rating of all strings connected). The number of poles of the breaker should be as per the voltage requirement.
- b. Having Rated short circuit capacity [kA] as per IEC 60947 (all parts amended to date 60898-2), EN 60898-2, GB/T 10963.2 (Icn) having Rated insulation voltage U<sub>i</sub> [V] 250. The cost of screws, necessary

cf

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fittings complete in all respect included as approved and directed by the Engineer Incharge.

- c. DC breakers should be marked with the manufacturer model number, rated voltage, ampere rating and batch/serial number.
- d. DC breakers rating should be approved from Engineer In-charge before installation at site.
- e. To prevent solar panels from damage an appropriate size of DC Breaker / Fuse may be installed for each PV string and Surge Protection may be installed for combined Array (before Main DC Breaker / Inverter).
- f. DC Breaker, AC Breaker & Change overs should be placed in an enclosure. All Enclosures / Junction boxes should be made from Hot Dipped Galvanized Sheets of minimum 16 SWG.
- g. The DC Combiner should contain proper bus bars of adequate size each for Positive, Negative and Earthing.
- h. All wiring should be in proper conduit of capping casing. Wire should not be hanging loose.
- i. All wires should be terminated properly by using lugs / thimble connectors / sleeves.
- j. Distribution board must be installed with proper screws or as per the design requirements.
- k. Electrical Hazards Safety Labels should be pasted on DC Combiner NFD Enclosure / Charge Controller / Battery Enclosures.

## 8.2 Type -1 (Lightning) Surge Arrester for External DC (PV) system

Parameters	min. specifications required for 1 1 string of 1500 V or less
Discharge current (I max)	min. 20kA (8/20 $\mu$ sec.)
Impulse current (I imp)	min. 25kA (10/350 $\mu$ sec.)
Response time	$\leq 50$ n sec
Leakage current	$\leq 1$ mA
Dielectric strength	2000 V AC @ 1 minute
Protection Class	Class 2(Type2) minimum
Discharge voltage	600 V DC or 1000 VDC (Line to earth) or above (matching the size of inverter)



Ingress Protection	Minimum IP20 (placed in IP 65 Box along with other protections)
Short circuit withstand capacity	min. 30kA
Presence	On all MPP inputs of inverters

## 9 Type- 2 Surge Arrester

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
Applications	Both DC side & AC sides, Type 2
Discharge current (I max)	min. 20kA (8/20 $\mu$ sec.)
Impulse current (I imp)	min. 25kA (10/350 $\mu$ sec.)
Response time	$\leq 50$ n sec
Leakage current	$\leq 1$ mA
Dielectric strength	2000 V AC @ 1 minute
Protection Class	Class 2(Type2) minimum
Discharge voltage	600 V DC (Line to earth) or above (matching the size )
Short circuit withstand	min. 30kA
Applications	Both DC side & AC sides, Type 2
Discharge current (I max)	min. 20kA (8/20 $\mu$ sec.)
Impulse current (I imp)	min. 25kA (10/350 $\mu$ sec.)

### 9.1 Lightning Protection System

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
Air termination rod material	99 % Copper
Air termination rod length	As per design
Earthing Pit	Less than 2 Ohm (NEC Codes) 99 % Pure copper plate/ rod Size & weight of plate/rod varies from site to site

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Description	Requirement
Air termination rod diameter	As per design
Air termination rod	As per design
Cable for structure	2.5 mm <sup>2</sup> or higher, 99.9% pure copper connected with minimum 6 inches x 2 inches strip
Cable for interconnecting/ Grounding metal structure	4 mm <sup>2</sup> or higher, 99.9% pure copper
Insulated Spacer	As per design
Cable Bracket	As per design
Stand – Fang Fix system	As per design
Recommended method for calculation	Rolling sphere method
Functional Compliance	IEC62305-3 (EN 62305-3) or equivalent

### Distribution Box, Wiring, Ducting

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
<b>Outer Body</b>	<ol style="list-style-type: none"> <li>1. Powder Coated, minimum sheet thickness Min 16 Gauge, Min Dimension (12 x18 x 6) inch</li> <li>2. Cable entry should have cable gland and shrouds with appropriate color coding where required</li> <li>3. Front section should be isolated with a protection sheet (acrylic or suitable material) to prevent unauthorized access and injury.</li> </ol> <p>50% space of box should be free/open space. IP-54 for Indoor and IP-65 for Outdoor.</p>
<b>Breakers and disconnectors</b>	<p>DC breakers: 2/4 Pole DC breaker with current Capacity should be Min 1.25-time I<sub>sc</sub> of Solar PV Modules.</p> <p>AC/VFD Output breakers: 3/4 Pole MCCB breaker with each string with current Capacity should be Min 1.25-time to 1.5- times I<sub>sc</sub> of Line current.</p>
<b>Cable Conduiting</b>	Cables should be covered in suitable hard/flexible PVC conduits when used inside the building and underground ducting to avoid external damage by impact.

a. All exposed wiring (with the possible exception of the module interconnects) must

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be covered in conduits/duct. Wiring through roofing, walls and other structures must be protected through the use of bushings. Wiring through roofing must form a waterproof seal (applicable for wiring only).

- b. For conduit and duct flexible PVC material with suitable size must be use, so that  $\frac{3}{4}$  spaces in a conduit should be empty.
- c. Field installed wiring must be joined using terminal strips or screw connectors. Soldering or crimping in the field must be avoided if at all possible. Wire nuts are not allowed. The rated current carrying capacity of the joint must not be less the circuit current rating. All connections must be made in junction boxes. Fittings for lights, switches, and polarity sensitive socket outlets may be used as junction boxes where practical.
- d. All wiring shall be color coded as per IEC standards and labeled at termination point.
- e. No conduit or fitting shall be attached directly to thatch or any other non- supportive surface
- f. Especially avoid installing the conduit direct over the roof; there must be distance not less than 2 inches between the roof surface and conduit/duct.
- g. Cables must be joined by the use of junction boxes, screw-connectors, and block connectors, MC4 or equaling connectors must be used for PV joints.
- h. All wires must be terminated with proper end sleeves and wire thimbles with different colors for positive and negative polarity.
- i. Size, voltage grade and manufacturer name should be printed on every cable
- j. Cable voltage drop specifications are as follows that must be verified through software simulation/ Calculations.

Description	Requirement
<b>1. PV to VFD/Inverter:</b>	Voltage drop less than 2% tin coated (Stranded and flexible), 99.9 % pure copper fire resistive insulation (Stranded) All open/ Exposed cables must be UV resistive.
<b>2. Grid / LV DB to Inverter/VFD</b>	Voltage drop less than 2%, 99.9 % pure copper fire resistive insulation (Stranded) as per requirement mentioned above



## 10 Earthing / Grounding

- a. The PV Panel frame and structure should be connected by the shortest practical route to an adequate earth contact (of Less than 5 Ohms Resistance) as per requirement of equipment manufacturer and site earth conditions, using an uninterrupted conductor. Grounding can reduce the risks of damage from lightning- induced surges.
- b. The Sizing of Earthing conductor will be done as per NEC Table 250.122
- c. The grounding conductor should be 99% Copper and PVC insulated / Bare Copper if installed underground along a defined path.
- d. Motor, inverter, Battery / Battery Box (if required), Main Distribution Board should be connected to an adequate earth contact / Grounding.
- e. Ground enhancement material (GEM) shall be used below and above the Earthing plate for proper grounding. Gravel or coarse sand shall be poured along with soil in the pit.
- f. Grounding / Earthing plate should be made of GI Plate of 6mm/ Copper Cladded plate of 4mm thickness & size minimum 12" x 2.5".
- g. Grounding / Earthing conductor should be connected to the plate / Rode / GI Pipe by proper connector of minimum depth of 6 feet.
- h. Alternatively, Earthing Rod of suitable size and length can be installed. (Instead of Plate). As per BOQ/Design given and Engineer In-Charge Approval.
- i. Earthing as per Electricity Act of Pakistan/NEPRA
- j. AC and DC equipment shall be earthed separately.

## 11 Nuts, Bolts, Washers and other fastening equipment

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
<b>Adhesives and Sealants</b>	Epoxy/UV weather resistive Silicon Adhesives should be used for metal-to-metal or metal-to-concrete bonding (if required) Compliance with ASTM C920 or equivalent
<b>Cable Ties:</b>	UV-resistant nylon or stainless steel



Description	Requirement
<b>Cable Clips and Trays</b>	<p>Material should be GI, or plastic (UV-resistant) for cable runs on rooftops.</p> <p>Underground pipes should be suitable as follows Materials: PVC, HDPE, equaling.</p> <p>Size: Typically, 1/2" to 4" diameters (size depends on wire gauge and number of conductors).</p> <p>Burial Depth: 6" to 24" depending on material and installation requirements.</p> <p>Conduit Type: Rigid or flexible, depending on the environmental and mechanical protection required.</p>
<b>Grounding Clips and Lugs</b>	<p>Tinned copper and Coper Clips for joint with grounding/earthing rod.</p>
<b>Bolts and Nuts</b>	<p>Stainless steel (Grade SS304 or SS316 for corrosion resistance)</p> <p>With size M6, M8, or as specified by the design,</p>
<b>Screws &amp; Washers</b>	<p>Material for screws should be galvanized or stainless steel. Type should be Self-drilling for metal i.e. earthing wires of modules.</p> <p>Chrome coated plain washers and spring washers for secure fastening</p>
<b>Mid Clamps &amp; End Clamps</b>	<p>Anodized aluminum or stainless steel with minimum thickness of 3 mm, adjustable to fit different panel thicknesses</p>
<b>Anchoring Systems</b>	<p>Minimum 8 mm thickness and minimum 3 inches in length</p>

**SHRIMP ESTATE AT  
58NB, SARGODHA**

**BOQ Genset & Internal  
Electrification**

## SUMMARY OF COST

### VOLUME-2 Genset

1.0	Genset (35 KVA) x 27 Nos	Rs.	-
2.0	Genset (25 KVA) x 5 Nos	Rs.	-
3.0	Genset (15 KVA) x 13 Nos	Rs.	-
4.0	Genset (200 KVA) x 1 Nos	Rs.	-
<b>Total Rs.</b>			-

### VOLUME-4 Power Cabling & Internal Electrification

1.0	Power Cabling, Internal Electrification, Conduit, Pump Room Electrification	Rs.	-
<b>Total Rs.</b>			-

#### Note:

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office. MIR (Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Any other Requirement, not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

ix	Governor: Electronic Governor with ECM Module.			
x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.			
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 35 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c16mmsq Cable + 1c 16mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	
	<b><u>Sound Attenuated Canopy</u></b>			

	<p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading</b>. The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>							
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p>	<b>1</b>	<b>No.</b>					
	<p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>							
<b>f</b>	<p><b>RCC Foundation</b></p>	<b>1</b>	<b>No.</b>					
	<p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>Job</b>					
	<p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>					
	<p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p> <p><b>2.25 Hr Load Testing will be carried out during FAT with following Protocol</b>  <b>(For two persons and as per standard principal protocols):</b>  <b>1) 15 min @ 50% Load</b>  <b>2) 30 min @ 75% Load</b>  <b>3) 1 hr @ 100 % Load</b>  <b>4) 30 min @ 110% Load</b></p>							

	<p>In this regards the said expances of boarding &amp; lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .</p> <p><b>Note:</b> It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.</p> <p>The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.</p> <p><i>1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine &amp; Alternator. Engine Cummins/Perkins/FPT Alternator: Leory Sormer / Stamford</i></p>				
	Total / Genset	<b>Nos</b>	1		
	27 Nos (4 Pond CLUSTER)	<b>Nos</b>	27		
	GST @ 18%				
	Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
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MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

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xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 25 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c16mmsq Cable + 1c 16mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	
	<b><u>Sound Attenuated Canopy</u></b>			

	<p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading</b>. The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>				
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>				
<b>f</b>	<p><b>RCC Foundation</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p> <p><b>2.25 Hr Load Testing will be carried out during FAT with following Protocol</b>  <b>(For two persons and as per standard principal protocols):</b>  <b>1) 15 min @ 50% Load</b>  <b>2) 30 min @ 75% Load</b>  <b>3) 1 hr @ 100 % Load</b>  <b>4) 30 min @ 110% Load</b></p>				

<p>In this regards the said expances of boarding &amp; lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .</p> <p><b>Note:</b> It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.</p> <p>The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.</p> <p><i>1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine &amp; Alternator. Engine Cummins/Perkins/FPT Alternator: Leory Sormer / Stamford</i></p>				
Total / Genset	<b>Nos</b>	1		
5 Nos (2 POND CLUSTER)	<b>Nos</b>	5		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b><u>DIESEL GENERATOR SET</u></b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the in coming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p> <p>ix Governor: Electronic Governor with ECM Module.</p> <p>x Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU)</p> <p>Current Rating &amp; RC rating will be dependent on the KVA Rating &amp; Power System.</p>				

xi	<p>Generator Module should display following parameters (but not limited to following):</p> <ul style="list-style-type: none"> <li>-KVA, KW, KVAR &amp; % KW Loading</li> <li>-Load Current (I1, I2 &amp; I3)</li> <li>-V(L-L) &amp; V(L-N)</li> <li>-Frequency(Hz)</li> <li>-Power Factor</li> <li>-Engine Temperature</li> <li>-Coolant Temperature</li> <li>-Engine Oil Temperature</li> <li>-Engine Oil Pressure</li> <li>-Fuel Consumption (L/Hr)</li> <li>-Engine &amp; Alternator Emergency Alarms</li> <li>-Emergency Trip Alarms &amp; Ground Fault Alarms</li> <li>-Make Deepsea / Approved Eqv</li> </ul>				
xii	<p>Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor &amp; 400VAC, make Fast/Newage/Pakistan cables.</p>				
xii	<p>Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance &amp; start up procedure of generator alongwith written gurantee of spare parts availability</p>				
xii	<p>Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.</p>				
<b>a</b>	<p><b>Supply of 15 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b></p>	<b>1</b>	<b>No.</b>		
<b>b</b>	<p><b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b></p>	<b>1</b>	<b>No.</b>		
<b>c</b>	<p><b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b></p>	<b>1</b>	<b>No.</b>		
<b>d</b>	<p><b>4c10mmsq Cable + 1c 10mmsq Cable(CPC) CU/PVC/PVC</b></p>	<b>50</b>	<b>Mtr</b>		

	<p><b><u>Sound Attenuated Canopy</u></b></p> <p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b><u>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading.</u></b> The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>			
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p> <p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>	<b>1</b>	<b>No.</b>	
<b>f</b>	<p><b>RCC Foundation</b></p> <p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p> <p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p> <p><b><u>Note</u></b>  <b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>	<b>1</b>	<b>No.</b>	
		<b>1</b>	<b>Job</b>	
		<b>1</b>	<b>Job</b>	

**2.25 Hr Load Testing will be carried out during FAT with following Protocol**  
**(For two persons and as per standard principal protocols):**  
**1) 15 min @ 50% Load**  
**2) 30 min @ 75% Load**  
**3) 1 hr @ 100 % Load**  
**4) 30 min @ 110% Load**

In this regards the said expances of boarding & lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .

**Note:**

It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.

The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.

*1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine & Alternator.  
 Engine Cummins/Perkins/FPT  
 Alternator: Leory Sormer / Stamford*

Total / Genset	<b>Nos</b>	1		
Total 13 Nos (1 POND CLUSTER)	<b>Nos</b>	13		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
 MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b><u>DIESEL GENERATOR SET</u></b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the in coming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p> <p>ix Governor: Electronic Governor with ECM Module.</p>				

x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.				
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv				
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.				
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability				
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.				
<b>a</b>	<b>Supply of 200 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>		<b>No.</b>	
<b>b</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>		<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>		<b>No.</b>	
<b>d</b>	<b>4c185mmsq Cable + 1c 70mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>		<b>Mtr</b>	

	<p><b><u>Sound Attenuated Canopy</u></b></p> <p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b><u>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading.</u></b> The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>			
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p> <p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>	<b>1</b>	<b>No.</b>	
<b>f</b>	<p><b>RCC Foundation</b></p> <p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p> <p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p> <p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>	<b>1</b>	<b>No.</b>	
		<b>1</b>	<b>Job</b>	
		<b>1</b>	<b>Job</b>	

**2.25 Hr Load Testing will be carried out during FAT with following Protocol  
(For two persons and as per standard principal protocols):**

- 1) 15 min @ 50% Load**
- 2) 30 min @ 75% Load**
- 3) 1 hr @ 100 % Load**
- 4) 30 min @ 110% Load**

In this regards the said expances of boarding & lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .

**Note:**

It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.

The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.

*1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine & Alternator.  
Engine Cummins/Perkins/FPT  
Alternator: Leory Sormer / Stamford*

Total / Genset (Office)	<b>Nos</b>	1		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

**ELECTRICAL & ALLIED WORKS****Vol-4**

S. No.	Description	Qty	Unit	Rate	Amount
1	<b>LT SWITCHGEARS</b>				
1.01	<p><b>Main Panel Board+ ATS Panels + DBs as per SLD</b></p> <p>Switchgear: Terasaki Japan / Legrand EU / ABB / Approved as per Annex-A  PFI Relay &amp; Capacitors: Shizuki / Nokian EU /EPCOS / Approved as per Annex-A  Digital Voltmeter / Ammeters &amp; Energy Analyzers: Smart Controller UK / Lovato EU / Sinusoid /  <b>Energy Analyzer SS-04 with RS-485 Port &amp; Digital Output for Serial Communication</b>  Supply installation and commissioning of key tagged type <b>Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color</b>, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below.</p> <p>complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below, complete with internal wiring earthing, neutral link, termination blocks and cable chamber at the top of the DB.</p> <p>Each D.B. shall have Digital Voltmeter, Voltmeter / Selector switch, LED Phase indication lights &amp; control fuses on incoming. All breakers &amp; instrumentation and other materials shall be as listed in Annexure "A" it shall be manufactured by any one of the manufacturers as mentioned in Annexure "A" and <b>conforming to and complete as per the single line diagram.</b></p> <p>All incoming and outgoing breakers shall be <b>accessible by opening the front door</b> having additional M.S. sheet cover. Gaskets shall also be provided where necessary. All MCBs/MPCB/MCCBs/Accessories shall be suitable to operate <b>without any de-rating at 50°C ambient temperature</b> and shall be of one make only and not a mixture of more than one make.</p> <p><b>Cable Glands</b> Make/Brand:Brass Alloy and should be Appropriatsize as per the incoming &amp; O/G cables</p> <p><b>Terminal Block</b> Make/Brand: Imported, should be Appropriate size as per the O/G cables  <b>Exhaust Fan</b> Make/Brand: Imported and should be installed in every floor standing cubical on the side/top including the necessary range of thermostate &amp; filter.The size should not be less than 6" in dia.</p>	44	Nos		

S. No.	Description	Qty	Unit	Rate	Amount
	<p><b>Tube Light</b> with Microswitch Make/Brand:Imported, should be installed in every floor standing cubical inside.</p> <p><b>Distribution Board/ACP</b> should be Frame 16 SWG IP-65</p> <p><b>Safety Punch Plates</b>, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.</p> <p>2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.</p> <p><b>Paint</b> should be All cubical shall be painted in textured white colour.</p> <p>Fishnet Flexible Earth Strips to be used for earthing housing of panels</p> <p>Phase Separators should be used.</p> <p>Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.</p> <p>MCCB SP of 2Amp should be used for fuse purpose instead of control fuse.</p> <p>Note: Dimension, Panel/DB Structure, Mounting Arrangement &amp; Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication &amp; Delivery of Panels</p> <p>The above mentioned points are common in almost all the switchgear, the contractor / manufacturer is advised to incorporate all above mentioned points with other ammendments during manufacturing of switchgear.</p> <p>Complete in all respects as per SLD</p>				

S. No.	Description	Qty	Unit	Rate	Amount
1.02	<p><b>Automatic Power Factor Improvement Plant</b></p> <p>Supply, installation &amp; commissioning of sheet metal clad totally enclosed free standing, front excess <b>Power factor improvement plant</b> to be installed with Main LT Switch Board, fabricated from <b>16 SWG M.S. sheet steel</b> &amp; doors from <b>16 SWG M.S. sheet steel, degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron</b> thickness of approved color, <b>415 volts, 3 phase, 50Hz</b>, power factor improvement plant of automatically / manually controlled. complete with air contactors, HRC fuses for short circuit protection.</p> <p>Each cubicle to have <b>2 thermostatically controlled 220~240 Volts Operated robust exhaust fan 6"/8" dia.</b> to be installed on inner sides on back or on top of synch panel for hot air exhaust, including cost of thermostat ON/OFF switches wire mesh, air filters and all accessories / wiring, complete in all respects.</p> <p><b>Tube light with rod</b> to be installed inside each cubicle with <b>micro switch</b> on each door.</p> <p>On/Off push buttons, On/Off indication light, PFI relay, make for switching in &amp; out out the capacitors in , control fuses, auto/manual selector switch, 415 volts 3 phase delta connected capacitors make BTB/Nokian and ON/OFF indicating lamps.</p> <p><b>MAGNETIC CONTACTORS; PFI CONTACTOR SHALL HAVE INBUILT DAMPING RESISTANCE, RELAY MUST HAVE CHARGING / DISCHARGING RATE SELECTION</b></p> <p>a APFI Plant <b>37 KVAR</b></p> <p>Complete in all respect as per single line diagram. <b><u>Thimbles must be covered with fire retardant tape.</u></b> <b><u>Fire resistance pad must be installed on panel top plates.</u></b></p> <p><b>Sub Total</b></p>	44	Nos		
2.0	<b>CABLE TRAYS &amp; LADDERS</b>				
2.01	<p><b>Powder Coated Ceiling Suspended / Horizontal/ Vertical Cable Tray</b></p> <p>Fabrication, supply at site and installation of <b>Degreased, De-rusted, Hot Dip Galvanized Perforated</b> cable tray with cover made of <b>G.I. sheet</b> 8 ft. to 10 ft. long with sides 4" high with cover to be installed on wall, or in vertical, or above false ceiling in horizontal position or as shown on drawing, including cost of following:</p> <p>-2 M.S threaded hanging rod 1/2" dia. Length 12" or as required as per site. -M.S strip 2" wide x 1/4" thick. -Hilti rawal bolts as per required quantity &amp; size. -Complete hanging system shall be installed at every 36".</p>				

S. No.	Description	Qty	Unit	Rate	Amount
a	<p>The cable tray shall be complete in all respects including cost of all accessories / materials. Cable tray shall be of the following sizes.</p> <p style="text-align: center;"><b>For Power</b></p> <p>9" X 4" MS Cable Tray 16 SWG &amp; MS Cover 18 SWG</p> <p><b>Important Note:</b> Actual length of the cable tray shall be measured at site duly by the contractor under the presence of Engineer Incharge, complete in all respects. Above mentioned lengths are the estimated lengths which are required at site.</p> <p>The contractor shall submit the shop drawings, samples of the brand selected for procurement of cable trays, complete compliance report with BOQ specs prior to the procurement.</p> <p><b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.</p> <p><u>Sub Total</u></p>	0	Rft		
<b>2.0</b>	<b>POWER CABLES AND CONDUITS</b>				
2.01	<p>Supply at site, installation, testing and commissioning of <b>PVC/XLPE insulated PVC sheathed Non armoured 99.9% pure Copper conductor / Aluminum Conductor power cable 600 / 1000 Volt grade</b> manufactured by any one of the manufacturers as mentioned in Annexure in preinstalled cable tray / trenches cables to be installed as per routes shown on drawings including cost of all necessary materials, connections of cables and identification tags at both ends, cables lugs properly crimped at both ends for the following sizes complete in all respects.</p> <p>Actual length of cables to be installed shall be practically measured at site by the Contractor, duly authenticated by the employers electrical engineer before placing the order with the manufacturer, however, approximate length of cables are shown herewith. Payments shall be made as per actual length installed.</p> <p><b>- Power Cables:</b></p> <p style="text-align: center;"><b>ats to 60HP Pumps isolator box</b></p> <p>i 4 Core 50mm.sq. /XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 40HP Pumps isolator box</b></p> <p>ii 4 Core 25mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 20 HP Pumps isolator box</b></p>	1,144	Rm		
		792	Rm		

<b>S. No.</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
iii	4 Core 16mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.  <b>ats db to submersible pump isolator</b>  <b>ats db to aerator isolator box</b>	9,328	Rm		
iv	5 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	15,360	Rm		
v	5 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	3,840	Rm		
vi	1 Core 10mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		
vii	1 Core 6mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		
viii	1 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	32,580	Rm		
ix	1 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	32,580	Rm		
-	<b><u>Circuit Protective Conductor</u></b>				
x	1Core 16mm.sq. XLPE/PVC Ins 600/1000V Cable.	11,264	Rm		

S. No.	Description	Qty	Unit	Rate	Amount
2.02	<b>P.V.C. Conduit and Accessories</b>  Supply at site and installation of heavy duty pipe class D Pipes to be installed under ground, including cost of excavation , including cost of all PVC pipe accessories like bends, sockets, laying of PVC pipe with 4" thick layer of sand beneath pipe, protection and sand tape above pipe, refilling of excavations with sweet earth, ramming, watering cost of labour, material, complete in all respects.	300	Rft		
i	2" dia. PVC conduit	19200	Rmtr		
ii	4" dia. PVC conduit	3840	Rmtr		
	<b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.				
<b>3</b>	<b><u>Clean Agent Fire Suppression for Ele &amp; IT</u></b>				
3.01	Supply at site, installation, testing and comissioning of UL Listed Fire extinguishing PEX tubing system for Switchgear Panels, comprising of maximum 3.5 Meters long PEX tube as per requirement Five layered (adhesive resin glue inner / outer layerd, barrier layer, Inner outer layer designed to endure with inner pressure and gas barrier layer to prevent inner gas permeation), fire detection ability before temp rising upto 120 deg centigrade, filled with Novec1230 / approved fire extinguishing agent, complete in all respects. Make Erase Tube (Eyelogy) / Approved eqv. The contractor shall provide product's complete technical literature & compliance with UL certficiation prior to the procurement, complete in all respects. <b>2 Meter /DB Panel</b>	44	Nos		
	<b>Sub Total</b>				

S. No.	Description	Qty	Unit	Rate	Amount
4.0	<b>Store Room Electrification</b>				
	<b>Note:-</b> For list of approved manufacturer's see Annexure "A".				
4.01	Supply and wiring of first light from DB MCB with 2x2.5mmsq single core insulated 300/500 volt grade cables(P+N) and 2.5mmsq cable as protective conductor (PC) in & including 1" dia Class-Electrical PVC conduit installed/ recessed in walls / R.C.C. Slab, on ceiling or as required as per site conditions. Complete with all conduit accessories junction boxes, pull boxes as required complete in all respects as per specifications and drawings.	141	Each		
b	Same as item No. 1.05 above but point to point wiring with 3 x 1.5mmsq PVC insulated Cu.Cond cable (P+N+E), complete in all respects.	0	Each		
4.02	Wiring of one 15A power sockets from DB MCB to outlet with 2x 4mmsq single core cables (P+N) and 4 mmsq as CPC from DB to point including cost of one Nos. 15A 3 pin switch socket outlet make as approved by consultant & including 1" dia Class-Electrical PVC conduit recessed in walls/R.C.C. slab, or on surface of ceiling including all conduits accessories, junction boxes, pull boxes etc. installed on & including 16 SWG sheet steel boards recessed in walls /columns, Complete in all respects.	141	Each		
4.03	Providing ,installation ,testing and commissioning of the following <b>lighting fixture</b> including all accessories like mounting arrangement, electronic ballast, drivery circuitry etc. Complete in all respects.  General Technical Specification includes color temperature ranging from 2700K to 6000K (As per the Consultant / Architect Approval), CRI:80, having lumen efficay of atleast 80 lumen/watt and operational power factor of 0.9 Must have IEC CE driver and chipset report ,osram / philips/approved equiv. <b><u>Imp Note: All lighting fixtures and fans will be according to the choice of architect/engr.incharge, complete in all respects. Contractor/manufacturer to get techincal submittals of all lighting fixtures approved along with the submission of DIALux/Eqv Illumination study along LM 79, 80 &amp; 81 report, prior to the procurement complete in all respects.</u></b>				
i	1x15W LED downlight SMD type.	256	Nos		
ii	Supply and installation of <b>following fan</b> ,complete as per specifications and drawings. Wall bracket fan (energy efficient copper wire, 3 speed mode, metal body)	0	Each		

<b>S. No.</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
	<b>Sub Total</b>				
	<b>Total Carried Over to Summary of Costs</b>				
	<b>18% GST</b>				
	<b>Total (Incl of GST)</b>				

**Note:**

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 1) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 2) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
  - 3) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.
  - 4) MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.

**Signed & Stamped Of Contractor**

**SHRIMP ESTATE AT  
58NB-Phase-2**

**BOQ for Genset & Internal  
Electrification**

**SUMMARY OF COST**

**VOLUME-2 Genset**

1.0	Genset (35 KVA) x 9 Nos	Rs.
2.0	Genset (15 KVA) x 3+5 Nos	Rs.

**Total Rs.**

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**VOLUME-4 Power Cabling & Internal Electrification**

1.0	Power Cabling, Internal Electrification, Conduit, Pump Room Electrification	Rs.
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**Total Rs.**

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**Grand Total Rs.  
(Incl of Taxes)**

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S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

ix	Governor: Electronic Governor with ECM Module.			
x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.			
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 35 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>b</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c16mmsq Cable + 1c 16mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	

	<p><b><u>Sound Attenuated Canopy</u></b></p> <p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b><u>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading.</u></b> The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>			
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p> <p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>	<b>1</b>	<b>No.</b>	
<b>f</b>	<p><b>RCC Foundation</b></p> <p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>No.</b>	
	<p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>	
	<p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>			

**2.25 Hr Load Testing will be carried out during FAT with following Protocol**  
**(For two persons and as per standard principal protocols):**

- 1) 15 min @ 50% Load**
- 2) 30 min @ 75% Load**
- 3) 1 hr @ 100 % Load**
- 4) 30 min @ 110% Load**

In this regards the said expances of boarding & lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .

**Note:**

It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.

The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.

*1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine & Alternator.  
 Engine Cummins/Perkins/FPT  
 Alternator: Leory Sormer / Stamford*

Total / Genset	<b>Nos</b>	1		
Total Pond Cluster	<b>Nos</b>	9		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
 MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.

- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

ix	Governor: Electronic Governor with ECM Module.			
x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.			
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 15 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c10mmsq Cable + 1c 10mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	
	<b><u>Sound Attenuated Canopy</u></b>			

	<p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading</b>. The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>				
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>				
<b>f</b>	<p><b>RCC Foundation</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p> <p><b>2.25 Hr Load Testing will be carried out during FAT with following Protocol</b>  <b>(For two persons and as per standard principal protocols):</b></p> <p><b>1) 15 min @ 50% Load</b>  <b>2) 30 min @ 75% Load</b>  <b>3) 1 hr @ 100 % Load</b>  <b>4) 30 min @ 110% Load</b></p>				

<p>In this regards the said expances of boarding &amp; lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .</p> <p><b>Note:</b> It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.</p> <p>The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.</p> <p><i>1 - The engine offered must be Make and manufactured in the European region.</i></p> <p><i>2 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer.</i></p>				
Total / Genset	<b>Nos</b>	8		
Total Pond Cluster	<b>Nos</b>	8		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

**ELECTRICAL & ALLIED WORKS**

Vol-4

S. No.	Description	Qty	Unit	Rate	Amount
1	<b>LT SWITCHGEARS</b>				
1.01	<p><b>Main Panel Board+ ATS Panels + DBs as per SLD</b></p> <p>Switchgear: Terasaki Japan / Legrand EU / ABB / Approved as per Annex-A  PFI Relay &amp; Capacitors: Shizuki / Nokian EU /EPCOS  Digital Voltmeter / Ammeters &amp; Energy Analyzers: Smart Controller UK / Lovato EU / Sinusoid  <b>Energy Analyzer SS-04 with RS-485 Port &amp; Digital Output for Serial Communication</b>  Supply installation and commissioning of key tagged type <b>Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color</b>, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below.</p> <p>complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below, complete with internal wiring earthing, neutral link, termination blocks and cable chamber at the top of the DB.</p> <p>Each D.B. shall have Digital Voltmeter, Voltmeter / Selector switch, LED Phase indication lights &amp; control fuses on incoming. All breakers &amp; instrumentation and other materials shall be as listed in Annexure "A" it shall be manufactured by any one of the manufacturers as mentioned in Annexure "A" and <b>conforming to and complete as per the single line diagram.</b></p> <p>All incoming and outgoing breakers shall be <b>accessible by opening the front door</b> having additional M.S. sheet cover. Gaskets shall also be provided where necessary. All MCBs/MPCB/MCCBs/Accessories shall be suitable to operate <b>without any de-rating at 50°C ambient temperature</b> and shall be of one make only and not a mixture of more than one make.</p> <p><b>Cable Glands</b> Make/Brand:Brass Alloy and should be Appropriatsize as per the incoming &amp; O/G cables</p> <p><b>Terminal Block</b> Make/Brand: Imported, should be Appropriate size as per the O/G cables  <b>Exhaust Fan</b> Make/Brand: Imported and should be installed in every floor standing cubical on the side/top including the necessary range of thermostate &amp; filter.The size should not be less than 6" in dia.</p>	19	Nos		

S. No.	Description	Qty	Unit	Rate	Amount
	<p><b>Tube Light</b> with Microswitch Make/Brand:Imported, should be installed in every floor standing cubical inside.</p> <p><b>Distribution Board/ACP</b> should be Frame 16 SWG IP-65</p> <p><b>Safety Punch Plates</b>, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.</p> <p>2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.</p> <p><b>Paint</b> should be All cubical shall be painted in textured white colour.</p> <p>Fishnet Flexible Earth Strips to be used for earthing housing of panels</p> <p>Phase Separators should be used.</p> <p>Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.</p> <p>MCCB SP of 2Amp should be used for fuse purpose instead of control fuse.</p> <p>Note: Dimension, Panel/DB Structure, Mounting Arrangement &amp; Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication &amp; Delivery of Panels</p> <p>The above mentioned points are common in almost all the switchgear, the contractor / manufacturer is advised to incorporate all above mentioned points with other ammendments during manufacturing of switchgear.</p>				

S. No.	Description	Qty	Unit	Rate	Amount
1.02	<b>Automatic Power Factor Improvement Plant</b>				
	<p>Supply, installation &amp; commissioning of sheet metal clad totally enclosed free standing, front excess <b>Power factor improvement plant</b> to be installed with Main LT Switch Board, fabricated from <b>16 SWG M.S. sheet steel</b> &amp; doors from <b>16 SWG M.S. sheet steel, degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron</b> thickness of approved color, <b>415 volts, 3 phase, 50Hz</b>, power factor improvement plant of automatically / manually controlled. complete with air contactors, HRC fuses for short circuit protection.</p> <p>Each cubicle to have <b>2 thermostatically controlled 220~240 Volts Operated robust exhaust fan 6"/8" dia.</b> to be installed on inner sides on back or on top of synch panel for hot air exhaust, including cost of thermostat ON/OFF switches wire mesh, air filters and all accessories / wiring, complete in all respects.</p> <p><b>Tube light with rod</b> to be installed inside each cubicle with <b>micro switch</b> on each door.</p> <p>On/Off push buttons, On/Off indication light, PFI relay, make for switching in &amp; out out the capacitors in , control fuses, auto/manual selector switch, 415 volts 3 phase delta connected capacitors make BTB/Nokian and ON/OFF indicating lamps.</p> <p><b>MAGNETIC CONTACTORS; PFI CONTACTOR SHALL HAVE INBUILT DAMPING RESISTANCE, RELAY MUST HAVE CHARGING / DISCHARGING RATE SELECTION</b></p> <p>a APFI Plant <b>50 KVAR</b> Complete in all respect as per single line diagram.</p> <p>b APFI Plant <b>25 KVAR</b> Complete in all respect as per single line diagram. <b><u>Thimbles must be covered with fire retardant tape.</u></b> <b><u>Fire resistance pad must be installed on panel top plates.</u></b> <b>Sub Total</b></p>	9	Nos		-
		8	Nos		-
					-
2.0	<b>CABLE TRAYS &amp; LADDERS</b>				
2.01	<p><b>Powder Coated Ceiling Suspended / Horizontal/ Vertical Cable Tray</b></p> <p>Fabrication, supply at site and installation of <b>Degreased, De-rusted, Hot Dip Galvanized Perforated</b> cable tray with cover made of <b>G.I. sheet</b> 8 ft. to 10 ft. long with sides 4" high with cover to be installed on wall, or in vertical, or above false ceiling in horizontal position or as shown on drawing, including cost of following:</p> <p>-2 M.S threaded hanging rod 1/2" dia. Length 12" or as required as per site.</p> <p>-M.S strip 2" wide x 1/4" thick.</p> <p>-Hilti rawal bolts as per required quantity &amp; size.</p> <p>-Complete hanging system shall be installed at every 36".</p>				

S. No.	Description	Qty	Unit	Rate	Amount
a	<p>The cable tray shall be complete in all respects including cost of all accessories / materials. Cable tray shall be of the following sizes.</p> <p style="text-align: center;"><b>For Power</b></p> <p>9" X 4" MS Cable Tray 16 SWG &amp; MS Cover 18 SWG</p> <p><b>Important Note:</b> Actual length of the cable tray shall be measured at site duly by the contractor under the presence of Engineer Incharge, complete in all respects. Above mentioned lengths are the estimated lengths which are required at site.</p> <p>The contractor shall submit the shop drawings, samples of the brand selected for procurement of cable trays, complete compliance report with BOQ specs prior to the procurement.</p> <p><b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.</p> <p><u>Sub Total</u></p>	0	Rft		-
<b>2.0</b>	<b>POWER CABLES AND CONDUITS</b>				
2.01	<p>Supply at site, installation, testing and commissioning of <b>PVC/XLPE insulated PVC sheathed Non armoured 99.9% pure Copper conductor / Aluminum Conductor power cable 600 / 1000 Volt grade</b> manufactured by any one of the manufacturers as mentioned in Annexure in preinstalled cable tray / trenches cables to be installed as per routes shown on drawings including cost of all necessary materials, connections of cables and identification tags at both ends, cables lugs properly crimped at both ends for the following sizes complete in all respects.</p> <p>Actual length of cables to be installed shall be practically measured at site by the Contractor, duly authenticated by the employers electrical engineer before placing the order with the manufacturer, however, approximate length of cables are shown herewith. Payments shall be made as per actual length installed.</p> <p><b>- Power Cables:</b></p> <p style="text-align: center;"><b>ats to 60HP Pumps isolator box</b></p> <p>i 4 Core 35mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 40HP Pumps isolator box</b></p> <p>ii 4 Core 25mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 20 HP Pumps isolator box</b></p> <p>iii 4 Core 16mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p>				
		600	Rm		-
		288	Rm		-
		3,168	Rm		-

S. No.	Description	Qty	Unit	Rate	Amount
	<b>ats db to aerator isolator box</b>				
iv	5 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	4,920	Rm		-
iv	5 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	1,230	Rm		-
iv	1 Core 10mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		-
iv	1 Core 6mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		-
iv	1 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	12,450	Rm		-
iv	1 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	13,254	Rm		-
-	<b><u>Circuit Protective Conductor</u></b>				
viii	1Core 16mm.sq. Al/XLPE/PVC Ins 600/1000V Cable.	4,056	Rm		-
2.02	<b>P.V.C. Conduit and Accessories</b>				
	Supply at site and installation of heavy duty pipe class D Pipes to be installed under ground, including cost of excavation , including cost of all PVC pipe accessories like bends, sockets, laying of PVC pipe with 4" thick layer of sand beneath pipe, protection and sand tape above pipe, refilling of excavations with sweet earth, ramming, watering cost of labour, material, complete in all respects.	250	Rft		-
i	2" dia. PVC conduit	6150	Rmtr		-
ii	4" dia. PVC conduit	1640	Rmtr		-
	<b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.				
					-
3	<b><u>Clean Agent Fire Suppression for Ele &amp; IT</u></b>				

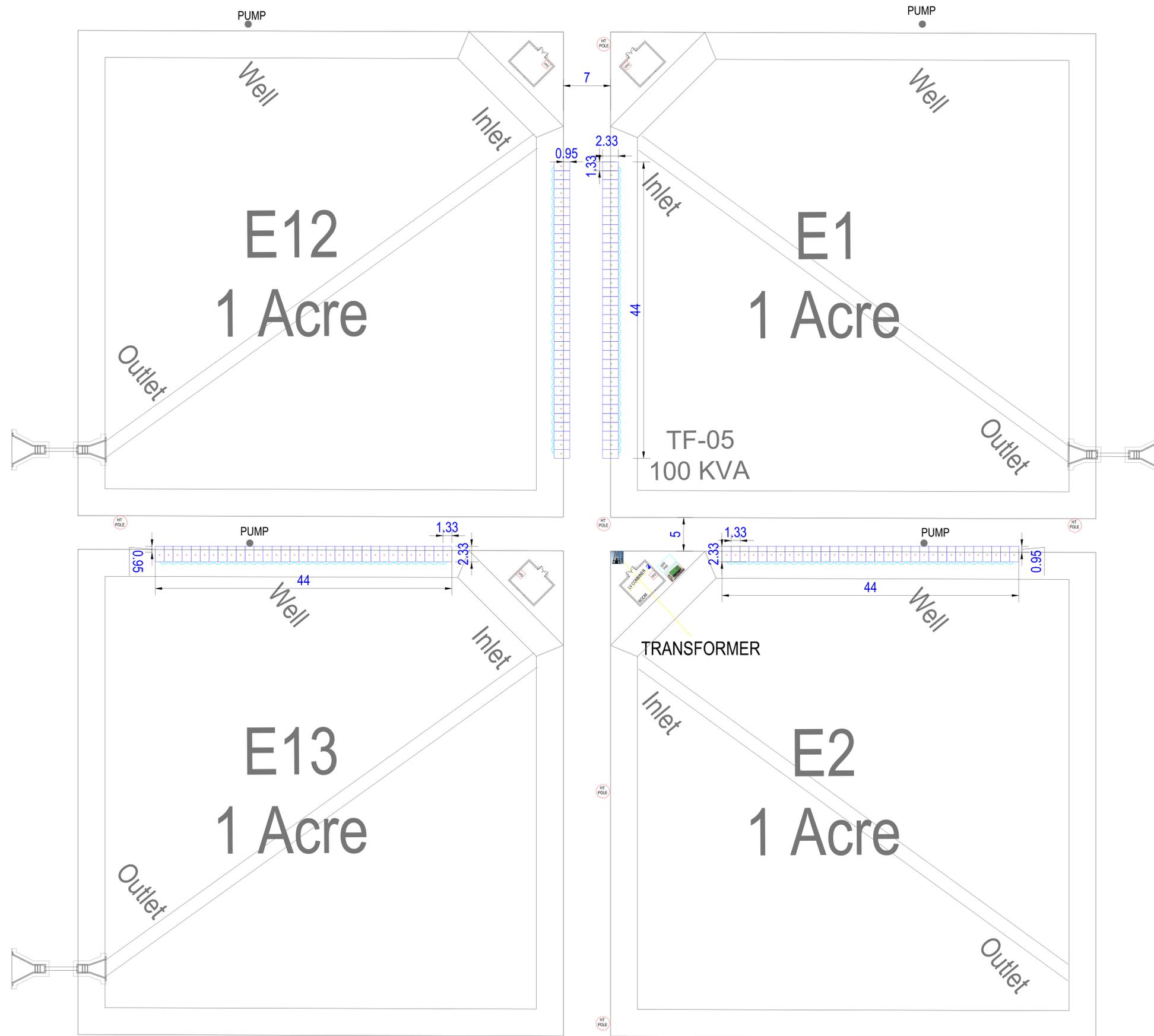
S. No.	Description	Qty	Unit	Rate	Amount
3.01	Supply at site, installation, testing and commissioning of UL Listed Fire extinguishing PEX tubing system for Switchgear Panels, comprising of maximum 3.5 Meters long PEX tube as per requirement Five layered (adhesive resin glue inner / outer layer, barrier layer, Inner outer layer designed to endure with inner pressure and gas barrier layer to prevent inner gas permeation), fire detection ability before temp rising upto 120 deg centigrade, filled with Novec1230 / approved fire extinguishing agent, complete in all respects. Make Erase Tube (Eyelogy) / Approved eqv. The contractor shall provide product's complete technical literature & compliance with UL certification prior to the procurement, complete in all respects. <b>2 Meter /DB Panel</b>	15	Nos		-
	<b>Sub Total</b>				-
<b>4.0</b>	<b>Store Room Electrification</b>				
	<b>Note:-</b> For list of approved manufacturer's see Annexure "A".				
4.01	Supply and wiring of first light from DB MCB with 2x2.5mmsq single core insulated 300/500 volt grade cables(P+N) and 2.5mmsq cable as protective conductor (PC) in & including 1" dia Class-Electrical PVC conduit installed/ recessed in walls / R.C.C. Slab, on ceiling or as required as per site conditions. Complete with all conduit accessories junction boxes, pull boxes as required complete in all respects as per specifications and drawings.	41	Each		-
b	Same as item No. 1.05 above but point to point wiring with 3 x 1.5mmsq PVC insulated Cu.Cond cable (P+N+E), complete in all respects.	0	Each		-
4.02	Wiring of one 15A power sockets from DB MCB to outlet with 2x 4mmsq single core cables (P+N) and 4 mmsq as CPC from DB to point including cost of one Nos. 15A 3 pin switch socket outlet make as approved by consultant & including 1" dia Class-Electrical PVC conduit recessed in walls/R.C.C. slab, or on surface of ceiling including all conduits accessories, junction boxes, pull boxes etc. installed on & including 16 SWG sheet steel boards recessed in walls /columns, Complete in all respects.	41	Each		-
4.03	Providing ,installation ,testing and commissioning of the following <b>lighting fixture</b> including all accessories like mounting arrangement, electronic ballast, drivery circuitry etc. Complete in all respects.				

S. No.	Description	Qty	Unit	Rate	Amount
	General Technical Specification includes color temperature ranging from 2700K to 6000K (As per the Consultant / Architect Approval), CRI:80, having lumen efficacy of atleast 80 lumen/watt and operational power factor of 0.9 Must have IEC CE driver and chipset report ,osram / philips/approved equiv. <b><u>Imp Note: All lighting fixtures and fans will be according to the choice of architect/engr.incharge, complete in all respects. Contractor/manufacturer to get technical submittals of all lighting fixtures approved along with the submission of DIALux/Eqv Illumination study along LM 79, 80 &amp; 81 report, prior to the procurement complete in all respects.</u></b>				
i	1x15W LED downlight SMD type.	82	Nos		-
ii	Supply and installation of <b>following fan</b> ,complete as per specifications and drawings. Wall bracket fan (energy efficient copper wire, 3 speed mode, metal body)	0	Each		-
	<b>Sub Total</b>				-
	<b>Total Carried Over to Summary of Costs</b>				-
	<b>18% GST</b>				-
	<b>Total (Incl of GST)</b>				-

## Note:

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 1) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 2) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
  - 3) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.
  - 4) MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.

Signed &amp; Stamped Of Contractor



CLIENT :  
**A D F**  
**(SWARC)**

PROJECT :  
*SHRIMPESTATE SARGODHA*  
*AT CHAK-58NB*

TITLE :  
**4 POND CLUSTER**

LOCATION:  
*CHAK-58NB*  
*PUNJAB*

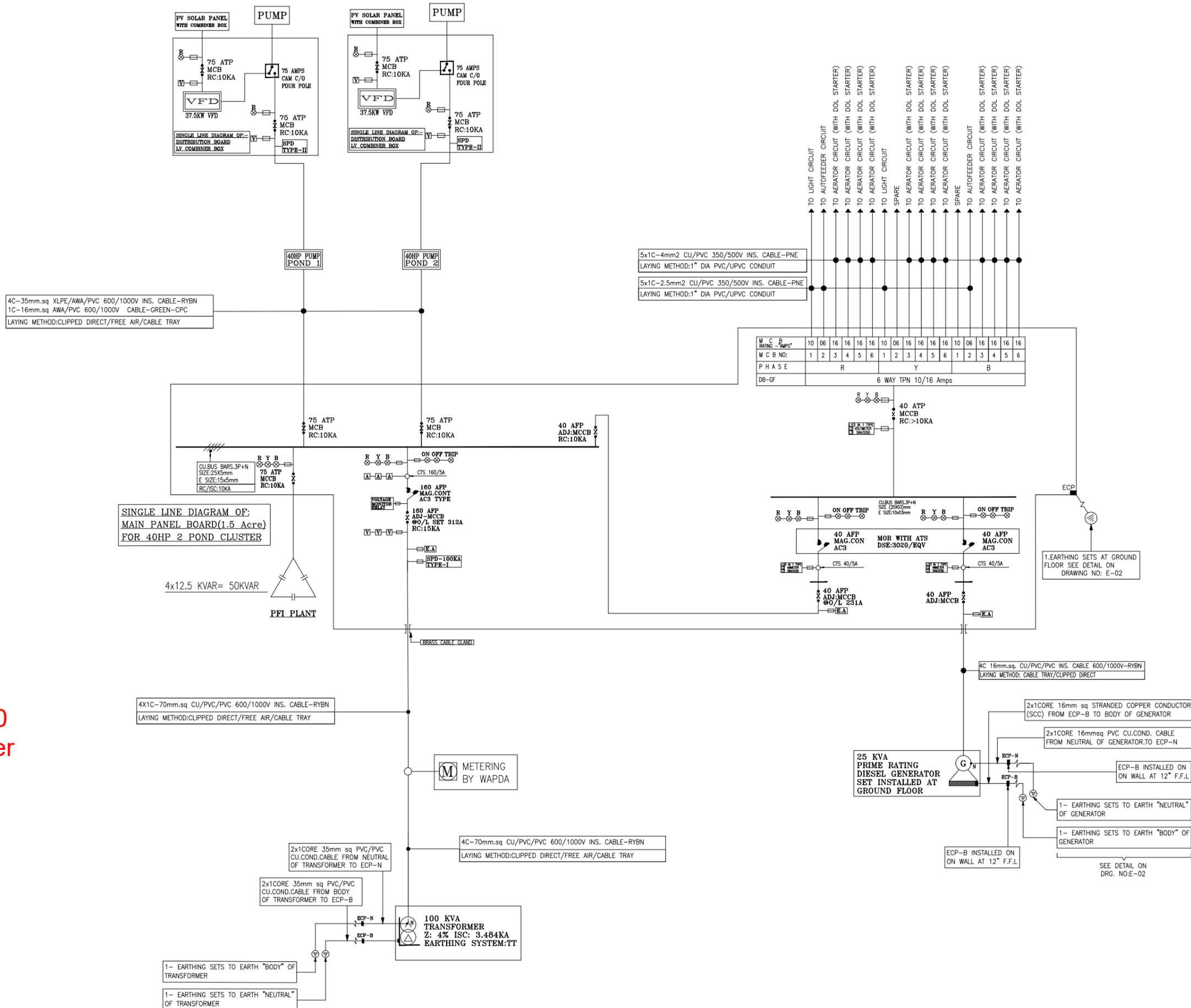
DRAWN BY:  
 BELONGS TO:  
 SECTION:  
 ARCHITECTURE

DATE: **JAN-2026**  
 DWG NO: **SP-01**  
 PROJECT CODE: **-----**





# 2 Pond 40 HP Cluster





### Section-IV: Bid Data Sheet

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

<b>A. Introduction</b>		
<b>BDS Clause Number</b>	<b>ITB Number</b>	<b>Amendments of, and Supplements to, Clauses in the Instruction to Bidders</b>
<b>1.</b>	<b>2.1.1</b>	<p>Name of Procuring Agency: PMU Shrimp Aquaculture, Punjab.</p> <p>The subject of procurement: Electrical &amp; Power Infrastructure Works under the Turn-Key project titled “Establishment of Shrimp Estate with Value Chain components at Chak 58-NB, Tehsil &amp; District, Sargodha”.</p> <p>Period for Design, Supply, Installation, Testing &amp; Commissioning: Within <b>60 days</b> of the Effective Date of this Agreement further one year of operation after commissioning.</p> <p>Commencement date for Design, Supply, Installation, Testing &amp; Commissioning: The successful firm/company shall be bound to provide the required Design, Supply, Installation, Testing &amp; Commissioning and operation after signing the agreement.</p>
<b>2.sss</b>	<b>2.1.2</b>	<p>Financial year for the operations of the Procuring Agency: Financial Year 2025-26</p> <p>Name of Project/ Grant (Development or Non-Development): <b>Establishment of Shrimp Estate with Value Chain components at Chak 58-NB, Tehsil &amp; District, Sargodha.</b></p> <p>Name of financing institution: Aquaculture &amp; Fisheries Department, Punjab.</p> <p>Name and identification number of the Contract: <b>Procurement # PD(PMUSAP)SES-5/2025-26</b></p>
<b>3.</b>	<b>2.1.3 (v)</b>	<p><b>Maximum number of members in case of joint venture, consortium or association shall be:</b></p> <p>The number of members of a joint venture / consortium will be limited to three (03).</p> <p>Joint venture / consortium of any kind is allowed to participate in the bid.</p> <p>The joint venture / consortium must propose the lead member (LM).</p>

		Lead Member shall be local / Pakistan member.
4.	2.1.4	Ineligible country(s) is or are: <b>Not Applicable</b>
5.	2.3.6(iii)	Demonstration of authorization by manufacturer: <b>Not Applicable</b>
<b>B. Bidding Documents</b>		
6.	2.2.2	<b>The address for clarification on Bidding Documents:</b> On request by bidder, only through EPADS portal, not later than February 9, 2026, before 5:00 PM.
7.	2.2.2	Pre-bid meeting: will be held on dated <b>February 04, 2026</b> on 04:00 PM. Those bidders who are interested to participate through online, can request by email: dfshrimpaqua@gmail.com, before February 03, 2026 by 05:00 PM.
8.	2.3.9 & 2.4.1	<b>Single Stage Two Envelopes bidding procedure</b> will be follow, Complete bid containing the Technical (Eligibility & Technical Bid) and Financial Bid, with all required information, documentary evidence, and annexures shall be submitted on the EPADS portal before closing date.
9.	2.3.6 (x)	Pursuant to the requirements as indicated in ITB 2.3.6, the firm/company shall furnish, as part of its Bid, all those documents establishing the eligibility in conformity to the terms and conditions specified in the Bidding Documents for all goods which the firm/company proposes to deliver.
<b>C. Bid Price, Currency, Language and Country of Origin</b>		
10.	2.3.1	Language of bid should be English.
11.	2.3.4	The price quoted shall be in PKR. Including all applicable taxes.
12.	2.1.4 (ii)	Country of origin: All eligible countries to do business in Pakistan by the law of Government of Pakistan.
13.	2.3.4	Prices quoted by the firm/company shall be fixed during the firm/company's performance of the contract, duration of this contract shall be 1 years and 02 months during which the prices shall be fixed, and contract will be Extendable without any price escalation.
<b>D. Preparation and Submission of Bids</b>		
14.	2.1.3	<b>Responsiveness</b>
		Only the bidders / Consortium / Joint Venture fulfilling the responsiveness of the bid shall be considered for further evaluation.

<b>Eligibility / Knock Down Criteria for Firm/Bidder</b>		
<b>Sr. No.</b>	<b>Eligibility Criteria Details</b>	<b>Response/Elaboration/ Proof Required</b>
1	Must be an Active Taxpayer as per "Active Taxpayer List" of FBR. (in case of consortium, Pakistan based lead firm must fulfil this requirement). In case of a Joint Venture, registration as separate entity including all-Joint Venture partner(s) is mandatory.	Attach proof to ascertain as active taxpayer in FBR.
2	Must be registered & active Taxpayer as per "Active Taxpayer List" of General Sales Tax (GST) & Provincial Sales Tax (PST) where applicable. (in case of consortium, Pakistan based lead firm must fulfil this requirement). In case of a Joint Venture, registration as separate entity including all-Joint Venture partner(s) is mandatory.	Attach proof to ascertain that the firm/company is on active list of General Sales Tax (GST) & Provincial Sales Tax (PST).
3	Provide the certificate of Pakistan Engineering Council (PEC) in C1 / CB / CA Category with field of specialization in electrical and civil / infrastructure. (in case of consortium, Pakistan based lead firm must fulfil this requirement). In case of a Joint Venture, registration as separate entity including all-Joint Venture partner(s) is mandatory.	Attach copy of valid certificate of registration with PEC.
4	Registered as certified installers with AEDB under (Certification) Regulations, 2021 Category C-3 or above. (in case of consortium, Pakistan based lead firm must fulfil this requirement). In case of a Joint Venture, registration as separate entity including all-Joint Venture partner(s) is mandatory.	Attach copy of valid certificate of registration.

		5	Affidavit on stamp paper ( <b>duly attested by oath commissioner / notary public</b> ) as per the form 8.6 of the tender documents, declaring that firm / company is not blacklisted by Procuring Agency / Aquaculture and Fisheries Department, Government of Punjab. In case of Consortium / Joint Venture applicable to all members.	Attach copy of Affidavit attested by oath commissioner/ notary public (as per the form 8.6 of tender document) on stamp paper of not less than Rs. 100, declaring that the bidder is not blacklisted.
		6	A duly executed Consortium Agreement on non-judicial stamp paper (not less than the value of PKR. 100) in the case of a Consortium, and a Joint Venture Agreement on non-judicial stamp paper (not less than the value of PKR. 100) in the case of a Joint Venture, clearly identifying the lead member and partner member(s).	(Copy of executed Consortium or Joint Venture Agreement on non-judicial stamp paper).
		7	Bidder must provide manufacturer's authorization letters for Genset & all key components of Solar System.	Copy of Letters is required however; it is recommended that bidder may use format provided <b>8.3. Manufacturer's Authorization Form.</b>
		8	Meet the required technical specification / Scope of work (Section – III- Technical Specification).	Provide the Technical Specification as per Form 8.8 Technical Bid Form in light of Section – III (Technical Specification)
		If the firm/company fails to provide above information or does not fulfil the requirement of, "Eligibility Criteria" shall be disqualified and declared ineligible for taking part in the bidding process and its technical evaluation shall not be carried out.		

15.	2.2.2	<b>Bid submission:</b> Complete bid containing the technical bid in one Envelope/tab and financial bid in separate envelope/tab, with all required information, documentary evidence, and annexures must be submitted on the EPADS portal before closing date & Time.
16.	2.4.2	The deadline for Bid submission is: <b>February 16, 2026, at 11:00 PM</b>
17.	2.5.1	Technical Proposals shall be publicly opened on the same day i.e., <b>February 16, 2026</b> , at 11:30 PM in the presence of bidder's representatives who wish to attend, it at 9-A Bahawalpur Road, Chauburji, Lahore – Pakistan.
18.	2.6.2	<p><b>Amount of Performance Guarantee:</b> The successful bidder will submit a performance guarantee in form of pay-order/ bank guarantee/ demand draft/ Call Deposit Receipt (CDR) of 10% of contract value at the time of contract signing <b>which will be returned after thirty (30) days of completion of commissioning on quarterly basis (in four installments, 2.5% each) during one-year operational services of the contract subject to satisfactory performance report from the Deputy Director Shrimp Estate Sargodha.</b></p> <p>Performance Guarantee must have a minimum validity period until the date of expiry of warranty period, support period or termination of contract, or fulfillment of all obligations under the contract, whichever is later. Performance Guarantee shall not be acceptable with any validity less than the prescribed time period.</p> <p>The bidder shall cause the validity period of the performance guarantee to be extended for such period(s) as the contract performance may be extended.</p> <p><b><u>Penalty Charges on Late Submission of Performance Guarantee by the bidder.</u></b></p> <p>A sum of money @0.25% of the total Performance Guarantee, for every day beyond fifteen (15) days of the issuance of notification of award / Letter of Intent (LOI) from the Procuring Agency, will be deducted as Penalty Charges. Provided that total amount of Penalty Charges so deducted shall not exceed, an amount equal to the value of Bid Security.</p>
19.	2.3.8	<p><b>Estimated Contract Price is: PKR 1,023,686,000/-</b></p> <p><b>Amount of Bid security is: Bid Security of 2% i.e., Rs.20,473,720 (Twenty million four hundred seventy-three thousand and seven hundred twenty Rupees only) in the form of a pay-order/ demand draft favoring "PMU Shrimp Aquaculture Punjab, Lahore"</b></p>

		<ul style="list-style-type: none"> <li>• Bid security must be submitted to PMU at 9-A-Bahawalpur Road Chauburji, Lahore – Pakistan <b>before the opening of the bid</b> (Please mention the title of the procurement on envelope).</li> <li>• <b>If the original bid security is not delivered before the closing time of the bid, the bidder shall be disqualified for further proceeding.</b></li> <li>• The Bid Security should be valid for a period not less than 6 months and a scanned copy must be attached in the technical envelope of the EPADS portal.</li> <li>• Bid Security of disqualified bidders will be returned after awarding the contract to the successful bidder on request.</li> </ul>
20.	2.3.9	<p><b>Bid validity period after opening of the Bid is:</b> The bid shall remain valid for the period of <b>180</b> days from the date of bid opening.</p>
<b>E. Opening and Evaluation of Bids</b>		
21.	2.5.1	<p>The Bid opening shall take place at: In the office of Project Director PMU at 9-A-Bahawalpur Road Chauburji, Lahore – Pakistan.</p>
22.	2.5.7	<p>The currency used for Bid evaluation and comparison purposes to convert all Bid prices expressed in various currencies shall be: PKR</p> <p>The rate of exchange shall be the selling rate, prevailing on the date of opening of (financial) bids specified in the bidding documents, as notified by the State Bank of Pakistan / National Bank of Pakistan on that day.</p> <p>In case of holiday in State Bank of Pakistan / National Bank of Pakistan on the day of opening financial bids, then previous working day's ex-change rates will prevail.</p>
<b>F. Bid Evaluation Criteria</b>		
23.	2.5.8	<p>The technical proposal of eligible bidders will be evaluated against requirements specified in the evaluation criteria given below in section "Technical Evaluation Criteria".</p> <p>In case of Consortium / Joint Venture all partners will be evaluated <b>cumulatively. Passing marks for the technical qualification are 65.</b> The Financial bid of only technically qualified bidders shall be opened.</p>
24.	2.5.8	<p>Financial Evaluation Criteria: Contract shall be awarded based on <b>Least Cost Selection Method.</b></p> <p>The Financial Proposals for only eligible bidders who have technically qualified will be opened publicly in the presence of bidders or their representatives who may choose to be present, at the time and place announced prior to the opening.</p>

		Provide information regarding Financials Bid Form / Price Schedule 8.10 and financial envelope at EPADS portal.
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**Technical Evaluation Criteria:**

Sr. No.	Descriptions	Total Points	Category Points	Remarks (Attachment of relevant evidence in each case is mandatory. In case of non-compliance, no mark will be awarded)
<b>1</b>	<b>Past Relevant Experience (Last 05 years)</b>	<b>20</b>		Documentary proof (copies of signed contract / Purchase Order along with completion certificate from the client) should be furnished with technical proposal. If no valid attachment is provided in this section, then zero (0) marks for this section will be awarded.
	More than (03) projects of similar nature completed, not less than 4 MW, each.		20	
	More than (02) projects of similar nature completed, not less than 4 MW, each.		15	
	More than (01) projects of similar nature completed, not less than 4MW, each.		10	
<b>2</b>	<b>Ongoing Projects</b>	<b>10</b>		Documentary proof (copies of signed contract / Purchase Order) should be furnished with technical proposal. If no valid attachment is provided in this section, then zero (0) marks for this section will be awarded.
	Two or more ongoing energy projects energy not less than 4 MW each.		10	
	One ongoing energy project not less than 4 MW		05	
Note: Similar nature means Solar System with Electrification along with ground-based structure / Genset with minimum capacity of 4 MW power system.				
<b>3</b>	<b>Personnel/HR Requirements</b>	<b>20</b>		Provide the complete CV along with experience certificates, valid PEC registration certificate (only for BSc Engineer) and degrees. If no valid attachment is provided in this section, then zero (0) marks for this section will be awarded.
	<ul style="list-style-type: none"> <li>• <b>6 Nos. of PEC Registered Engineering Graduates:</b> <ul style="list-style-type: none"> <li>i. 01 Electrical Engineer (Power &amp; Generation Specialist) with minimum 10 years' experience in relevant field.</li> <li>ii. 01 Electrical Engineer (Power &amp; Solar Specialist) with minimum 10 years' experience in relevant field.</li> <li>iii. 01 Electrical Engineer (Power Communication Specialist) with minimum 10 years' experience in relevant field.</li> </ul> </li> </ul>		20	

	<ul style="list-style-type: none"> <li>iv. 02 Civil Engineers (M.Sc. with 5 years' experience as Structure Specialist or B.Sc. with 10 years' experience as Structure Specialist.</li> <li>v. 01 Mechanical Engineer (Fabrication Specialist with minimum 10 years relevant experience.</li> <li>vi. <b>12 Associate Engineer (DAE) / B Tech:</b> (2 with each above engineer) with minimum 5 years relevant experience.</li> </ul>			
	<ul style="list-style-type: none"> <li>• <b>4 Nos. of PEC Registered Engineering Graduates:</b> <ul style="list-style-type: none"> <li>i. 01 Electrical Engineer (Power &amp; Generation Specialist) with minimum 10 years' experience in relevant field.</li> <li>ii. 01 Electrical Engineer (Power &amp; Solar Specialist) with minimum 10 years' experience in relevant field.</li> <li>iii. 01 Civil Engineers (M.Sc. with 5 years' experience as Structure Specialist or B.Sc. with 10 years' experience as Structure Specialist.</li> <li>iv. 01 Mechanical Engineer (Fabrication Specialist with minimum 10 years relevant experience.</li> <li>v. <b>8 Associate Engineer (DAE) / B Tech:</b> (2 with each above engineer) with minimum 5 years relevant experience.</li> </ul> </li> </ul>		10	
<b>4</b>	<b>Value of Projects of Similar Nature conducted in Last 3 Years</b>	<b>15</b>		Documentary proof (copies of signed contract / purchase order along with completion certificate reflecting the contract value. If no valid attachment is provided in this section, then zero (0) marks for this section will be awarded.
	Total Value of Projects 3,000M PKR or above.		15	
	Total Value of Projects 2,000M PKR or above.		10	
	Total Value of Projects 1000M PKR or above.		05	
<b>5</b>	<b>Average Annual Turn Over/ Sales/ Revenue in last three years</b>	<b>20</b>		Tax Returns or Copy of financial audit reports & statements of 2022-23 / 2023-24 / 2024 - 25 done by ICAP / SBP / ICMAP registered auditing firm (where
	Average of last three years Annual Turn Over/ Sales/ Revenue PKR 1,000M or above.		20	

	Average of last three years Annual Turn Over/ Sales/ Revenue PKR 700M or above.		15	applicable as per the law)
	Average of last three years Annual Turn Over/ Sales/ Revenue PKR 400M or above.		10	
<b>6</b>	<b>Average of last three years Annual value of Plants &amp; Machinery owned by bidder/Firm</b>	<b>15</b>		Copy of financial audit reports & statements of 2022-23 / 2023-24 / 2024 -25 done by ICAP / SBP / ICMAP registered auditing firm (where applicable as per the law).
	PKR 100M or above.		15	
	PKR 80M or above		10	
	PKR 60M or above.		05	
<b>Total Points Awarded</b>		<b>100</b>		

## G. Award of Contract

2.6.5	Percentage for quantity increase or decrease is: [ <i>Insert percentage, but not more/ less than 15%</i> ].
2.6.2	The Performance Guarantee: Successful bidder will submit a performance guarantee in form of pay-order or bank guarantee or demand draft or Call Deposit Receipt (CDR) of 10% of contract value within fifteen (15) days of the receipt of notification of award/letter of Intent (LOI) from the Procuring Agency <b>which will be returned after thirty (30) days of completion of commissioning on quarterly basis (in four installments, 2.5% each) during one year operational services of the contract subject to satisfactory performance report from the Deputy Director Shrimp Estate Sargodha.</b> Performance guarantee validity should be upto the contract period.
2.6.2	The Performance Security (or guarantee) shall be in the form of pay-order or bank guarantee or demand draft or Call Deposit Receipt (CDR)

## **Section-V: General Conditions of Contract**

### **1. Definitions**

1.1 In this Contract, the following terms shall be interpreted as indicated:

- a. "The Contract" means the agreement entered into between the Procuring Agency and the Supplier, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- b. "The Contract Price" means the price payable to the Supplier under the Contract for the full and proper performance of its contractual obligations.
- c. "The Goods" means all of the equipment, machinery, and/or other materials which the Supplier is required to supply to the Procuring Agency under the Contract.
- d. "The Services" means those services ancillary and related to the supply of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, maintenance & repair and other such obligations of the Supplier covered under the Contract.
- e. "GCC" means the General Conditions of Contract contained in this section.
- f. "SCC" means the Special Conditions of Contract.
- g. "The Procuring Agency" means the organization purchasing the Goods & Services, as named in SCC.
- h. "The Procuring Agency's country" is the country named in SCC.

- i. "The Supplier" means the Bidder or firm supplying the Goods and Services under this Contract.
- j. "The Project Site," where applicable, means the place or places named in SCC.
- k. "Day" means calendar day.

**2. Application**

2.1. These General Conditions shall apply to the extent that they are not superseded by provisions of other parts of the Contract.

**3. Country of Origin**

*[where applicable]*

3.1. All Goods and Services supplied under the Contract shall have their origin in the countries and territories eligible under the rules, as further elaborated in the SCC.

3.2. For purposes of this Clause, "origin" means the place where the Goods were mined, grown, or produced, or from where the Services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially recognized new product is obtained that is substantially different in basic characteristics or in purpose or utility from its components.

3.3. The origin of Goods and Services is distinct from the nationality of the Supplier. In any case, the requirements of rules 10 & 26, PPR-14, shall be followed.

**4. Standards**

4.1. The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, to the authoritative standards appropriate to the Goods' country of origin. Such standards shall be the latest issued by the concerned institution.

**5. Use of Contract Documents and Information; Inspection and Audit by the procuring agency.**

5.1. The Supplier shall not, without the Procuring Agency's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the Procuring Agency in connection therewith, to any person other than a person employed by the Supplier in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for purposes of such performance.

5.2. The Supplier shall not, without the Procuring Agency's prior written consent, make use of any document or information enumerated in GCC Clause 5.1 except for purposes of executing the Contract.

5.3. Any document, other than the Contract itself, enumerated in GCC Clause 5.1 shall remain the property of the Procuring Agency and shall be returned (all copies) to the Procuring Agency on completion of the Supplier's performance under the Contract if so required by the Procuring Agency.

5.4. The Supplier shall permit the Procuring Agency to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by the donors, if so required by the donors.

## **6. Patent Rights**

6.1. The Supplier shall indemnify the Procuring Agency against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof in the Procuring Agency's country.

## **7. Performance Guarantee**

7.1. Within fifteen (15) days *[to be decided by the procuring agency]* of receipt of the notification of Contract award, the successful Bidder shall furnish to the Procuring Agency the Performance Guarantee in the amount specified in SCC/Bid Data Sheet & clause 2.6.2 of ITB.

7.2. The proceeds of the Performance Guarantee shall be payable to the Procuring Agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

7.3. As per Rule-56 of PPR-14, the performance guarantee shall be denominated in the currency of the Contract acceptable to the Procuring Agency and shall be in one of the following forms:

- a) a bank guarantee or an irrevocable letter of credit issued by a reputable bank located in the Procuring Agency's country, in the form provided in the Bidding documents or another form acceptable to the Procuring Agency; or
- b) a Bank Guarantee, Bank call-deposit (CDR), Demand Draft (DD), Pay Order (PO) or Banker's cheque cashier's or certified cheque or CDR.

7.4. The performance guarantee will be discharged by the Procuring Agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless specified otherwise in SCC.

## **8. Inspections and Tests**

8.1. The Procuring Agency or its representative shall have the right to inspect and/or to test the Goods to confirm their conformity to the Contract specifications

at no extra cost to the Procuring Agency. SCC and the Technical Specifications shall specify what inspections and tests the Procuring Agency requires and where they are to be conducted. The Procuring Agency shall notify the Supplier in writing, in a timely manner, of the identity of any representatives nominated for these purposes.

8.2. The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at point of delivery, and/or at the Goods' final destination. If conducted on the premises of the Supplier or its subcontractor(s) (if so allowed by the Procuring Agency), all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Procuring Agency.

8.3. Should any inspected or tested Goods fail to conform to the Specifications, the Procuring Agency may reject the Goods, and the Supplier shall either replace the rejected Goods or make alterations necessary to meet specification requirements free of cost to the Procuring Agency.

8.4. The Procuring Agency's right to inspect, test and, where necessary, reject the Goods after the Goods' arrival in the Procuring Agency's country shall in no way be limited or waived by reason of the Goods having previously been inspected, tested, and passed by the Procuring Agency or its representative prior to the Goods' shipment from the country of origin.

8.5. Nothing in GCC Clause 8 shall in any way release the Supplier from any warranty or other obligations under this Contract.

## **9. Packing**

9.1. 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. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, 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.

9.2. 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 SCC, and in any subsequent instructions ordered by the Procuring Agency.

**10. Delivery and Documents**

10.1. Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in the Schedule of Requirements. The details of shipping and/or other documents to be furnished by the Supplier are specified in SCC.

*[in case of Framework Modality the Procuring Agency may amend these condition as per its requirements]*

10.2. Upon delivery, the Procuring Agency shall give receiving certificate to the supplier with the statement that, "completion certificate along with satisfactory report shall be issued after due inspection as per clause-8 of GCC, which will enable the supplier to put up the bill".

*[Further conditions may be incorporated by the Procuring Agency keeping in view the nature of contract, DDP, CIF, C&F, FOR, FOP for example; for a DDP contract the clause may be as follows:].*

10.3. For purposes of the Contract, DDP trade term used to describe the obligations of the parties shall have the meanings assigned to them by the current edition of *Incoterms*

10.4. Documents to be submitted by the Supplier are specified in SCC.

**11. Insurance**

*[If required and decided by the Procuring Agency]*

11.1. The Goods supplied under the Contract shall be delivered *[form of content to be decided by the Procuring Agency]* duty form paid under which risk is transferred to the buyer after having been delivered, hence *[details coverage to be decided by the Procuring Agency]* is sellers responsibility.

**12. Transportation**

12.1. The Supplier is required under the Contract to transport the Goods to a specified place of destination within the Procuring Agency's country, including *(details to be decided by Procuring Agency as per requirement)* insurance and storage, as shall be specified in the Contract, and related costs shall be included in the Contract Price.

**13. Incidental Services**

*[If required and decided by the Procuring Agency]*

13.1. The Supplier may be required to provide any or all of the following services, including additional services, if any, specified in SCC:

- a. satisfactory performance for specified time/ quantity on-site and/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. Ifurnishing 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 Procuring Agency's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.

13.2. Prices charged by the Supplier for incidental services shall be included in the Contract Price for the Goods and shall not exceed:

- (i) the prevailing rates charged for other parties by the Supplier for similar services; and
- (ii) original price of goods.

**14. Spare Parts**

*[If required and decided by the Procuring Agency]*

14.1. As specified in SCC, the Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:

- a. such spare parts as the Procuring Agency may choose to purchase from the Supplier, provided that this choice shall not relieve the Supplier of any warranty obligations under the Contract; and
- b. in the event of termination of production of the spare parts:
- c. advance notification to the Procuring Agency of the pending termination, in sufficient time to permit the Procuring Agency to procure needed requirements; and
- d. following such termination, furnishing at no cost to the Procuring Agency, the blueprints, drawings, and specifications of the spare parts, if requested.

**15. Warranty**

15.1. The Supplier warrants that the Goods supplied under the Contract are new, unused, of the most recent or current models selected by the Procuring Agency, and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Supplier further warrants that all Goods supplied under this Contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by the Procuring Agency's specifications) or from any act or omission of the Supplier,

that may develop under normal use of the supplied Goods in the conditions prevailing in the country of final destination.

15.2. This warranty shall remain valid **as required in Section – III “Technical Specifications”** 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 Contract, or **as required in Section – III “Technical Specifications”** after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise in SCC.

15.3. The Procuring Agency shall promptly notify the Supplier in writing of any claims arising under this warranty.

15.4. Upon receipt of such notice, the Supplier shall, within the period specified in SCC and with all reasonable speed, repair or replace the defective Goods or parts thereof, without costs to the Procuring Agency.

15.5. If the Supplier, having been notified, fails to rectify the defect(s) within the period specified in SCC, within a reasonable period, the Procuring Agency may proceed to take such remedial action as may be necessary, at the Supplier’s risk and expense and without prejudice to any other rights which the Procuring Agency may have against the Supplier under the Contract/relevant provision of PPR-14 including Blacklisting.

## **16. Payment**

16.1. The method and conditions of payment to be made to the Supplier under this Contract shall be specified in SCC.

16.2. The Supplier’s request(s) for payment shall be made to the Procuring Agency in writing, accompanied by an invoice describing, as appropriate, the Goods delivered and Services performed, and by documents submitted pursuant to GCC Clause 10, and upon fulfillment of other obligations stipulated in the Contract.

16.3. As per rule-62 of PPR-14, payments shall be made promptly by the Procuring Agency, but in no case later than thirty (30) days after submission of an invoice or claim by the Supplier, provided the work is satisfactory.

16.4. The currency of payment is **as mentioned in Section – III “Technical Specifications”**

**17. Prices** 17.1. Prices charged by the Supplier for Goods delivered and 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 SCC.

**18. Change Orders** 18.1. The Procuring Agency may at any time, by a written order given to the Supplier pursuant to GCC Clause 31, make changes within the general scope of the Contract, only if required for the successful completion of the job, 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 Procuring Agency;
- b. the method of shipment or packing;
- c. The place of delivery; and/or
- d. the Services to be provided by the Supplier.

18.2. 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 delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within thirty (30) days from the date of the Supplier's receipt of the Procuring Agency's change order. But, in no case, the overall impact of the change should exceed 15% of the contract cost and no provisions of PPR-14 should be violated.

**19. Contract Amendments** 19.1. Subject to GCC Clause 18, no variation in or modification of the terms of the Contract shall be made except by the mutual consent through written amendment signed by the parties. No variation in finalized brands/makes/models shall be allowed except in special conditions where the manufacturer has stopped producing or suspended that model or the latest model of similar series or version has been launched by the manufacturer or non-availability due to international mergers of the manufacturers or similar unavoidable constraints.

**20. Assignment** 20.1. The Supplier shall not assign the whole of contract to anybody else. However, some parts of contract or its obligations may be assigned to sub-contractors with the prior written approval of the procuring agency.

**21. Sub-contracts**

21.1. The Supplier shall notify the Procuring Agency in the Bid of all subcontracts to be assigned under this Contract. Such notification, in the original Bid or later, shall not relieve the Supplier from any liability or obligation under the Contract.

21.2. Subcontracts must comply with the provisions of GCC Clause 20.

**22. Delays in the Supplier’s Performance**

22.1. Delivery of the Goods and performance of Services shall be made by the Supplier in accordance with the time schedule prescribed by the Procuring Agency in the Schedule of Requirements-

22.2. If at any time during performance of the Contract, the Supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Procuring Agency in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier’s notice, the Procuring Agency shall evaluate the situation and may at its discretion extend the Supplier’s time for performance, with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of Contract.

22.3. Except as provided under GCC Clause 25, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 23, unless an extension of time is agreed upon pursuant to GCC Clause 22.2 without the imposition of liquidated damages.

**23. Liquidated Damages**

23.1. Subject to GCC Clause 25, if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Procuring Agency shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in 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 SCC. Once the maximum is reached, the Procuring Agency may consider termination of the Contract pursuant to GCC Clause 24 along with other remedies available under PPR-14.

**24. Termination for Default**

24.1. The Procuring Agency, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, may terminate this Contract in whole or in part:

- a. if the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Contract, or within any extension thereof granted by the Procuring Agency pursuant to GCC Clause 22;
- b. if the Supplier fails to perform any other obligation(s) under the Contract; or
- c. if the Supplier, in the judgment of the Procuring Agency has engaged in corrupt practices in competing for or in executing the Contract. For the purpose of this clause, corrupt practices will be defined as per Section-2 (d) of The PPRA Act, 2009.

*“Corrupt practices” in respect of procurement process, shall be as given in S-2 (d) of PPRA, Act, 2009:*

*1.2 “corrupt practice” means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official, bidder or Contractor in the procurement process or in Contract execution to the detriment of the procuring agency; or misrepresentation of facts in order to influence a procurement process or the execution of a Contract, collusive practices among bidders (prior to or after bid submission) designed to establish bid prices at artificial, noncompetitive levels and to deprive the procuring agency of the benefits of free and open competition and any request for, or solicitation of anything of value by any public official in the course of the exercise of his duty; it may include any of the following:*

- vi. coercive practice by impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence the actions of a party to achieve a wrongful gain or to cause a wrongful loss to another party;*
- vii. collusive practice by arrangement between two or more parties to the procurement process or Contract execution, designed to achieve with or without the knowledge of the procuring agency to establish prices at artificial, noncompetitive levels for any wrongful gain;*
- viii. offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence the acts of another party for wrongful gain;*
- ix. 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;*
- x. obstructive practice by harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a Contract or deliberately destroying, falsifying, altering or concealing of evidence material to the*

*investigation or making false statements before investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; 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 acts intended to materially impede the exercise of inspection and audit process*

24.2. In the event the Procuring Agency terminates the Contract in whole or in part, pursuant to GCC Clause 24.1, the Procuring Agency may procure, upon such terms and in such manner as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Procuring Agency for any excess costs for such similar Goods or Services. However, the Supplier shall continue performance of the Contract to the extent not terminated.

## **25. Force Majeure**

25.1. Notwithstanding the provisions of GCC Clauses 22, 23, and 24, the Supplier shall not be liable for forfeiture of its Performance Guarantee, 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.

25.2. For purposes of this clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the Procuring Agency in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes. Both, the Procuring Agency and the Supplier, may agree to exclude certain widespread conditions e.g: epidemics, pandemics, quarantine restrictions etc from the purview of "Force Majeure".

25.3. If a Force Majeure situation arises, the Supplier shall promptly notify the Procuring Agency in writing of such condition and the cause thereof. Unless otherwise directed by the Procuring Agency 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. Any difference of opinion concerning "Force Majeure" may be decided through means given herein below.

## **26. Termination for Insolvency**

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

**27. Termination for Convenience** 27.1. The Procuring Agency, by written 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 Procuring Agency's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective.

27.2. The Goods that are complete and ready for shipment (if applicable) within thirty (30) days after the Supplier's receipt of notice of termination shall be accepted by the Procuring Agency on the Contract terms and prices. For the remaining Goods, the Procuring Agency may choose:

- (a) to have any portion completed and delivered at the Contract terms and prices; and/or
- (b) to cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Services and for materials and parts previously procured by the Supplier.

**28. Resolution of Disputes** 28.1. After signing the contract or issuance of purchase order, The Procuring Agency 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.

28.2. If, after thirty (30) days from the commencement of such informal negotiations, the Procuring Agency and the Supplier have been unable to resolve amicably a Contract dispute, either party may require that the dispute be referred for resolution to the formal mechanisms specified in SCC. These mechanisms may include, but are not restricted to, conciliation mediated by a third party, adjudication in an agreed and/or arbitration as per rule 68 of PPR-14 and in accordance with Arbitration Act-1940.

**29. Governing Language** 29.1. The Contract shall be written in the language specified in SCC. Subject to GCC Clause 30, the version of the Contract written in the specified language shall govern its interpretation. All correspondence and other documents pertaining to the Contract which are exchanged by the parties shall be written in the same language.

**30. Applicable Law** 30.1. The Contract shall be interpreted in accordance with the laws of Punjab (Pakistan) unless otherwise specified in SCC.

**31. Notices**

31.1. Any notice given by one party to the other pursuant to this Contract shall be sent to the other party in writing or by any information technology mean for the time being in use and acceptable in ordinary course of business to the other party's address specified in SCC.

31.2. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

**32. Taxes and Duties**

32.1. Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods & Services to the Procuring Agency. In case of imposition of new taxes/duties or concession thereof after the deadlines for the submission of bids the effect thereof shall be borne or availed by the procuring agency as the case may be.

## **Section-VI. Special Conditions of Contract**

### **Special Conditions of Contract**

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

#### **2. Definitions (GCC Clause 1)**

GCC 1.1 (g)—The Procuring Agency is: **PMU Shrimp Aquaculture Punjab, Lahore**

GCC 1.1 (h)—The Procuring Agency's country is: **Pakistan**

GCC 1.1 (i)—The Supplier is: **Awardee**

#### **2.1 Country of Origin (GCC Clause 3)**

*[All countries and territories as indicated in Section IV, BDS, of the Bidding documents]*

#### **2.2 Performance Guarantee (GCC Clause 7)**

GCC 7.1—As per rule 56 of PPR-14, the amount of Performance Guarantee, as a percentage of the Contract Price, shall be: 10% of contract value.

GCC 7.4—the Performance Guarantee shall be retained for to cover the Supplier's warranty obligations or defect liability period in accordance with Clause GCC 15.2

Performance Guarantee must have a minimum validity to the contract period. Performance guarantee shall not be acceptable with any validity less than the prescribed time period.

The Contractor shall cause the validity period of the performance guarantee to be extended for such period(s) as the contract performance may be extended.

#### **2.3 Inspections and Tests (GCC Clause 8)**

GCC 8.6—Inspection by PMC consultant and tests prior to shipment and at the time of delivery of Goods at the site / any works done at site recommended by PMC consultant and at final acceptance are as followed by final acceptance certificate and inspection certificate by PMC consultant on the basis of inspection / test report.

#### **2.4 Delivery and Documents (GCC Clause 10)**

***[format of contract is to be decided by the Procuring Agency, however, a model provision for DDP is as follows]***

### **Sample provision (DDP terms)**

GCC 10.3—Upon shipment, the Supplier shall notify the Procuring Agency the full details of the shipment, including Contract number, description of Goods, quantity and usual transport document. The Supplier shall mail the following documents to the Procuring Agency:

- (i) copies of the Supplier's invoice showing Goods' description, quantity, unit price, and total amount;
- (ii) original and two copies of the usual transport document (for example, a negotiable bill of lading, a non-negotiable sea waybill, an inland waterway document, an air waybill, a railway consignment note, a road consignment note, or a multimodal transport document) which the buyer may require to take the goods;
- (iii) copies of the packing list identifying contents of each package;
- (iv) insurance certificate
- (v) Manufacturer's or Supplier's warranty certificate;
- (vi) Where applicable (Pre shipment/ port/ Procuring Agency Delivery site, inspection certificate), issued by the Procuring Agency nominated inspection agency, and the Supplier's factory inspection report (Inspection type depends on the nature of procurement and volume of procurement); and
- (vii) Certificate of origin.

[Other similar documents should be listed, depending upon the Incoterm provisions.]

## **2.5 Insurance**

### **(GCC Clause 11) [where applicable]**

GCC 11.1— The Contractor shall, at its own cost, obtain and maintain insurance coverage equal to one hundred percent (100%) of the Contract Price and submit and insurance bond of the same amount from AA+ insurance company.

The insurance shall cover Works, materials, plant, equipment and third-party liability and shall remain valid until completion of the Works and expiry of the Defects Liability Period.

## **8. Incidental Services (GCC Clause 13)**

GCC 13.1—Incidental services to be provided are:

*[Selected services covered under GCC Clause 13 and/or other should be specified with the desired features. The price quoted in the Bid price or agreed with the selected Supplier shall be included in the Contract Price.]*

## **9. Spare Parts**

GCC 14.1—Additional spare parts requirements are: Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods. Other spare parts and components shall be supplied as promptly as possible.

## 10. Warranty

All equipment, systems and components shall be covered by warranties strictly in accordance with the recommendations and standard terms of the respective manufacturers.

The Contractor shall be solely responsible for processing, registration and transfer of all warranties and guarantees in favor of the Employer.

The The existence of manufacturer warranties shall not relieve the Contractor of its contractual obligations.

## 12. Payment (GCC Clause 16)

### ***Sample provision***

GCC 16.1—The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:

The Contract Price shall be based on the approved Bill of Quantities (BOQ) and agreed rates. Payments shall be made through Payment Mechanism, comprising:

- Payments against verified progress of Works by PMC consultant through Interim Payment Certificates (IPCs) component wise;
- Final payment upon completion and acceptance of the Works.

Retention Money shall be deducted from IPCs in accordance with the provisions of this RFP.

### **Retention Money:**

Retention money equivalent to 10% of the amount of IPC submitted by the Contractor shall be deducted at the time of release of payments. The retention money will be released after successful completion and submission of report of O&M period / defect liability period. Whereas.

The Performance Security and Retention Money may be used by the Employer to remedy defaults or defects in accordance with the Contract.

Payment may be made in Pak. Rupees in the following manner: *(to be decided by the Procuring Agency)*

- (i) Running Bill modality.

## 13. Prices (GCC Clause 17)

### ***Sample provision***

GCC 17.1—Prices shall be fixed and shall not be adjusted.

## 14. Liquidated Damages (GCC Clause 23)

GCC 23.1—Applicable rate:

In case of delay in completion of the Works, the Contractor may be liable to pay Liquidated Damages at the rate of 0.1% of the Contract Price per day, subject to a maximum of 10% of the Contract Price.

#### **15. Resolution of Disputes (GCC Clause 28)**

GCC 28.2—The dispute resolution mechanism to be applied pursuant to GCC Clause 28.2 shall be as follows:

As per rule-68 of PPR-14, in the case of a dispute between the Procuring Agency and the Supplier, the dispute shall be referred for arbitration in accordance with the Arbitration Act 1940.

#### **16. Governing Language (GCC Clause 29)**

GCC 29.1—The Governing Language shall be:

#### **17. Applicable Law (GCC Clause 30)**

GCC 30.1-The Contract shall be interpreted in accordance with the laws applicable in the jurisdiction of the province of Punjab (Pakistan):

#### **18. Notices (GCC Clause 31)**

GCC 31.1—Procuring Agency's address for notice purposes:

—Supplier's address for notice purposes:

## **Section-VII. Schedule of Requirements**

### **7.1 Schedule of Requirements**

Works shall be completed within (60) days from the effective date of the contract Agreement.

In case of delay in completion of the Works, the Contractor may be liable to pay Liquidated Damages at the rate of 0.1% of the Contract Price per day, subject to a maximum of 10% of the Contract Price.

## Section-VIII: Forms

### 8.1 Financial Bid Form

**[To be signed & stamped by the Goods Provider and reproduced on the letter head. To be attached with the Financial Bid, in case of Single Stage Two Envelope Procedure]**

Date: \_\_\_\_\_

To: *[name and address of Procuring Agency]*

Gentlemen and/or Ladies:

Having examined the Bidding documents including Addenda Nos. *[insert numbers]*, the receipt of which is hereby duly acknowledged, we, the undersigned, in conformity with the said Bidding documents for the sum of *[total Bid amount in words and figures]* or such other sums as may be ascertained in accordance with the Schedule of Prices attached herewith and made part of this Bid.

We undertake, if our Bid is accepted, specified in the Schedule of Requirements.

If our Bid is accepted, we will obtain the guarantee of a bank in a sum equivalent to \_\_\_\_\_ percent of the Contract Price for the due performance of the Contract, in the form prescribed by the Procuring Agency.

We agree to a Bid by this Bid for a period of *[number]* days from the date fixed to Bid opening under Clause 2.3.8 of the Instructions to Bidders, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

Until a formal Contract is prepared and executed (*if required*), this Bid, together with your written acceptance thereof and your notification of award, shall constitute a binding Contract between us.

The Composition of our bid consists on separate Technical and financial bids, detail of which is as follows:

#### **Technical bid includes the following:-**

- a) Complete bidding document (without filling) signed and stamped by the bidder
- b) All the forms relevant to the technical bid, to be reproduced on the letter head of the bidder as indicated on each individual form.
- c) Copy of bid security form along with copy of financial instruments *[to be decided by the procuring agency i.e. Bank Guarantee / Bank call-deposit (CDR) / Demand Draft (DD) / Pay Order (PO) or Banker's cheque]* valid for sixty (60) Days, beyond the validity of Bid in the manner as prescribed on the bid security form **8.10**.
- d) Any other document required by the procuring agency not inconsistent with PPR-14.

**Financial bid includes the following:-**

- a) Original Bid form (as per **form 8.1** of Bidding documents) on letter head of the firm, duly signed and stamped.
- b) Price schedule / financial form (as per **form 8.10**) to be reproduced on the letter head of the bidder duly signed and stamped.
- c) Original Bid security form (as per **form 8.11**) along with Original financial instrument *[to be decided by the procuring agency i.e. Bank Guarantee / Bank call-deposit (CDR) / Demand Draft (DD) / Pay Order (PO) or Banker's cheque]* valid for sixty (60) Days, beyond the validity of Bid.
- d) *Any other document required by the procuring agency not inconsistent with PPR-14.*

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Name and address of goods provider	Amount and Currency

(if none, state "none")

We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_.

\_\_\_\_\_  
[signature]

\_\_\_\_\_  
[in the capacity of]

Duly authorized to sign Bid for and on behalf of \_\_\_\_\_

## 8.2 Bidder's JV/Consortium Members Information Form

*{To be reproduced and signed & stamped by the lead partner and all JV/consortium members on their letter Pad, to be attached with Technical Bid in addition to the JV/consortium agreement}*

*{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/consortium}.*

*Date: [insert date (as day, month and year) of Bid submission] RFB No.: [insert number of RFB 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/Consortium Member's name: <i>[insert JV's/ Consortium Member legal name]</i>
3. Bidder's JV/ Consortium Member's country of registration: <i>[insert JV's/ Consortium's Member country of registration]</i>
4. Bidder's JV/ Consortium Member's year of registration: <i>[insert JV's/ Consortium's Member year of registration]</i>
5. Bidder's JV/ Consortium Member's legal address in country of registration: <i>[insert JV's/ Consortium's Member legal address in country of registration]</i>
6. Bidder's JV/ Consortium Member's authorized representative information Name: <i>[insert name of JV's/ Consortium's Member authorized representative]</i> Address: <i>[insert address of JV's/ Consortium's Member authorized representative]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers of JV's/ Consortium's Member authorized representative]</i> Email Address: <i>[insert email address of JV's/ Consortium's Member authorized representative]</i>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i>  <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4.  <input type="checkbox"/> In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and that they are not under the supervision of the Purchaser, in accordance with ITB 4.6.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

### 8.3. Manufacturer's Authorization Form

[To be signed and stamped by the Bidder and to be attached with Technical Bid]

[See Clause 2.3.6 (iii) of the Instructions to Bidders.]

To: *[name of the Procuring Agency]*

WHEREAS *[name of the Manufacturer]*, who are established and reputable manufacturers of *[name and/or description of the goods]* having factories at *[address of factory]* do hereby authorize *[name and address of Agent]* to submit a Bid, and subsequently negotiate and sign the Contract with you against for the above goods manufactured by us.

We hereby extend our full guarantee and warranty as per Clause 15 of the General Conditions of Contract for the goods offered for supply by the above firm against this Invitation to Bids.

---

*[Signature for and on behalf of Manufacturer]*

*Note: This letter of authority should be on the letterhead of the Manufacturer and should be signed by a person competent and having the power of attorney to bind the Manufacturer. It should be included by the Bidder in its Bid.*

#### 8.4. Bidder Profile Form

**[To be signed & stamped by the Bidder and reproduced on the letter head. To be attached with Technical Bid]**

Organization Information			
Sr. #	Required Information	Response	
1	The legal name of the organization		
2	Year of Registration / Establishment of the Organization		
3	National Tax Number		
	General / Punjab Sales Tax Number		
5	What is the legal status of your organization? Tick the relevant box (one box only). (Attach Copy/Copies of Registration Certificate/s)	Public Sector Organization	
		Section 42 Company	
		Public Ltd. Company	
		Private Ltd. Company	
		Private Partnership Firm	
		Sole Proprietor	
		Others (Please specify)	
6	Name and designation of 'Head of Organization'		
7	Mobile:		
	Phone/s:		
	Email:		
	Fax:		
	Address of organization:		
	Website address:		
8	Name and designation of 'Contact Person':		
	Phone/s:		
	Mobile:		
	Email:		
	Fax:		

**2.6 Details of Experience (Last \_\_\_\_\_ Years)**

Relevant Experience		
Sr. #	Required Information	Response  (Please provide exact information with the organization name, location/s, and duration)  Provide data in the sequence given below
1	Name of Organizations with addresses	i.
		ii.
		iii.
		iv.
2	Start and end dates of providing Goods/Services (For example – Jan 2010 to September 2020)	i.
		ii.
		iii.
		iv.
3	Goods/Services provided to Number of companies/firms	i.
		ii.
		iii.
		iv.

**8.5. General Information Form**

**[To be signed & stamped by the Bidder and reproduced on the letter head. To be attached with Technical Bid]**

	<b>Particulars</b>			
<b>Company Name</b>				
<b>Abbreviated Name</b>				
<b>National Tax No.</b>			<b>Sales Tax Registration No</b>	
<b>PRA Tax No.</b>				
<b>No. of Employees</b>			<b>Company's Date of Formation</b>	

\*Please attach copies of NTN, GST Registration & Professional Tax Certificate

<b>Registered Office Address</b>		State/Province	
<b>City/Town</b>		Postal Code	
<b>Phone</b>		Fax	
<b>Email Address</b>		Website Address	

## 8.6. Affidavit

**[To be printed on not less than PKR 100 Stamp Paper, duly attested by oath commissioner. To be attached with Technical Bid]**

**Name:** \_\_\_\_\_

*(Applicant)*

I, the undersigned, do hereby certify that all the statements made in the Bidding document and in the supporting documents are true, correct and valid to the best of my knowledge and belief and may be verified by employer if the Employer, at any time, deems it necessary.

The undersigned hereby authorize and request the bank, person, company or corporation to furnish any additional information requested by the *[name of Procuring Agency]* of the Punjab deemed necessary to verify this statement regarding my (our) competence and general reputation.

The undersigned understands and agrees that further qualifying information may be requested and agrees to furnish any such information at the request of the *[name of Procuring Agency]*. The undersigned further affirms on behalf of the firm that:

- (i) is not in bankruptcy or liquidation proceedings.
- (ii) has never been declared blacklisted by PMU Shrimp Aquaculture Punjab / Aquaculture and Fisheries Department, Government of Punjab till date due to the any reasons
- (iii) is not making any misrepresentations or concealing any material fact and detail.
- (iv) has not been convicted of, fraud, corruption, collusion or money laundering.
- (v) is not aware of any conflict of interest or potential conflict of interest arising from prior or existing contracts or relationships which could materially affect its capability to comply with its obligations; and
- (vi) The documents/photocopies provided with Bid are authentic. In case, any fake/bogus document was found at any stage, the firm / company shall be blacklisted as per Law/ Rules.

*[Name of the Contractor/ Bidder/ Supplier]* undertakes to treat all information provided as confidential.

*Signed by an authorized Officer of the company*

Title of Officer: \_\_\_\_\_

Name of Company: \_\_\_\_\_

Date: \_\_\_\_\_

**8.7. Performance Guarantee Form**

*(Applicable in case of Bank Guarantee only)*

[To be signed & stamped by the Bidder and reproduced on the letter head. To be attached with Technical Bid]

To,

*[name and address of the Procuring Agency]*

**WHEREAS** (Name of the Contractor/ Supplier) \_\_\_\_\_ hereinafter called "the Contractor" has undertaken, in pursuance of "INVITATION TO BID FOR THE "PROVISION OF \_\_\_\_\_" procurement of the following:

2.7 **[Please insert details].**

(Here in after called "the Contract").

**AND WHEREAS** it has been stipulated by you in the Contract that the Contractor shall furnish you with a bank guarantee by a scheduled bank for the sum specified therein as security for compliance with the Contractor's performance obligations in accordance with the Contract;

**AND WHEREAS** we have agreed to give the Contractor a Guarantee;

**THEREFORE WE** hereby affirm that we are Guarantor and responsible to you, on behalf of the Contractor, up to a total of \_\_\_\_\_ (Amount of the guarantee in words and figures), and we undertake to pay you, upon your first written demand declaring the Contractor to be in default under the Contract, and without cavil or argument, any sum or sums as specified by you, within the limits of \_\_\_\_\_ (Amount of Guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, or \_\_\_\_\_ [insert number of days] after the rectification of the Defects, whichever is later.

**[NAME OF GUARANTOR]**

Signature \_\_\_\_\_

Name \_\_\_\_\_

Title \_\_\_\_\_

Address \_\_\_\_\_

Seal \_\_\_\_\_

Date \_\_\_\_\_

**8.8. Technical Bid Form**

**[(i)To be signed & stamped by the Bidder and reproduced on the letter head. To be attached with Technical Bid.**

(ii) Item names and quantities must be reproduced from Section – III (Technical Specifications). If any deviations are needed, it must be mentioned/quoted, separately in the Technical Proposal.]

<b>Sr. No.</b>	<b>Item name</b>	<b>Brand name with Country of Manufacturer</b>	<b>Make &amp; model</b>	<b>Quantity</b>	<b>Delivery Days</b>	<b>Country of Origin</b>	<b>Specifications dimensions</b>

**Stamp & Signature of Bidder \_\_\_\_\_**

**8.9. Contract Form**

**DATED\_\_\_\_, 2026**

**AGREEMENT FOR \_\_**

**BETWEEN**

*PMU Shrimp Aquaculture*

*Punjab, Lahore*

*AND*

**[Supplier]**

This **Agreement for the Provision of Imported Shrimp Feed & Feed Additives** (“**Agreement**”) is made at Lahore, Pakistan this \_\_\_day of Month, 2026 (“**Effective Date**”):

*By and Between*

**AQUACULTURE: SHRIMP FARMING IN PUNJAB**, a project of Aquaculture & Fisheries Department of Government of Punjab., having its office at 9-A-Bahawalpur Road Chauburji, Lahore (hereinafter referred to as “**PMU**” which expression shall, wherever the context so requires or permits, include its successors and assigns);

*And*

[**Supplier**], an **supplier for Imported Shrimp Feed & Feed Additives**, having its **office/address at** [ADDRESS] (hereinafter referred to as the “**Supplier**” which expression shall, wherever the context so requires or permits, include his successors and assigns). (**PMU**’ and **Supplier**’ shall individually be referred to as a “**Party**” and collectively as “**Parties**”)

## **RECITALS**

- A. **Whereas**, In this regard PMU desires to engage the Supplier in order to procure the Imported Shrimp Feed & Feed Additives (“**Goods**”) as envisaged herein this Agreement and specified under Annexure-A;
- B. **And Whereas**, the Supplier is desirous of providing services (“**Services**”) under this Agreement;
- C. **And Whereas**, the Supplier has agreed to offer and PMU has agreed to procure the envisaged Services on the terms and conditions set out herein below;
- D. **And Whereas**, the Recitals and appendices attached hereto shall be read and construed as an integral part of this Agreement.

**Now Therefore**, in consideration of the promises and mutual covenants contained herein and other good and valuable consideration, the adequacy of which is hereby acknowledged, the Parties agree as follows:

### *1. Definitions*

In this Agreement, unless the context otherwise requires, the following terms shall have the following meanings:

“**Applicable Law**” means any common or customary law, constitutional law, any statute, regulation, resolution, rule, ordinance, enactment, judgment, order, code, decree, directive, notification, clarification,

guideline, policy, requirement or any other governmental direction having the force of law and any form or decision of or determination by or interpretation of any of the foregoing by any competent authority or governmental body or department, now or hereafter in effect, in each case as amended, re-enacted or replaced to the extent applicable to any of the Parties;

**"Contract"** means the agreement entered into between PMU and the Supplier, as recorded in the contract form signed by the parties, including all attachments and appendices thereto, and all documents incorporated by reference therein.

**"Contract Price"** means the price payable to the Supplier under the Contract for the full and proper performance of its contractual obligations.

**"Confidential Information"** has the meaning given to the term found in Clause 14 below.

**"Party"** or **"Parties"** shall have the meaning set forth in this Agreement;

**"Services"** shall mean the services to be provided by the Supplier to PMU as more specifically described in Annexure A hereto;

**"Tax"** or **"Taxes"** shall mean any tax, charges, excise, fees, impost, tariff, duty, levy, and all other assessments, which may now or hereafter be enacted, levied or imposed, directly or indirectly, by the relevant authority.

**"Terms"** shall mean these General Terms and Conditions including all Annexures attached hereto. **"UAC"** shall mean the User Acceptance Certificate issued by PMU to the Supplier after the UAT has been conducted.

**"UAT"** shall mean User Acceptance Testing.

### **1.1. Interpretation**

Headings in these Terms are inserted only for convenience and shall not affect its construction and interpretation; the singular includes the plural, the masculine includes the feminine, and vice-versa where the context requires; a reference to any Clause or Annexure shall be construed as a reference to a clause or annexure to these Terms; Annexures to these Terms shall be an integral and operative part of this Agreement and any breach thereof or any misrepresentation contained therein shall entitle the Parties to the same remedies as are available in respect of other terms of the Agreement.

## **2. Scope of Work**

2.1. Supplier agrees to provide the Services in accordance with the specifications detailed under **Annexure A** (Scope of Work and Specifications of Goods) subject to negotiations in accordance with the Punjab Procurement Rules 2014 ("**PPRA 2014**").

2.2. Supplier further agrees to provide all related services which may be required by PMU at any time during the term of this Agreement.

## **3. Term & Payment**

3.1. This Agreement shall come into force on Month \_\_, 2026 and shall remain valid till [MM-DD, YY], the duration of this Agreement is six months (extendable).

3.2. Time is of the essence in this Agreement and, whenever a date or time is set forth in this Agreement, the same has entered into and formed a part of the consideration for

this Agreement.

In case of any delays in the performance by the Supplier, PMU shall be entitled to deduct up to 10% of the total contract value.

- 3.3. In consideration of the satisfactory provision of Services and related services, PMU shall pay an amount (inclusive of all applicable taxes & out of pocket expenses) of Pakistani Rupees (PKR) [INSERT] /- as per the payment terms (Annexure – B).
- 3.4. Subject to the terms and conditions of this Agreement, PMU shall pay the complete and valid invoice within thirty (30) days after the receipt of the invoice and the submission of the UAC.
- 3.5. All payments made hereunder shall be made subject to applicable tax deductions.

#### **4. Bid Security**

- 4.1. The Supplier shall furnish a bid security of PKR \_\_\_\_\_ to PMU in the form specified in clause 4.3.
- 4.2. The proceeds of the bid security shall be payable to PMU as compensation for any loss resulting from the Supplier's failure to proceed with the contract and complete its obligations.
- 4.3. The bid security shall be in the form of a pay-order or demand draft favoring PMU.
- 4.4. The Supplier shall ensure that the bid security holds a minimum validity period of six (6) months and it must be enclosed with the financial bid.

#### **5. Obligations**

- 5.1. In providing the Goods and related Services to PMU, the Supplier shall, at all times, observe and comply with all the guidelines and policies of PMU communicated to the Supplier from time to time.
- 5.2. Unless agreed otherwise in writing between the Parties, the Supplier shall ensure the delivery of the Goods, any related goods, items or services within \_\_\_ days from the signing of the contract or the date of issuance of the purchase order ("Purchase Order").
- 5.3. Supplier acknowledges that the Goods shall be subject to UAT by PMU, and shall ensure that the rectification of any issues regarding the Goods are made/done within 24 hours of receipt of request, whether written or oral, by PMU.
- 5.4. Supplier shall ensure all the Goods and ancillary items supplied pursuant to this Agreement are genuine and compatible with the existing infrastructure of PMU.
- 5.5. Supplier shall ensure that the Services provided pursuant to the Agreement are up to the standards as communicated by PMU and PMU has the right to request changes to the deliverables and Services provided by the Supplier to ensure that the Services are as per the requirement and expectation of PMU.
- 5.6. Supplier shall ensure that the Services provided are of the best quality and are in accordance with the specifications communicated by PMU to the Supplier and as laid

down in Annexure A.

- 5.7. Supplier shall retain and maintain all records related to the Agreement during the life of the Agreement and five (05) years after the expiry of this Agreement.
- 5.8. Supplier shall carry out all activities under this Agreement with the highest standards of quality, professional and ethical competency and integrity.
- 5.9. Supplier shall further ensure that it has obtained all permissions to use, install, repair, maintain etc. the Goods from the original manufacturer, if required.

## **6. *Warranties and Representations***

### **6.1. Supplier's warranties and representations**

- 6.1.1. Supplier warrants and represents that he has the legal right and capacity to enter into this Agreement and the execution and delivery of this Agreement has been duly and validly authorized and no proceedings on part of any person are necessary to authorize this Agreement or to consummate the transactions contemplated hereby.
- 6.1.2. Supplier is legally entitled, validly existing and carrying on his business under the laws of Pakistan and complies with the eligibility criteria set out in the expression of interest and the request for proposal document.
- 6.1.3. Supplier warrants and represents that he shall comply with any alteration or replacement requests made by PMU to ensure that the Services and are up to the standards and expectations of PMU, at no additional cost to PMU.
- 6.1.4. Supplier warrants and represents that the Services provided in connection to this Agreement are free from defects and up to or exceeding industry standards, the quality and fitness for which shall be determined by PMU.
- 6.1.5. Supplier warrants and represents that he has the requisite experience of providing the Services required in connection with this Agreement.
- 6.1.6. Supplier warrants and represents that he shall be legally responsible for all acts of his employees, sub-contractors, independent contractors etc. (if any) providing the Services. Provided, that the Supplier has taken written permission from PMU to delegate/assign any employee/contractor the obligations of this Agreement.
- 6.1.7. The execution and performance of this Agreement does not constitute a violation of any applicable laws of Pakistan and/or any agreement/understandings to which any or each of the said Parties are bound by.
- 6.1.8. Supplier warrants that he possesses all requisite licenses, qualifications, certifications, registrations, regulatory approvals etc. for entering into, and performing his obligations under this Agreement.
- 6.1.9. Supplier warrants and represents that there are no proceedings pending, or threatened,

(i) for its dissolution or bankruptcy or (ii) that could adversely affect the performance of his respective obligations under this Agreement or the transaction contemplated hereby.

6.1.10. Supplier warrants that he shall perform his obligations with all due diligence and efficiency and to the satisfaction of PMU and shall exercise such skill and care in performance of the same in accordance with the best professional techniques, standards and practices in the training industry in engagements of similar scope, complexity and duration.

6.1.11. This Agreement and all documents to be executed by the Supplier and to be delivered to PMU are/shall be duly authorized, registered, executed and delivered, and are/shall be legal, valid, and binding obligations of the Supplier.

## 6.2. PMU's warranties and representations

6.2.1. This Agreement and all documents executed or to be executed by PMU and to be delivered to the Supplier in connection herewith are/shall be duly authorized, executed and delivered, are legal, valid and binding obligations of PMU enforceable in accordance with their respective terms, and do not violate the provisions of any agreement, judicial order, governmental ruling or applicable state or federal law or regulation to which PMU is a party or to which PMU is subject.

## 7. *Indemnities and Liabilities of the Supplier*

7.1. Supplier shall be fully liable for the obligations arising out of or in connection with this Agreement.

7.2. Supplier shall defend, indemnify and hold safe and harmless PMU and its respective owners, employees, representatives and affiliates from and against any and all claims, demands, complaints or actions, including those by third parties (including employees of the Supplier, its subcontractors and government agencies), arising from or relating to this Agreement (including personal injury, death, property damage or damage to the environment) to the extent arising out of or in connection with any breach of this Agreement or violation of law by Supplier or any contractor thereof, and including claims of or actual joint or concurrent negligence, but not including any sole or gross negligence, or willful misconduct of PMU. The claims, demands, complaints and actions covered hereunder include but are not limited to all settlements, losses, liabilities, judgments, court costs, reasonable attorneys' fees, fines, penalties and other litigation costs and expenses arising from or related to such claims, demands, complaints or actions.

## 8. *Indemnities and Liabilities of PMU*

8.1. Except for a breach of this Agreement, in no event shall PMU be liable to the Supplier for any loss of profits, loss of business, interruption of business, or for indirect,

special, incidental or consequential damages of any kind, even if such Supplier or PMU received advance notice of the possibility of such damages.

- 8.2. The Supplier shall have no claim against PMU for any liability whatsoever unless expressly provided in this Agreement. In this regard, PMU's liability shall be excluded to the fullest extent permitted under law and to the extent it cannot be excluded under law; the maximum overall liability of PMU shall not exceed value of the contract for any and all claims and losses.

## 9. *Events of Default and Termination*

- 9.1. The following events shall each constitute an "Event of Default" by Supplier and PMU. Upon such Event of Default shall be entitled to forthwith terminate this Agreement without any notice:

- 9.1.1. If the Supplier fails to timely complete the Services or fails to provide the deliverables within the stipulated timeframes.

- 9.1.2. If the Supplier violates or breaches, or materially fails to fully and completely observe, keep, satisfy, perform and comply with, any agreement, term, covenant, condition, requirement, restriction or provision of this Agreement and does not cure such violation, breach or failure within thirty (30) days after PMU gives the Supplier written notice of such violation, breach or failure, or, if such violation, breach or failure can be cured but not within thirty (30) days with the use of diligent efforts, if the Supplier does not commence to cure such violation, breach or failure within such thirty (30) days period.

- 9.1.3. If the Services provided do not conform to any requirements of PMU and subject to the same being informed to the Supplier in writing the same is not replaced and/or rectified within twenty-four (24) hours of such intimation and/or notification.

- 9.2. PMU reserves the right to terminate the Agreement, in whole or in part, at any point in time without assigning any reasons whatsoever with a one-month notice.

## 10. *Inspection*

- 10.1. PMU's technical department shall inspect and check the Goods supplied by the Supplier at the time of delivery.
- 10.2. Subject to the terms and conditions of this Agreement, the Supplier shall use all reasonable efforts to correct all failures pertaining to the supply of the Goods and replace them as required. In case the Goods are not in accordance with the provisions of this Agreement, PMU shall have the discretion to order replacement and/or terminate the Agreement in which case the Supplier shall be obligated to return any and all amounts extended to them.

## **11. *Entire Agreement***

- 11.1. This Agreement, together with the Annexure A and B constitutes the entire agreement and understanding of the Parties with respect to its object and supersedes and cancels any prior representation, commitment, undertaking or agreement between the Parties, whether oral or written, with respect to or in connection with any of the matters or things to which such Agreement applies or refers.
- 11.2. The Bid Form and the Price Schedule submitted by the Bidder.
- 11.3. The Procuring Agency's Notification of Award.
- 11.4. Complete Bidding document

## **12. *Record***

- 12.1. Supplier shall retain all the record and working papers including monthly/quarterly reports, contracts, policies/ procedures invoices, receipts and other documentary evidence in connection with the execution of this Agreement for a period of five years after the termination of this Agreement.

## **13. *Assignment and Sub-contracting***

- 13.1. Supplier shall not assign, transfer or in any other way alienate any of its rights or obligations under this Agreement whether in whole or in part without the prior written consent of PMU.
- 13.2. Supplier shall not sub-contract the provisioning of the Services or any related services without the express written permission of PMU.

## **14. *Confidentiality***

- 14.1. Except as otherwise permitted by this Agreement, neither of the Parties to this Agreement may disclose to third parties the contents of this Agreement or any information (other than Tax Advice) provided by or on behalf of the other that ought reasonably to be treated as confidential and/or proprietary.
- 14.2. Either Party may, however, disclose such information to the extent that it:
  - 14.2.1. Is or becomes public other than through a breach of this Agreement;
  - 14.2.2. Is subsequently received by the recipient from a third party who, to the recipient's knowledge, owes no obligation of confidentiality to the disclosing party with respect to that information;
  - 14.2.3. Was known to the recipient at the time of disclosure or is thereafter created independently;
  - 14.2.4. Is disclosed as necessary to enforce the recipient's rights under this Agreement;or

14.2.5. Must be disclosed under applicable law, legal process or professional regulations.

14.3. Either Party may use electronic media to correspond or transmit information and such use will not in itself constitute a breach of any confidentiality obligations under this Agreement.

**15. Blacklisting**

15.1. After signing the Agreement, if Supplier is unable to fulfil its obligations and/or abandons the project without any cogent reason and/or commits fraud or corruption, harassment or discrimination, the Supplier may be blacklisted by PMU and may be prohibited from participating in any PMU funded schemes in the future.

**16. Force Majeure**

16.1. Any event or circumstances beyond the reasonable control of a Party and unavoidable by the affected Party by exercise of due care shall be deemed as an 'event of Force Majeure'. This shall include, but not be limited to, earthquakes, tsunami, fire, explosion, terrorism, storm, flood, lightening, war and hostilities.

16.2. If either Party is affected by Force Majeure, it shall forthwith notify the other party of the nature and extent thereof.

16.3. Neither Party shall be deemed to be in breach of this Agreement, or otherwise be liable to the other, by reason of any delay in performance, or non-performance, of any of its obligations under this Agreement to the extent that such delay or non-performance is due to any Force Majeure of which it has notified the other Party, and the time for performance of that obligation shall be extended accordingly.

**17. Notices**

17.1. A notice or other communication under or in connection with this Agreement shall be:

- (a) in writing;
- (b) in the English language; and
- (c) delivered personally, sent by courier or transmitted by email to the Party to which it is intended to be delivered.

**17.2. Addresses:**

<b>PMU</b>	<b>Supplier</b>
9-A-Bahawalpur Road Chauburji, Lahore	Attention:

## **18. Severability**

18.1. In the event that any provision of this Agreement shall be found to be void or unenforceable, such findings shall not be construed to render any other provision of this Agreement either void or unenforceable, and all other provisions shall remain in full force and effect unless the provision(s) that is/are invalid or unenforceable shall substantially affect the rights or obligations granted to or undertaken by either Party.

## **19. Variations**

19.1. No variation of this Agreement shall be effective unless in writing and signed by or on behalf of all the Parties.

## **20. Counterparts**

20.1. This Agreement may be entered into in any number of counterparts and by the Parties to it on separate counterparts and each of the executed counterparts, when duly exchanged or delivered, shall be deemed to be an original, but taken together, they shall constitute one and the same instrument.

## **21. Amendments**

21.1. Any amendment to this Agreement shall only be binding if executed in writing by the Parties through their duly authorized representatives.

## **22. Arbitration and Governing Law**

22.1. This Agreement shall be governed by, construed and enforced in accordance with the laws of the Islamic Republic of Pakistan and the Parties consent and submit to the jurisdiction and service of process to the courts in Lahore.

22.2. The Parties agree that in case of any dispute regarding the quality and quantity of the Services and/or any related services the decision of PMU shall be binding and final.

22.3. The Parties agree that in all other disputes, differences and questions in respect of any matter under this Agreement, whether during the term of this Agreement, or any renewals thereof, or after the expiry of this Agreement, arising between them may be referred to arbitration as stipulated in the Arbitration Act 1940 as amended from time to time.

## **23. Harassment**

23.1. The Supplier is expected to treat all persons with whom it interacts or whom it engages for the purpose of providing the Services, with respect and dignity. No worker shall be subjected to corporal punishment, abuse of power, threats, violence, intimidation, or harassment of any kind under the applicable laws.

**24. Discrimination**

24.1. In the process of providing the Services, the Supplier shall not engage in discrimination based on race, colour, biological sex, nationality, religion, any type of disability or physical characteristics, marital status, sexual orientation, gender identity, social class and age.

**25. Anti-Bribery and Anti-Corruption**

25.1. The Supplier shall ensure that the Supplier, the Supplier’s personnel and any other person responsible for providing and performing the Services are in compliance with all anti- corruption and anti-bribery laws, and will remain in compliance with all such laws during the term of this Agreement.

25.2. PMU shall have the right to terminate this Agreement if the Supplier breaches this Clause 25.

**26. Waiver**

26.1. Neither the failure by either Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement, nor time or other indulgence granted by one Party to the other, shall act as a waiver of such breach or acceptance of any variation or the relinquishment of any such right or any other right hereunder, which shall remain in full force and effect.

**In witness thereof**, each Party has executed and delivered this Agreement as a deed on the date, which first appears above.

*PMU*

*Supplier*


Witnesses:

1.

2.

*Annexure-A*

As specified in Section-III. Technical Specifications

*Annexure-B*

Payment Terms

As specified in 8.10. Financial Bid Form/Price Schedule

**8.10. Financial Bid Form/Price Schedule**

[To be signed & stamped by the Bidder and reproduced on the letter head. To be attached with Financial Bid]

**Summary of Prices:**

<b>Project Description</b>	<b>Total Price with applicable taxes PKR</b>
Component–I: Solar Power Systems for Farm Tubewells	
Component–II: Genset & Internal Electrification with Integration	
<b>Total Price with all applicable Taxes (PKR) in figures:</b>	
<b>Total Price with all applicable Taxes (PKR) in Words:</b>	

**Note:**

- In case of difference between unit price and total price, unit price shall prevail, and total price shall be “final”. *(Please refer ITB clause 2.5.6).*
- In case of difference between amount in “words” and amount in “figures”, amount in “words” shall be considered final.

**Payment Terms:**

- Business shall be awarded based on Least Cost Selection Method.
- Payment shall be made within thirty (30) days after complete licensees’ deployment, user acceptance certificate and submission of invoice.
- PMU shall be entitled to increase or decrease the quantity of required BOQ. Moreover, the quantity will be finalized at the time of signing the contract and the above-mentioned quantities are just for the evaluation purpose.
- All the payments shall be made in PKR after applying all the applicable taxes.

**Penalties:**

The Supplier affirms and acknowledges that any delay in the delivery of the Products will result in a penalty applicable to the Supplier. The penalty shall be one (1%) percent per day, not exceeding

a total of ten (10%) of the total value of the Agreement. Such penalty may be deductible from the amount secured as a Performance Guarantee / invoice from the Supplier.

- 0.1% per day delay upto 10% of contract value.

**Stamp & Signature of Bidder** \_\_\_\_\_

**BILL OF QUANTITIES (BOQS)  
RELATED TO 58-NB SITE,  
SARGODHA**

**RFP Package**  
**SHRIMP ESTATE AT**  
**Sargodha**  
**58NB (Phase-1+2)**

**BOQ Package**  
**Solar Systems**

SHRIMP ESTATE PROJECT						
SOLAR & STRUCTURE ESTIMATE						
SUMMARY OF COST ESTIMATE						
S. No	DESCRIPTION					AMOUNT
1	80KW FOR 4 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		27			
	58NBxPh-2 Cluster		9			
	TOTAL COST OF# CLUSTERS Including cost of applicable Taxes		36			
2	80KW FOR 2 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		4			
	58NBxPh-2 Cluster		-			
	TOTAL COST OF# CLUSTERS Including cost of applicable Taxes		4			
3	60KW FOR 1 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		13			
	58NBx Ph-2 Cluster		5			
	TOTAL COST OF #CLUSTERS Including cost of applicable Taxes		18			
3	40KW FOR 1 POND CLUSTER					
	STRUCTURE & CIVIL WORKS					
	TOTAL/Cluster=					
	58NB Cluster		-			
	58NB-Ph-2 Cluster		5			
	TOTAL COST OF #CLUSTERS Including cost of applicable Taxes		5			



80 KW-

## 4 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>80kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier-1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC(IEC) or Equivalent; Busbar 9 or Higher	138.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>18.5KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control (≥98.5% efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be -10°C to +60°C with proper grounding (≤3 ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	4.0	Nos.		Rs -
<b>LV Panel &amp; DC combiner Box</b>					
3	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	4.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				
	Paint should be All cubical shall be painted in textured white colour.				
	Fishnet Flexible Earth Strips to be used for earthing housing of panels				

80 KW-

## 4 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Phase Separators should be used.				
	Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 24x24x8 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	Inverter Connection : 2x40 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 1x 40AFP C/O Switch				
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTS-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	4.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
4	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	4.0	Nos		Rs -
5	99.99% Pure Copper Earthing ¾" dia & 10 ft long copper rod as earth electrode , below ground level including cost of boring and lowering the rod (20ft down complete with clamp and 2x16mm2 stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover with Earth Enhancement GEM /Betonite Chemical, complete in all respects. for AC Earthing + DC Earthing + Lightning Protection	12.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less then 2% from Grid LV DB to Inverters.</i>					
6	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC (For PV Panel to DC Combiner Box Only)	700.0	Rft		Rs -
7	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC (For nearest PV System Combiner Box to Control Room)	500.0	Rft		Rs -
8	DC cables 10 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC (For 3 furthest cluser , DC Combiner to Control Room.)	1,500.0	Rft		Rs -
9	AC Cables XLPE/PVC 0.6/1kV , 4core 16mmsq for 18.5 KW Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-v)</b>	150.0	Rft		Rs -
10	AC Cables XLPE/PVC 0.6/1kV , 4core 70mmsq from 80 KW LV Combiner to Building LT Panel <b>(Mrs 24-12b-ix)</b>	200.0	Rft		Rs -
11	Earthing Cable for Inverter & LV Panel 35 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	600.0	Rft		Rs -

80 KW-

## 4 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
12	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V (Mrs 24-10-iv)	300.0	Rft		Rs -
13	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V (Mrs 24-8c-iii)	500.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
16	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement (50' each) (Mrs 24-99-i)	200.0	Rft		Rs -
17	1" Diameter PVC Pipe, Class E with sockets end (Mrs 24-03(a)-iii)	500.0	Rft		Rs -
18	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
19	Miscellaneous accessories including Nuts/bolts, screws,Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
20	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects for all 4 PV Sides	1.0	Job		Rs -
22	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
23	Total (Excl Civil Works) Including cost of all applicable Taxes				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.
- Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
  - Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

- Note:**
- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels.  
Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file  
Contractor shall be responsible on provided all PPE's to its installation team including Saftey Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 80KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b>					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	4,471.20		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	320.76		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(a)-2	Cft	121.50		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	768.00		-
	<b>Steel Reinforcement</b>					



Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<p><b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b></p>					
6	<p>Note:                      - Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.                      - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file                      - Contractor shall be responsible on provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines</p>					

80 KW-

## 2 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>80kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier-1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC(IEC) or Equivalent; Busbar 9 or Higher	137.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>37.5KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control (≥98.5% efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be -10°C to +60°C with proper grounding (≤3 ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	2.0	Nos.		Rs -
<b>LV Panel</b>					
3	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	2.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				

80 KW-

## 2 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Paint should be All cubical shall be painted in textured white colour.				
	Fishnet Flexible Earth Strips to be used for earthing housing of panels				
	Phase Separators should be used.				
	Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 12x18x16 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	Inverter Connection : 2x75 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 2x 75AFP C/O Switch				
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTs-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
4	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	2.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
5	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	4.0	Nos		Rs -
6	99.99% Pure Copper Earthing ¾" dia & 10 ft long copper rod as earth electrode , below ground level including cost of boring and lowering the rod (20ft down complete with clamp and 2x16mm2 stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover with Earth Enhancement GEM /Betonite Chemical, complete in all respects. for AC Earthing + DC Earthing + Lightning Protection	6.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less than 2% from Grid LV DB to Inverters.</i>					
7	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	250.0	Rft		Rs -
8	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	200.0	Rft		Rs -
9	DC cables 25 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	800.0	Rft		Rs -
10	AC Cables XLPE/PVC 0.6/1kV , 4core 25mmsq for 37.5 KW Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-vi)</b>	250.0	Rft		Rs -
11	AC Cables XLPE/PVC 0.6/1kV , 4core 70mmsq from 80 KW LV Combiner to Building LT Panel <b>(Mrs 24-12b-ix)</b>	375.0	Rft		Rs -
12	Earthing Cable for Inverter & LV panel 35 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	300.0	Rft		Rs -

80 KW-

## 2 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
13	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-10-iv)</b>	400.0	Rft		Rs -
14	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V <b>(Mrs 24-8c-iii)</b>	300.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
17	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement <b>(Mrs 24-99-i)</b>	200.0	Rft		Rs -
18	1" Diameter PVC Pipe, Class E with sockets end <b>(Mrs 24-03(a)-iii)</b>	300.0	Rft		Rs -
19	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
20	Miscellaneous accessories including Nuts/bolts, screws, Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
21	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects for all 2 PV Sides	1.0	Job		Rs -
23	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
24	<b>Total (Excl Civil Works)</b> <b>Including cost of all applicable Taxes</b>				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.
- Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
  - Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

## Note:

- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file  
Contractor shall be responsible for provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 80KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	<b>Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.</b>					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	4,471.20		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	320.76		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(á)-2	Cft	121.50		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	768.00		-
	<b>Steel Reinforcement</b>					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-					
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg	1,411.90		-
	<b>Steel Structure</b>					
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg	6,400.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg	6,400.00		-
					<b>Total :</b>	-
					including all applicable taxes	
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.					
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent co					
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. F					
4	MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office. MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.					
5	Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
6	<p>Note:</p> <ul style="list-style-type: none"> <li>- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.</li> <li>- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file</li> <li>- Contractor shall be responsible on provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines</li> </ul>					

60 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>60kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier- 1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC/IEC) or Equivalent; Busbar 9 or Higher	104.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>55KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control (≥98.5% efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be -10°C to +60°C with proper grounding (≤3 ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	1.0	Nos.		Rs -
<b>LV Panel</b>					
3	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	1.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				
	Paint should be All cubical shall be painted in textured white colour.				

60 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Fishnet Flexible Earth Strips to be used for earthing housing of panels Phase Separators should be used. Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 12x18x16 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	AC Breakers Incomer : 125 ATP MCCB , Icu RC=> 25kA				
	Inverter Connection : 2x100 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 1x 100AFP C/O Switch				
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTs-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
4	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	1.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
5	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	3.0	Nos		Rs -
6	99.99% Pure Copper Earthing ¾" dia & 10 ft long copper rod as earth electrode , below ground level including cost of boring and lowering the rod (20ft down complete with clamp and 2x16mm <sup>2</sup> stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover with Earth Enhancement GEM /Betonite Chemical, complete in all respects. for AC Earthing + DC Earthing + Lightning Protection	3.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less then 2% from Grid LV DB to Inverters.</i>					
7	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	250.0	Rft		Rs -
8	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	300.0	Rft		Rs -
9	DC cables 35 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	400.0	Rft		Rs -
10	AC Cables XLPE/PVC 0.6/1kV , 4core 35mmsq for 18.5 KW Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-vii)</b>	250.0	Rft		Rs -

60 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
11	AC Cables XLPE/PVC 0.6/1kV , 4core 50mmsq from 80 KW LV Combiner to Building LT Panel (Mrs 24-12b-viii)	250.0	Rft		Rs -
12	Earthing Cable for Inverter 25 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V (Mrs 24-12a-v)	250.0	Rft		Rs -
13	Earthing Cable for LV Panel 35 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V (Mrs 24-12a-iv)	250.0	Rft		Rs -
14	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V (Mrs 24-10-iv)	250.0	Rft		Rs -
15	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V (Mrs 24-8c-iii)	250.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
18	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement (Mrs 24-99-i)	200.0	Rft		Rs -
19	1" Diameter PVC Pipe, Class E with sockets end (Mrs 24-03(a)-iii)	300.0	Rft		Rs -
20	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
21	Miscellaneous accessories including Nuts/bolts, screws,Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
22	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects	1.0	Job		Rs -
24	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
25	Total (Excl Civil Works) <b>Including cost of all applicable Taxes</b>				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.
- Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
  - Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

**Note:**

- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels.  
Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file
- Contractor shall be reponsible on provided all PPE's to its installation team including Saftey Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 60KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual- 2025	UNIT	QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	3,353.40		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	240.57		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual- 2025	UNIT	QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(á)-2	Cft	91.13		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	576.00		-
	<b>Steel Reinforcement</b>					
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-					
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg	1,058.93		-
	<b>Steel Structure</b>					
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg	4,800.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg	4,800.00		-
					<b>Total :</b>	-
					including all applicable taxes	
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.					
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact					
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furthermco					



40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
A	Supply at site, installation, testing and commissioning of <b>40kWp (DC) VFD based PV System as per following and attached Technical Specifications upto satisfaction of Engineer Incharge:</b>				
<b>Technical Specification</b>					
<b>Solar Panels</b>					
1	Solar Panels <b>Tier-1</b> 580W or Above, Module Efficiency 22% or Higher 1st year power degradation no more than 1% Annual power degradation no more than 0.5% over 25 years & above 1500V DC(IEC) or Equivalent; Busbar 9 or Higher	69.0	Nos.		Rs -
	Temperature Coefficient of Pmax-0.30% / O C or less Frame Must Withstand 5400 PA impulse Load Warranty Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs. 12 Years product material and workmanship warranty+25 years for 80% of warranted min. power				
<b>Inverters &amp; Data Loggers</b>					
2	<b>37.5KW Solar Hybrid VFD</b> The Solar VFD shall be an IP65-rated controller complying with IEC/EN 62109-1 and IEC 61683, designed to convert DC solar input to regulated AC output for pump operation. It shall support solar/grid/generator hybrid operation with automatic start/stop and advanced MPPT control ( $\geq 98.5\%$ efficiency) for maximum energy utilization. The unit shall provide protections including dry-run, overload, short-circuit, reverse polarity, lightning transients, overheating, and no-load/well-probe sensing. Communication capability via RS-232/485 shall be included for monitoring. Operating range shall be $-10^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ with proper grounding ( $\leq 3$ ohms). A minimum 3-year comprehensive warranty and complete import/compliance documentation shall be provided.	1.0	Nos.		Rs -

40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
<b>LV Panel</b>					
6	Supply installation and commissioning of Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic & thermal trip devices) as given below.	1.0	Nos		Rs -
	complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top/bottom with cable glands and shorud with proper labelling , complete with internal wiring earthing, neutral link, termination blocks.				
	Distribution Board/ACP should be IP-54 Frame 16 SWG Outdoor IP-65				
	Safety Punch Plates, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.				
	2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.				
	Paint should be All cubical shall be painted in textured white colour.				
	Fishnet Flexible Earth Strips to be used for earthing housing of panels				
	Phase Separators should be used.				
	Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.				
	Size of Cubicle Minimum : 12x18x16 Inch however GA Fabrication drawing shall be approved from Engineer Incharge with proper creepage distances as per IEC				
	AC Breakers Incomer : 100 ATP MCCB , Icu RC=> 25kA				
	Inverter Connection : 1x75 ATP MCCB , Icu RC=> 25kA or as per Inverter Rating + 2x 75AFP C/O Switch				

40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
	Type 1 SPD for External DC Side (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Type 2 SPD for AC (Impulse Current 25kA minimum, Discharge Current 20kA, Response Time <=50ns; Dielectrick Strength 2000VAC @ 1 minute				
	Energy Analyzer , CTS-160/5 , complete in all respects				
	Note: Dimension, Panel/DB Structure, Mounting Arrangement & Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication & Delivery of Panels				
	DC Combiner Box alongwith DC SPD , Protection Devices, as per Engineer Incharge Approval, Complete in all respects	1.0	Nos		Rs -
<b>Lightning Protection &amp; Earthing System</b>					
7	Air termination rods shall be 99% pure copper, with lengths defined by the approved site-specific lightning protection design. Earthing pits shall achieve a grounding resistance of <2 ohms as per NEC, utilizing 99% pure copper plates or rods sized according to soil resistivity and site conditions. All materials and dimensions shall be finalized based on detailed site assessment and engineering design requirements.	3.0	Nos		Rs -
8	99.99% Pure Copper Earthing Veractor Cone / Spike Size 2" thick, 12" long as shown in drawings or ¾" dia & 10 ft long copper rod as earth electrode 100 ft or upto the water level, below ground level including cost of boring and lowering the rod (100ft / upto the water level) down. complete with clamp and 2x16mm2 stranded copper conductor from rod to ground surface in 1½" dia GI Pipe (EL Class) with watering cap, Man-hole with cover for AC Earthing + DC Earthing + Lightning Protection	3.0	Nos		Rs -
<b>DC, AC, Earthing and Communication Cables</b>					
<i>Note: Below Quantities are for estimation reference, the bidder shall carried out site survey and the system shall be complete in all respects whether mentioned or not but required for proper functioning of system.</i>					
<i>Voltage Drop shall be less than 2% from PV to Inverter DC Side &amp; shall also be less then 2% from Grid LV DB to Inverters.</i>					
9	DC cables 4 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC	250.0	Rft		Rs -
10	DC cables 6 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	100.0	Rft		Rs -
10	DC cables 25 Sq.mm, Cu, 1C, double insulated XLPO/XLPO, rated at 1500V DC <i>Note: Contractor shall verify the lengths and may change</i>	400.0	Rft		Rs -
11	AC Cables XLPE/PVC 0.6/1kV , 4core 25mmsq Solar Hybrid VFD /as per Inverter Ratings <b>(Mrs 24-12b-vi)</b>	150.0	Rft		Rs -
12	AC Cables XLPE/PVC 0.6/1kV , 4core 35mmsq LV Combiner to Building LT Panel <b>(Mrs 24-12b-vii)</b>	150.0	Rft		Rs -
13	Earthing Cable for Inverter & LV panel 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	150.0	Rft		Rs -
14	Earthing Cable for Structure 16 Sq.mm, Copper, 1C, Green Coloured, PVC, 600/1000V <b>(Mrs 24-12a-iv)</b>	150.0	Rft		Rs -
15	Earthing Cable for Panels 2.5 Sq.mm, Copper, 1C, Green Coloured, PVC, 450/750V <b>(Mrs 24-8c-iii)</b>	150.0	Rft		Rs -
<b>Conduiting &amp; Accessories</b>					
18	(300mm x100mm) Cable Tray, Pre-Galvanized, For Plain Roof top or Ground/Dome Type Roof/PEB Shed, Perforated Type, SWG14 (1.5mm) complete with nuts bolts cover and supports, as per engineer requirement <b>(Mrs 24-99-i)</b>	100.0	Rft		Rs -

40 KW-

## 1 Pond Clusters

Sr#	Description of Items	Qty	Unit	Unit Price (PKR)	Total Price (PKR)
19	1" Diameter PVC Pipe, Class E with sockets end <b>(Mrs 24-03(a)-iii)</b>	150.0	Rft		Rs -
20	DC MC4 Connectors (1500VDC) High Quality	1.0	Job		Rs -
21	Miscellaneous accessories including Nuts/bolts, screws, Cable Ties, MC4 nails, tape, Lugs, AC Glands, Shrouts, safety signs, warning tapes, shrouds, etc	1.0	Job		Rs -
<b>Services</b>					
22	Supply and installation of Water Distribution Network with 20mm PPRC Pipe PN20 , complete with nozzles, valves , complete in all respects	1.0	Job		Rs -
23	Electrical & Mechanical Works including energization and successful comissioning with client acceptance including Scissor lift/Crane for material shifting + Operation & Maintainance of Complete System including management of spares etc , cleaning services (weekly), complete in all respects.(1 Year from start of comissioning)	1.0	Job		Rs -
	Total (Excl Civil Works) <b>Including cost of all applicable Taxes</b>				Rs -

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survey prior to bidding.
- 1)
  - 2) Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 3) Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file of each site. Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of Electrical , Civil, MEP systems before execution to Engineer Incharge.
  - 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARS.
  - 5) Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.

6)

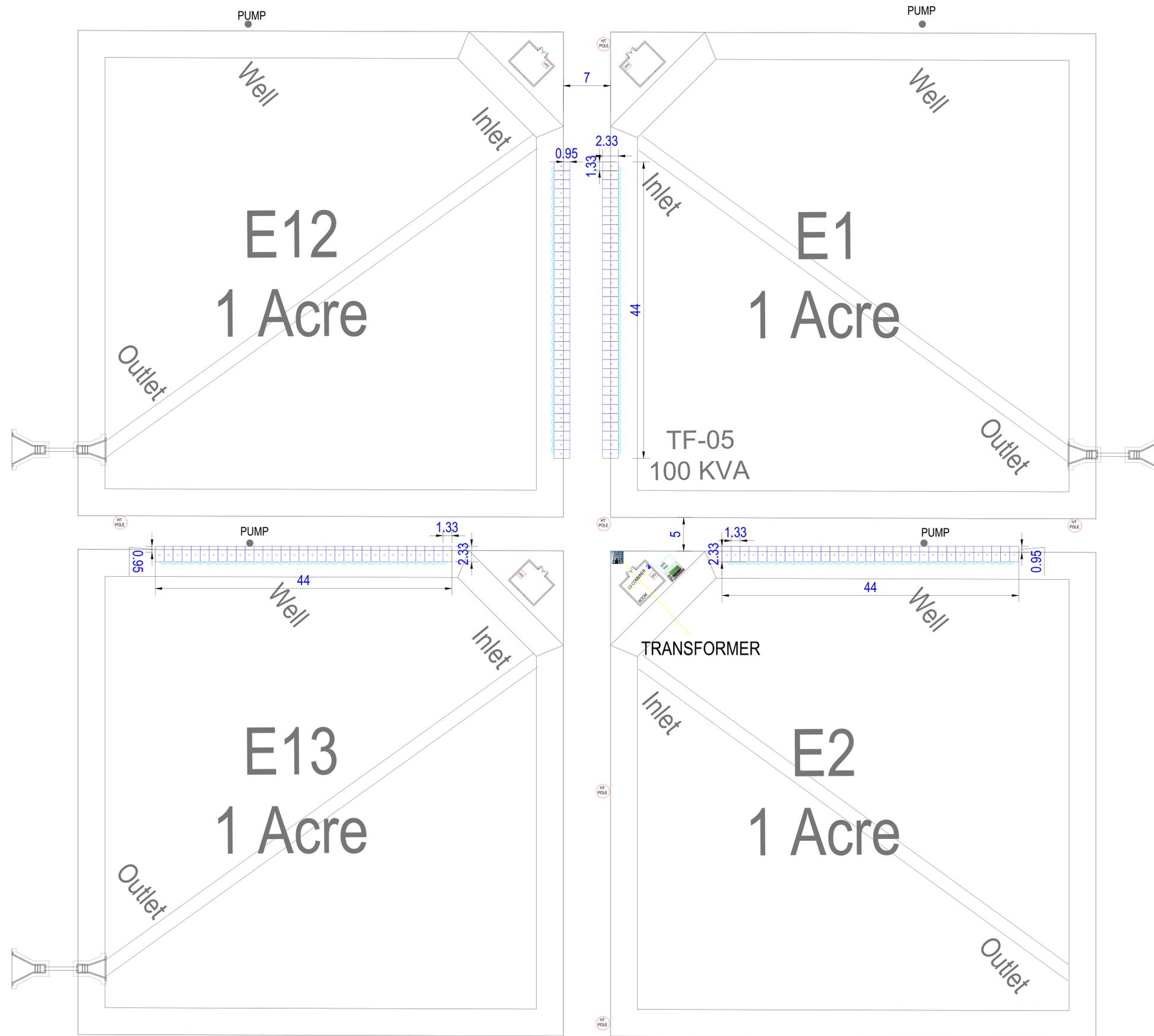
Note:

- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels.
- Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.
- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteororm weather file
- Contractor shall be reponsible on provided all PPE's to its installation team including Saftey Helmets, Safety Shoes, Harness, LifeLines

<b>SOLAR STRUCTURE ESTIMATE FOR 40KW</b>						
Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT	QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.					
	<b>GENERAL</b>					
	All items of Civil works of building described here of under the title description unless specifically indicated otherwise, shall be deemed to be read in terms of supplying, protecting, making, assembling, installing, providing, laying, fixing, testing and commissioning.					
	<b>Excavation:</b>					
1	Excavation in foundation of building, bridges and other structures, including dagbelling, dressing, refilling around structure with excavated earth, watering and rammiing lead upto one chain (30 m) and lift upto 5 ft. (1.5 m)					
	a) In Ordinary Soil (By Excavator)	Ch-3/21-b(ii)	Cft	2,235.60		-
	<b>PCC 1:4:8</b>					
2	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate):					
	a) Ratio 1: 4: 8	Ch-6/5-i	Cft	160.38		-
	<b>RCC in Super Structure &amp; Foundations</b>					
	Providing and laying reinforced cement concrete prestressed concrete), using coarse sand and screened graded and washed aggregate, in required shape and design including forms, moulds, shuttering, lifting, compacting,curing, (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.)					
3	Reinforced cement concrete in roof slab, beams, foundations columns lintels, girders and other structural members laid in situ or precast laid in position, or prestressed members cast in situ, complete in all respects:-					
	a) Type B (nominal mix 1: 1½: 3)	Ch-6/6,(á)-2	Cft	60.75		-
	b) Type B (nominal mix 1: 2: 4)	Ch-6/6, (c)-3	Cft	384.00		-
	<b>Steel Reinforcement</b>					

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT		QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.						
	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings, including cost of binding wire and labour charges for binding of steel reinforcement (also includes removal of rust from bars):-						
	a) Deformed bars (Grade-60)	Ch-6/11-ii	Kg		705.95		-
	<b>Steel Strcuture</b>						
4	Fabrication of heavy steel works, with columns, base plate, channels, angle iron, tees, flats iron, round iron, and sheet iron for making trusses, girders, tanks, (solar structures) etc. including cutting, drilling, reviting, handling, assembling, and fixing but erection in position (but including three coat painting). Complete in all respect as per drawing.	Ch-25/10	Kg		3,200.00		-
5	Erection and fitting in position iron trusses, staging water tanks (solar strcutures) etc.	Ch-25/11	Kg		3,200.00		-
						<b>Total :</b>	-
1	It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder. Bidder to do site survery prior to bidding.						
2	Contractor has to make sure all contingencies due to site constraints and authorities variations. Any modification and subsequent cost in						
3	Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file of each site. Furth						
4	MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office. MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.						
5	Anyother Requirement , not mentioned, but required by Site Incharge for proper functioning of system, complete in all respects.						

Sr.	DESCRIPTION	MRS 2nd Bi-Annual-2025	UNIT		QTY.	RATE	AMOUNT
	Following are the minimum specifications ; The structure shall bear wind pressure more than 150 km/hr and contractor shall submit SAP report to Engineer Incharge for approval before execution.						
6	<p>Note:</p> <ul style="list-style-type: none"> <li>- Contractor will provide the Sketchup/CAD design. Spaces shall be kept for Cleaning purposes and access to all Solar Panels. Contractor shall have to submit SAP report for structural design and will be responsible for windspeed as specified by Engineer Incharge-150 km/hr.</li> <li>- Contractor will provide Energy Simulation reports based on PVSyst software simulated with Meteonorm weather file</li> <li>- Contractor shall be responsible on provided all PPE's to its installation team including Safety Helmets, Safety Shoes, Harness, LifeLines</li> </ul>						



CLIENT :  
**A D F**  
 (SWARC)

PROJECT :  
 SHRIMPESTATE SARGODHA  
 AT CHAK-58NB

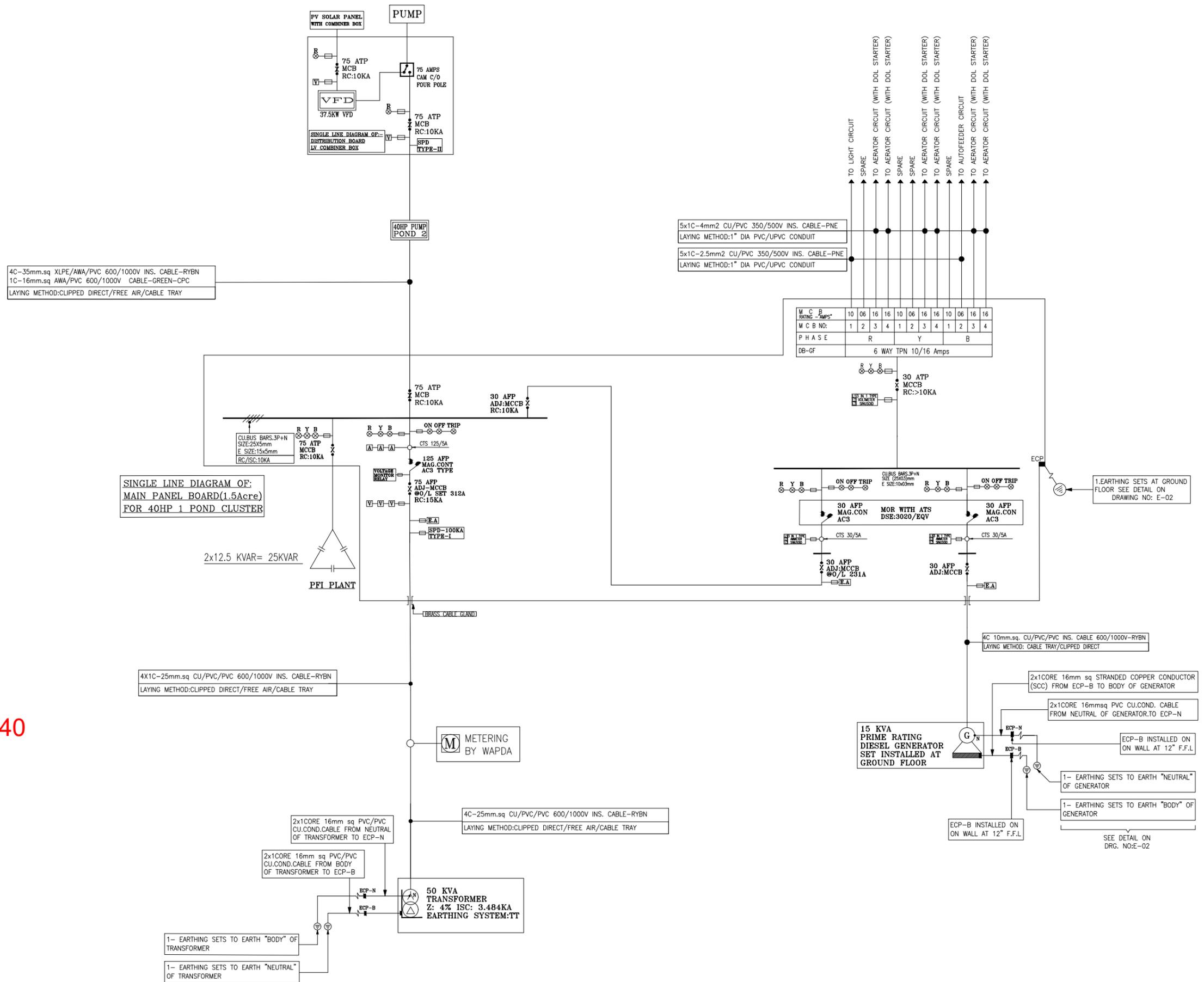
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 4 POND CLUSTER

LOCATION:  
 CHAK-58NB  
 PUNJAB

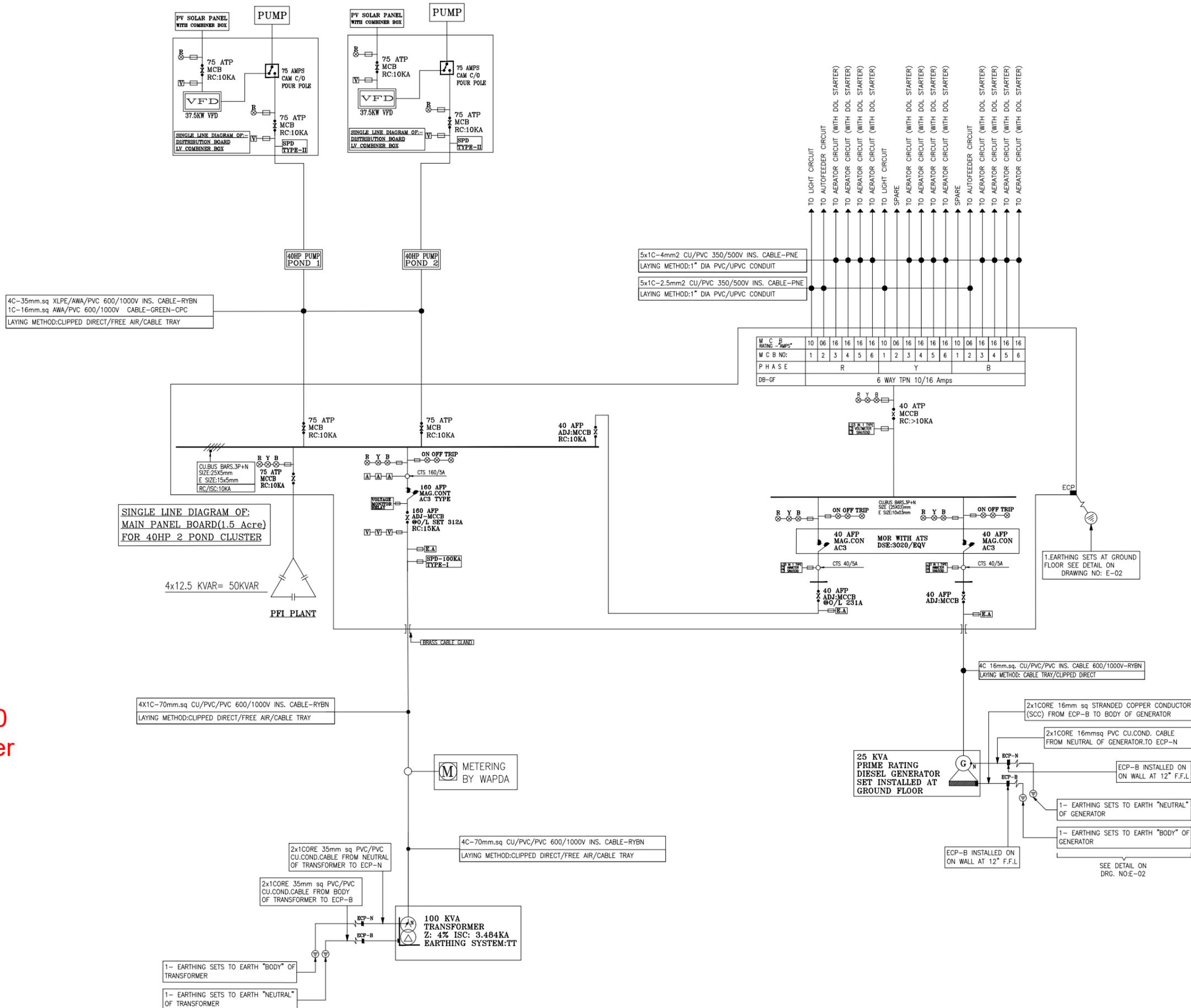
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 BELONGS TO:  
 SECTION:  
 ARCHITECTURE

DATE: **JAN-2026**  
 DWG NO: **SP-01**  
 PROJECT CODE: \_\_\_\_\_

# 1 Pond Cluster 40 HP



# 2 Pond 40 HP Cluster









**TECHNICAL SPECIFICATIONS  
FOR SOLAR EQUIPMENT AND ALLIED ACCESSORIES**

**ENERGY DEPARTMENT**

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14TH JULY-2025

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## Minimum Technical Specifications Requirement for Solar Panel and Allied Equipment

Note- The technical specifications of the solar Panels & allied equipment must fulfil the standard requirements (PSS#ES) as per the import policy S.R.O.604 (I) /2019, Dated 28th May, 2019. Verifiable Test Certifications for the required standards must be provided with the technical proposal. In case of discrepancy, the mentioned S.R.O shall prevail.

This document provide minimum technical requirement for solar panels and allied equipment. "All products should be compliant to relevant IEC standards/ specifications; however, other equivalent, international standards may be used where, IEC relevant standard is not available, as per the project requirement, with subject to prior approval of the Project Director"

### 1 Solar PV Modules

Parameters	
Module Make	Tier 1, Brand should be verifiable
Rated Power (STC)	580 Wp or above
Cell Quality	A Grade (verifiable)
Module Efficiency	22% or Higher (Front Side)
Module Degradation	1st year power degradation no more than 1%
	Annual power degradation no more than 0.5% over 25 years & above
Mechanical Load Tolerance	5400 Pa positive load or above, 2400 Pa negative load or above
Mechanical Load	Should be verifiable through a standard lab test
Maximum System Voltage	1500V DC(IEC) or Equivalent
Power Tolerance	0 ~ + 3 to 5 W
Max. Series Fuse Rating	25 amp or above



Parameters	
Operating Temperature	-40 °C to +85 °C
Temperature Coefficient of Pmax	-0.30% / °C or less
Bypass Diode	As per design
Bus Bar	9 or higher
Product Certification	IEC 61215, IEC 61730, IEC61701 ED2 or equivalent
Management Certification	ISO 9001, ISO 14001, OHSAS 18001 or equivalent
Frame	Must Withstand 5400 PA impulse Load
Junction Box	IP 68
Cable	4 mm <sup>2</sup> , cable length up 300mm or above
Connectors	MC4 or Comparable weatherproof
Cover	3mm Front or above (Mono-facial)
	2mm Front and 2mm Back or above (Bi-facial)
Product Warranty and Guarantee	Sample size 1% of the total solar capacity (at the time of execution) should shall be verified by local Labs.
	12 Years product material and workmanship warranty
	25 years for 80% of warranted min. power.

## 2 On-Grid Solar Inverter

Parameters	Min. Specifications required
Inverter Manufacturer	Renowned and verifiable brand having successful history in similar climatic conditions
Inverter Type	String Inverter (or as per supported design)
Max. Efficiency	≥ 98% or above
Max. Input Voltage	1500V (or as per supported design)
Max Input Current per MPPT	30A (or as per supported design)
MPPT Operating Voltage Range	140V ~ 1500V (or as per supported design)
Total Harmonic Distortion	<3%. As per relevant IEC clauses.
Power Factor Range	0.8 leading ~ 0.8 lagging



Parameters	Min. Specifications required
<b>MPPT Operating Voltage Range</b>	140V ~ 1500V (or as per supported design)
<b>Total Harmonic Distortion</b>	<3%. As per relevant IEC clauses.
<b>Power Factor Range</b>	0.8 leading ~ 0.8 lagging
<b>IP Protection</b>	IP 65 or better
<b>Protections</b>	Input-side Disconnection Device Anti-islanding AC Over current DC Reverse-polarity PV-array String Fault Monitoring (optional) DC Insulation Resistance Detection Residual Current Monitoring Unit DC Surge AC Surge Ripple Receiver Control (optional)
<b>Operating temperature</b>	-25°C to 60°C
<b>Communication</b>	With Remote Monitoring Feature, Mobile App, Web server user interface, Cloud Connected. Real Time System Monitoring. Alerts, Faults and Warning data display. System Statistics – System Parameters, Support WLAN/4G/RS485 communication
<b>Minimum Applicable Standards and Compliances</b>	IEC62109-1/-2, IEC62116, IEC60068, IEC61683, IEC 61727, EN50530, IEEE1547 or equivalent
<b>Warranty</b>	Minimum 5 Years standard warranty; and support 15 Years extended warranty.

### 3 Hybrid Solar Inverter

Parameters	Minimum Specifications Required
<b>Inverter Make</b>	Renowned and verifiable brand having successful history in similar climatic conditions.
<b>Inverter Type</b>	Hybrid inverter Grid synchronized Pure Sine wave. Net Metering option available.

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Parameters	Minimum Specifications Required
	Genset synchronization option available (variable frequency).
<b>Output Voltage Range</b>	230VAC/400 VAC $\pm 5\%$ for string inverters.
<b>Battery Charger</b>	12/24 /48VDC or above (Built-In or External)
<b>IP Rating/ Dust Proofing</b>	IP-65 (IEC 60529) or better
<b>Max. efficiency</b>	97 % or above
<b>Protections</b>	<ol style="list-style-type: none"> <li>1. Input-side Disconnection Device</li> <li>2. AC Overcurrent</li> <li>3. DC Reverse-polarity</li> <li>4. PV-array String Fault Monitoring (optional)</li> <li>5. DC Insulation Resistance Detection</li> <li>6. DC Surge</li> <li>7. AC Surge</li> <li>8. Ripple Receiver Control (optional)</li> </ol>
<b>Operating temperature</b>	-10 to 55°C
<b>Humidity</b>	10 ~ 80%RH
<b>Communication and Data Logging</b>	<ol style="list-style-type: none"> <li>1. With Remote Monitoring Feature, Mobile App, Web server user interface, Cloud Connected.</li> <li>2. Real Time System Monitoring. Alerts, Faults and Warning data display. System Statistics System Parameters</li> <li>3. PV predicted values, forecasted values, Load data, Energy</li> <li>4. Support W-Lan/4G/RS485 communication</li> </ol>
<b>Total Harmonic Distortion</b>	$\leq 3\%$ As per relevant IEC clauses.
<b>Performance guarantee</b>	Minimum 5 years comprehensive warranty of inverter ( Parts and Service)
<b>MPPT Voltage Range</b>	80-1000V or above (depend upon the selected design)
<b>MPPT input current</b>	16 amp or above
<b>Output power</b>	$\geq$ Rated Power
<b>Power Factor range</b>	0.8 leading ~ 0.8 lagging
<b>Output Wave Form</b>	Pure Sine Wave
<b>Applicable Standards and Compliances</b>	IEC62109-1/-2, IEC62116, IEC60068, IEC61683, IEC 61727, EN50530 Or equaling with supporting documents

#### 4 Solar Pump Inverter/ Solar Pump Variable Frequency Device (VFD)

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Item/Feature	Specification
<b>Application</b>	Converts D.C. voltage to A.C. voltage and regulates the functionality of Pump
<b>Standard Compliance</b>	IP 65 complying VFDs conforming IEC/EN 62109-1, IEC61683, IEC/EN 62109-2/equaling.
<b>Grid Connectivity</b>	As per Requirement. In case of Grid Input option, dv/dT or Sine Filters between VFD and Motor be installed as per Manufacturer/Design recommendations.
<b>Rated Conversion Efficiency</b>	96 % or above
<b>MPPT Efficiency</b>	98.5% or above
<b>Mounting Type</b>	Wall mounted,
<b>Free warranty period</b>	03 year or more comprehensive service warranty, from the date of certification/ commissioning as provided by manufacturer.
<b>Built-in functions</b>	Variable Frequency Drive. Automatic Start and Stop with any input power (solar, Grid and Generator). Self-diagnostic and self-Protection. Dry run protection detection. Should have advanced auto MPPT (Maximum Power Point Tracking) controller. Should have RS 232/485, etc. communication port for monitoring.
<b>Protections</b>	The proposed controller unit must have adequate technological features to protect itself and the pumping machinery from all type of accidental short circuit, Reverse Polarity protection, overload protection, low rpm protection (less than 30 Hz, or as per pump characteristic curve, pump stop motor operation), Lightning induced transients'

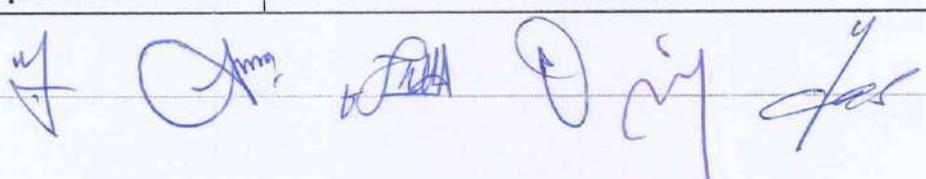
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Item/Feature	Specification
	<p>protection, dry source protection / well probe sensor, float switch, sun switch and overheating Protection.</p> <p>The proposed controller shall have built in feature to switch pumping unit ON/OFF automatically w.r.t adequacy of solar irradiance.</p> <p><b>External Surge Protector:</b> Type 2 of applicable system voltage range</p> <p><b>No Load Protection:</b> Well Probe or equal methodology for avoidance of no-load operation</p>
Temperature range	-10 to + 60 degree Celsius or better
Rated output voltage	A.C. and D.C. rated voltage (single/three phase)/rated voltage matching with the motor.
Grounding/ Earthing	The VFD drive body shall be separately earthed with maximum resistance of 3 ohms.
Documentation	All import related documents must be available that include kit as well as other relevant components

## 5 Lithium ion battery

Nominal Voltage	12 Volts to 600 Volts/equaling as per system design
Nominal Capacity (Wh)	Value should be written as actual
Voltage	Ensure the voltage matches your inverter's requirements and the overall system design
Usable Capacity (Wh)	>85% of rated value
Depth of Discharge (DoD)	85–100%
Communication Port	RS232, RS485, CAN/ equaling
Working Temperature°C	-5 to 45



Storage Temperature °C	-10 to 60
Authentication Level	TUV / CE / UN38.3
Design Life	≥10 Years (25°C )
Cycle Life	≥6000, 25°C at 80% DoD
Humidity	25%~ 80% RH
Charge temperature	0 to 45°C
Discharge temperature	-5 to 45°C
Case and Cover	Electric shock proof powder coated metal sheet
Internal resistance	≤ 200mΩ
Storage life	Minimum 6 months maintenance charge interval in storage
Production Date	Must not be older than 2 year
Battery Management System (BMS)	Batteries come with BMS for multi-battery parallel system, with features of self cell balancing, temperature control, protecting against short-circuit with alarm function, over-charge/discharge conditions SoC-DoD-SoH reporting / setting, device events, battery parameters and storage. Compliance with safety standards such as UL 1973, IEC 62619, or equivalent Low & high Voltage Disconnect
Warranty	Comprehensive ≥ 5 Years

## 6 PV Mounting Standard Structure

### 6.1 Hot Dipped Galvanized Mild Steel

Description	Requirement
Tentative outlines, design will be site dependent and may varies	
Structure material and Protection	Supply and installation of solar panel structure of suitable type with minimum 12 Gauge with minimum size of 2 x 1 inch. Galvanized Iron

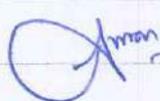
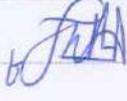
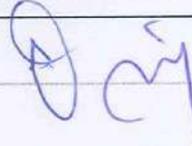


Description	Requirement
	material shall be hot dipped with protective zinc layer and should not be less than 80 microns. All bolts, nuts, fasteners should be stainless steel. Double washers should be used in sequence of SS Flat Washer and Rubber Washer (panel side and GI contact side). Flat washer of SS304 or SS316, 1.5-2 mm thickness, matching bolt size and rubber washer of Neoprene or EPDM, UV-resistant, 2-3 mm thickness. SS Rawal Bolt of minimum 8 mm thickness and minimum 3 inches in length. SAP Analysis or equivalent report should be approved by the Engineer in-charge before execution. Solar Panel should be secured using Clamps (stainless steel/Aluminum).
<b>Wind loading</b>	Mounting system should be able to allow air circulation for cooling in high temperature and withstand minimum wind speed of 150 Km/hour.
<b>Angle adjustment</b>	Seasonal adjustment optional as per requirement.

## 6.2 Aluminum Structure

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
<b>Structure material and Protection</b>	Supply and installation of solar panel structure of suitable type with minimum 2.5 mm with minimum size of 2 x 1 inch Aluminum material. Mounting structure should be pure aluminum and shall be as per SAA type II. All bolts, nuts, fasteners shall be stainless steel. Double washers should be used in






Description	Requirement
	sequence of SS Flat Washer and Rubber Washer (panel side and GI contact side). Flat washer of SS304 or SS316, 1.5-2 mm thickness, matching bolt size and rubber washer of Neoprene or EPDM, UV-resistant, 2-3 mm thickness. SS Rawal Bolt of minimum 8 mm thickness and minimum 3 inches in length. SAP Analysis or equivalent report should be approved by the Engineer in-charge before execution. Solar Panel should be secured using Clamps (stainless steel/Aluminum).
<b>Wind loading</b>	Mounting system should be able to allow air circulation for cooling in high temperature and withstand minimum wind speed of 150 Km/hour.
<b>Angle adjustment</b>	Seasonal adjustment optional as per requirement.

**Note: Civil Work for rooftop structure**

- Structure should support the existing roof top.
- To avoid the drilling in roofs, use appropriate arrangements for strengthen the structure without damage the roofs.
- Pointed dead loads on rooftop surface is not recommended.
- Additional beams can be casted to avoid drilling on roofs.
- Existing Water drainage must not be disturbed;
- In-case of Ground, Slope should be maintained properly to allow access water drainage.
- A concrete pad of minimum one-cubic ft. and minimum 65 kg comprising of 1 : 1.5 : 3 (Cement, Sand, Crush) shall be formed on the roof and  $\geq 2.5$  inches of drill to be done on the concrete pad on which structure shall be mounted.

**For Soft Ground L(x\*) Structure**

- The pit size for concrete works should be minimum 1.5 x 1.5 x 3 feet for each individual leg or 1.5 x 2.5 x 3 for double leg and the concrete should be extended at least 1 foot above the ground. A concrete pad of minimum 3-cubic ft. comprising of 1 : 1 : 3 (Cement, Sand, Crush) shall be formed on the ground.

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- Array fasteners (nut/bolts/washers) between PV Module and Structure shall be stainless steel. Washers should be installed on both sides of Module frame.
- All other array fasteners Structure shall be stainless steel or galvanized steel that provides the required mechanical strength.
- The minimum space between two PV Modules should be 2.54 cm (1 inch), to avoid air push over PV Modules.
- Due to land Non-availability or Limited Roof Space, Structure design can be modified as per site requirement. Pole Mounted or manual Tracker Structure can be provided as per client requirement and approval of Engineer In-charge.

## 7 DC Cable

- a. The DC cables should be made of 99.9% copper strands and flexible.
- b. XLPO/XLPE insulated sheathed, Tin Coated, Double Insulated. (Conforming preferably to EN 50618 or IEC FDIS 62930) be used suitable for minimum 1500 V<sub>DC</sub> transmission.
- c. Cables shall be clearly labelled with essential electrical parameters including manufacturer name, Voltage Range, standards etc.
- d. All DC Wiring shall be aesthetically neat and clean, over all wiring/connection losses shall not exceed 1% of the total rated output power.
- e. All wires/cables should be in standard flexible UV-Resistant conduits / HDPE/GI cable tray (as per design) for outdoor installation & (2-3 feet deep) for underground wiring / Cabling and PVC ducts for indoor installation (as per design).

## 8 Protection Device

### 8.1 DC Breaker

- a. DC circuit breakers (not fuse) of  $\geq$  Voc of String Voltage and suitable ampere rating (Greater than 1.1 Times of Rated Current & less than the fuse rating of all strings connected). The number of poles of the breaker should be as per the voltage requirement.
- b. Having Rated short circuit capacity [kA] as per IEC 60947 (all parts amended to date 60898-2), EN 60898-2, GB/T 10963.2 (Icn) having Rated insulation voltage U<sub>i</sub> [V] 250. The cost of screws, necessary

cf

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fittings complete in all respect included as approved and directed by the Engineer Incharge.

- c. DC breakers should be marked with the manufacturer model number, rated voltage, ampere rating and batch/serial number.
- d. DC breakers rating should be approved from Engineer In-charge before installation at site.
- e. To prevent solar panels from damage an appropriate size of DC Breaker / Fuse may be installed for each PV string and Surge Protection may be installed for combined Array (before Main DC Breaker / Inverter).
- f. DC Breaker, AC Breaker & Change overs should be placed in an enclosure. All Enclosures / Junction boxes should be made from Hot Dipped Galvanized Sheets of minimum 16 SWG.
- g. The DC Combiner should contain proper bus bars of adequate size each for Positive, Negative and Earthing.
- h. All wiring should be in proper conduit of capping casing. Wire should not be hanging loose.
- i. All wires should be terminated properly by using lugs / thimble connectors / sleeves.
- j. Distribution board must be installed with proper screws or as per the design requirements.
- k. Electrical Hazards Safety Labels should be pasted on DC Combiner NFD Enclosure / Charge Controller / Battery Enclosures.

## 8.2 Type -1 (Lightning) Surge Arrester for External DC (PV) system

Parameters	min. specifications required for 1 1 string of 1500 V or less
Discharge current (I max)	min. 20kA (8/20 $\mu$ sec.)
Impulse current (I imp)	min. 25kA (10/350 $\mu$ sec.)
Response time	$\leq 50$ n sec
Leakage current	$\leq 1$ mA
Dielectric strength	2000 V AC @ 1 minute
Protection Class	Class 2(Type2) minimum
Discharge voltage	600 V DC or 1000 VDC (Line to earth) or above (matching the size of inverter)



Ingress Protection	Minimum IP20 (placed in IP 65 Box along with other protections)
Short circuit withstand capacity	min. 30kA
Presence	On all MPP inputs of inverters

## 9 Type- 2 Surge Arrester

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
Applications	Both DC side & AC sides, Type 2
Discharge current (I max)	min. 20kA (8/20 $\mu$ sec.)
Impulse current (I imp)	min. 25kA (10/350 $\mu$ sec.)
Response time	$\leq 50$ n sec
Leakage current	$\leq 1$ mA
Dielectric strength	2000 V AC @ 1 minute
Protection Class	Class 2(Type2) minimum
Discharge voltage	600 V DC (Line to earth) or above (matching the size )
Short circuit withstand	min. 30kA
Applications	Both DC side & AC sides, Type 2
Discharge current (I max)	min. 20kA (8/20 $\mu$ sec.)
Impulse current (I imp)	min. 25kA (10/350 $\mu$ sec.)

### 9.1 Lightning Protection System

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
Air termination rod material	99 % Copper
Air termination rod length	As per design
Earthing Pit	Less than 2 Ohm (NEC Codes) 99 % Pure copper plate/ rod Size & weight of plate/rod varies from site to site

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Description	Requirement
Air termination rod diameter	As per design
Air termination rod	As per design
Cable for structure	2.5 mm <sup>2</sup> or higher, 99.9% pure copper connected with minimum 6 inches x 2 inches strip
Cable for interconnecting/ Grounding metal structure	4 mm <sup>2</sup> or higher, 99.9% pure copper
Insulated Spacer	As per design
Cable Bracket	As per design
Stand – Fang Fix system	As per design
Recommended method for calculation	Rolling sphere method
Functional Compliance	IEC62305-3 (EN 62305-3) or equivalent

### Distribution Box, Wiring, Ducting

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
<b>Outer Body</b>	<ol style="list-style-type: none"> <li>1. Powder Coated, minimum sheet thickness Min 16 Gauge, Min Dimension (12 x18 x 6) inch</li> <li>2. Cable entry should have cable gland and shrouds with appropriate color coding where required</li> <li>3. Front section should be isolated with a protection sheet (acrylic or suitable material) to prevent unauthorized access and injury.</li> </ol> <p>50% space of box should be free/open space. IP-54 for Indoor and IP-65 for Outdoor.</p>
<b>Breakers and disconnectors</b>	<p>DC breakers: 2/4 Pole DC breaker with current Capacity should be Min 1.25-time Isc of Solar PV Modules.</p> <p>AC/VFD Output breakers: 3/4 Pole MCCB breaker with each string with current Capacity should be Min 1.25-time to 1.5- times Isc of Line current.</p>
<b>Cable Conduiting</b>	Cables should be covered in suitable hard/flexible PVC conduits when used inside the building and underground ducting to avoid external damage by impact.

a. All exposed wiring (with the possible exception of the module interconnects) must



be covered in conduits/duct. Wiring through roofing, walls and other structures must be protected through the use of bushings. Wiring through roofing must form a waterproof seal (applicable for wiring only).

- b. For conduit and duct flexible PVC material with suitable size must be use, so that  $\frac{3}{4}$  spaces in a conduit should be empty.
- c. Field installed wiring must be joined using terminal strips or screw connectors. Soldering or crimping in the field must be avoided if at all possible. Wire nuts are not allowed. The rated current carrying capacity of the joint must not be less the circuit current rating. All connections must be made in junction boxes. Fittings for lights, switches, and polarity sensitive socket outlets may be used as junction boxes where practical.
- d. All wiring shall be color coded as per IEC standards and labeled at termination point.
- e. No conduit or fitting shall be attached directly to thatch or any other non- supportive surface
- f. Especially avoid installing the conduit direct over the roof; there must be distance not less than 2 inches between the roof surface and conduit/duct.
- g. Cables must be joined by the use of junction boxes, screw-connectors, and block connectors, MC4 or equaling connectors must be used for PV joints.
- h. All wires must be terminated with proper end sleeves and wire thimbles with different colors for positive and negative polarity.
- i. Size, voltage grade and manufacturer name should be printed on every cable
- j. Cable voltage drop specifications are as follows that must be verified through software simulation/ Calculations.

Description	Requirement
<b>1. PV to VFD/Inverter:</b>	Voltage drop less than 2% tin coated (Stranded and flexible), 99.9 % pure copper fire resistive insulation (Stranded) All open/ Exposed cables must be UV resistive.
<b>2. Grid / LV DB to Inverter/VFD</b>	Voltage drop less than 2%, 99.9 % pure copper fire resistive insulation (Stranded) as per requirement mentioned above



## 10 Earthing / Grounding

- a. The PV Panel frame and structure should be connected by the shortest practical route to an adequate earth contact (of Less than 5 Ohms Resistance) as per requirement of equipment manufacturer and site earth conditions, using an uninterrupted conductor. Grounding can reduce the risks of damage from lightning- induced surges.
- b. The Sizing of Earthing conductor will be done as per NEC Table 250.122
- c. The grounding conductor should be 99% Copper and PVC insulated / Bare Copper if installed underground along a defined path.
- d. Motor, inverter, Battery / Battery Box (if required), Main Distribution Board should be connected to an adequate earth contact / Grounding.
- e. Ground enhancement material (GEM) shall be used below and above the Earthing plate for proper grounding. Gravel or coarse sand shall be poured along with soil in the pit.
- f. Grounding / Earthing plate should be made of GI Plate of 6mm/ Copper Cladded plate of 4mm thickness & size minimum 12" x 2.5".
- g. Grounding / Earthing conductor should be connected to the plate / Rode / GI Pipe by proper connector of minimum depth of 6 feet.
- h. Alternatively, Earthing Rod of suitable size and length can be installed. (Instead of Plate). As per BOQ/Design given and Engineer In-Charge Approval.
- i. Earthing as per Electricity Act of Pakistan/NEPRA
- j. AC and DC equipment shall be earthed separately.

## 11 Nuts, Bolts, Washers and other fastening equipment

Description	Requirement
<b>Tentative outlines, design will be site dependent and may varies</b>	
<b>Adhesives and Sealants</b>	Epoxy/UV weather resistive Silicon Adhesives should be used for metal-to-metal or metal-to-concrete bonding (if required) Compliance with ASTM C920 or equivalent
<b>Cable Ties:</b>	UV-resistant nylon or stainless steel



Description	Requirement
<b>Cable Clips and Trays</b>	<p>Material should be GI, or plastic (UV-resistant) for cable runs on rooftops.</p> <p>Underground pipes should be suitable as follows Materials: PVC, HDPE, equaling.</p> <p>Size: Typically, 1/2" to 4" diameters (size depends on wire gauge and number of conductors).</p> <p>Burial Depth: 6" to 24" depending on material and installation requirements.</p> <p>Conduit Type: Rigid or flexible, depending on the environmental and mechanical protection required.</p>
<b>Grounding Clips and Lugs</b>	<p>Tinned copper and Coper Clips for joint with grounding/earthing rod.</p>
<b>Bolts and Nuts</b>	<p>Stainless steel (Grade SS304 or SS316 for corrosion resistance)</p> <p>With size M6, M8, or as specified by the design,</p>
<b>Screws &amp; Washers</b>	<p>Material for screws should be galvanized or stainless steel. Type should be Self-drilling for metal i.e. earthing wires of modules.</p> <p>Chrome coated plain washers and spring washers for secure fastening</p>
<b>Mid Clamps &amp; End Clamps</b>	<p>Anodized aluminum or stainless steel with minimum thickness of 3 mm, adjustable to fit different panel thicknesses</p>
<b>Anchoring Systems</b>	<p>Minimum 8 mm thickness and minimum 3 inches in length</p>

**SHRIMP ESTATE AT  
58NB, SARGODHA**

**BOQ Genset & Internal  
Electrification**

## SUMMARY OF COST

### VOLUME-2 Genset

1.0	Genset (35 KVA) x 27 Nos	Rs.	-
2.0	Genset (25 KVA) x 5 Nos	Rs.	-
3.0	Genset (15 KVA) x 13 Nos	Rs.	-
4.0	Genset (200 KVA) x 1 Nos	Rs.	-
<b>Total Rs.</b>			-

### VOLUME-4 Power Cabling & Internal Electrification

1.0	Power Cabling, Internal Electrification, Conduit, Pump Room Electrification	Rs.	-
<b>Total Rs.</b>			-

#### Note:

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office. MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

ix	Governor: Electronic Governor with ECM Module.			
x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.			
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 35 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c16mmsq Cable + 1c 16mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	
	<b><u>Sound Attenuated Canopy</u></b>			

	<p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading</b>. The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>							
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p>	<b>1</b>	<b>No.</b>					
	<p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>							
<b>f</b>	<p><b>RCC Foundation</b></p>	<b>1</b>	<b>No.</b>					
	<p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>Job</b>					
	<p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>					
	<p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p> <p><b>2.25 Hr Load Testing will be carried out during FAT with following Protocol</b></p> <p><b>(For two persons and as per standard principal protocols):</b></p> <p><b>1) 15 min @ 50% Load</b></p> <p><b>2) 30 min @ 75% Load</b></p> <p><b>3) 1 hr @ 100 % Load</b></p> <p><b>4) 30 min @ 110% Load</b></p>							

	<p>In this regards the said expances of boarding &amp; lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .</p> <p><b>Note:</b> It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.</p> <p>The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.</p> <p><i>1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine &amp; Alternator. Engine Cummins/Perkins/FPT Alternator: Leory Sormer / Stamford</i></p>				
	Total / Genset	<b>Nos</b>	1		
	27 Nos (4 Pond CLUSTER)	<b>Nos</b>	27		
	GST @ 18%				
	Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
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MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
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**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

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xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 25 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c16mmsq Cable + 1c 16mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	
	<b><u>Sound Attenuated Canopy</u></b>			

	<p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading</b>. The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>				
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Floating Foundation of Generator</u></b></p>				
	<p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>				
<b>f</b>	<p><b>RCC Foundation</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Control Cables</u></b></p>				
	<p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Transportation</u></b></p>				
	<p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Note</u></b></p>				
	<p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>				
	<p><b>2.25 Hr Load Testing will be carried out during FAT with following Protocol</b></p>				
	<p><b>(For two persons and as per standard principal protocols):</b></p>				
	<p><b>1) 15 min @ 50% Load</b></p>				
	<p><b>2) 30 min @ 75% Load</b></p>				
	<p><b>3) 1 hr @ 100 % Load</b></p>				
	<p><b>4) 30 min @ 110% Load</b></p>				

<p>In this regards the said expances of boarding &amp; lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .</p> <p><b>Note:</b> It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.</p> <p>The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.</p> <p><i>1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine &amp; Alternator. Engine Cummins/Perkins/FPT Alternator: Leory Sormer / Stamford</i></p>				
Total / Genset	<b>Nos</b>	1		
5 Nos (2 POND CLUSTER)	<b>Nos</b>	5		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b><u>DIESEL GENERATOR SET</u></b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the in coming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p> <p>ix Governor: Electronic Governor with ECM Module.</p> <p>x Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU)</p> <p>Current Rating &amp; RC rating will be dependent on the KVA Rating &amp; Power System.</p>				

xi	<p>Generator Module should display following parameters (but not limited to following):</p> <ul style="list-style-type: none"> <li>-KVA, KW, KVAR &amp; % KW Loading</li> <li>-Load Current (I1, I2 &amp; I3)</li> <li>-V(L-L) &amp; V(L-N)</li> <li>-Frequency(Hz)</li> <li>-Power Factor</li> <li>-Engine Temperature</li> <li>-Coolant Temperature</li> <li>-Engine Oil Temperature</li> <li>-Engine Oil Pressure</li> <li>-Fuel Consumption (L/Hr)</li> <li>-Engine &amp; Alternator Emergency Alarms</li> <li>-Emergency Trip Alarms &amp; Ground Fault Alarms</li> <li>-Make Deepsea / Approved Eqv</li> </ul>				
xii	<p>Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor &amp; 400VAC, make Fast/Newage/Pakistan cables.</p>				
xii	<p>Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance &amp; start up procedure of generator alongwith written gurantee of spare parts availability</p>				
xii	<p>Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.</p>				
<b>a</b>	<p><b>Supply of 15 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b></p>	1	No.		
<b>b</b>	<p><b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b></p>	1	No.		
<b>c</b>	<p><b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b></p>	1	No.		
<b>d</b>	<p><b>4c10mmsq Cable + 1c 10mmsq Cable(CPC) CU/PVC/PVC</b></p>	50	Mtr		

	<p><b><u>Sound Attenuated Canopy</u></b></p> <p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b><u>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading.</u></b> The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>			
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p> <p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>	<b>1</b>	<b>No.</b>	
<b>f</b>	<p><b>RCC Foundation</b></p> <p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p> <p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p> <p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>	<b>1</b>	<b>No.</b>	
		<b>1</b>	<b>Job</b>	
		<b>1</b>	<b>Job</b>	

**2.25 Hr Load Testing will be carried out during FAT with following Protocol**  
**(For two persons and as per standard principal protocols):**  
**1) 15 min @ 50% Load**  
**2) 30 min @ 75% Load**  
**3) 1 hr @ 100 % Load**  
**4) 30 min @ 110% Load**

In this regards the said expances of boarding & lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .

**Note:**

It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.

The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.

*1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine & Alternator.  
 Engine Cummins/Perkins/FPT  
 Alternator: Leory Sormer / Stamford*

Total / Genset	<b>Nos</b>	1		
Total 13 Nos (1 POND CLUSTER)	<b>Nos</b>	13		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
 MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b><u>DIESEL GENERATOR SET</u></b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the in coming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p> <p>ix Governor: Electronic Governor with ECM Module.</p>				

x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.				
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv				
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.				
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability				
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.				
<b>a</b>	<b>Supply of 200 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>		<b>No.</b>	
<b>b</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>		<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>		<b>No.</b>	
<b>d</b>	<b>4c185mmsq Cable + 1c 70mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>		<b>Mtr</b>	

	<p><b><u>Sound Attenuated Canopy</u></b></p> <p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b><u>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading.</u></b> The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>			
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p> <p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>	<b>1</b>	<b>No.</b>	
<b>f</b>	<p><b>RCC Foundation</b></p> <p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p> <p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p> <p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>	<b>1</b>	<b>No.</b>	
		<b>1</b>	<b>Job</b>	
		<b>1</b>	<b>Job</b>	

**2.25 Hr Load Testing will be carried out during FAT with following Protocol  
(For two persons and as per standard principal protocols):**

- 1) 15 min @ 50% Load**
- 2) 30 min @ 75% Load**
- 3) 1 hr @ 100 % Load**
- 4) 30 min @ 110% Load**

In this regards the said expances of boarding & lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .

**Note:**

It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.

The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.

*1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine & Alternator.  
Engine Cummins/Perkins/FPT  
Alternator: Leory Sormer / Stamford*

Total / Genset (Office)	<b>Nos</b>	1		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

**ELECTRICAL & ALLIED WORKS****Vol-4**

<b>S. No.</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
1	<b>LT SWITCHGEARS</b>				
1.01	<p><b>Main Panel Board+ ATS Panels + DBs as per SLD</b></p> <p>Switchgear: Terasaki Japan / Legrand EU / ABB / Approved as per Annex-A  PFI Relay &amp; Capacitors: Shizuki / Nokian EU /EPCOS / Approved as per Annex-A  Digital Voltmeter / Ammeters &amp; Energy Analyzers: Smart Controller UK / Lovato EU / Sinusoid /  <b>Energy Analyzer SS-04 with RS-485 Port &amp; Digital Output for Serial Communication</b>  Supply installation and commissioning of key tagged type <b>Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color</b>, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below.</p> <p>complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below, complete with internal wiring earthing, neutral link, termination blocks and cable chamber at the top of the DB.</p> <p>Each D.B. shall have Digital Voltmeter, Voltmeter / Selector switch, LED Phase indication lights &amp; control fuses on incoming. All breakers &amp; instrumentation and other materials shall be as listed in Annexure "A" it shall be manufactured by any one of the manufacturers as mentioned in Annexure "A" and <b>conforming to and complete as per the single line diagram.</b></p> <p>All incoming and outgoing breakers shall be <b>accessible by opening the front door</b> having additional M.S. sheet cover. Gaskets shall also be provided where necessary. All MCBs/MPCB/MCCBs/Accessories shall be suitable to operate <b>without any de-rating at 50°C ambient temperature</b> and shall be of one make only and not a mixture of more than one make.</p> <p><b>Cable Glands</b> Make/Brand:Brass Alloy and should be Appropriatsize as per the incoming &amp; O/G cables</p> <p><b>Terminal Block</b> Make/Brand: Imported, should be Appropriate size as per the O/G cables  <b>Exhaust Fan</b> Make/Brand: Imported and should be installed in every floor standing cubical on the side/top including the necessary range of thermostate &amp; filter.The size should not be less than 6" in dia.</p>	44	Nos		

S. No.	Description	Qty	Unit	Rate	Amount
	<p><b>Tube Light</b> with Microswitch Make/Brand:Imported, should be installed in every floor standing cubical inside.</p> <p><b>Distribution Board/ACP</b> should be Frame 16 SWG IP-65</p> <p><b>Safety Punch Plates</b>, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.</p> <p>2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.</p> <p><b>Paint</b> should be All cubical shall be painted in textured white colour.</p> <p>Fishnet Flexible Earth Strips to be used for earthing housing of panels</p> <p>Phase Separators should be used.</p> <p>Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.</p> <p>MCCB SP of 2Amp should be used for fuse purpose instead of control fuse.</p> <p>Note: Dimension, Panel/DB Structure, Mounting Arrangement &amp; Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication &amp; Delivery of Panels</p> <p>The above mentioned points are common in almost all the switchgear, the contractor / manufacturer is advised to incorporate all above mentioned points with other ammendments during manufacturing of switchgear.</p> <p>Complete in all respects as per SLD</p>				

S. No.	Description	Qty	Unit	Rate	Amount
1.02	<p><b>Automatic Power Factor Improvement Plant</b></p> <p>Supply, installation &amp; commissioning of sheet metal clad totally enclosed free standing, front excess <b>Power factor improvement plant</b> to be installed with Main LT Switch Board, fabricated from <b>16 SWG M.S. sheet steel</b> &amp; doors from <b>16 SWG M.S. sheet steel, degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron</b> thickness of approved color, <b>415 volts, 3 phase, 50Hz</b>, power factor improvement plant of automatically / manually controlled. complete with air contactors, HRC fuses for short circuit protection.</p> <p>Each cubicle to have <b>2 thermostatically controlled 220~240 Volts Operated robust exhaust fan 6"/8" dia.</b> to be installed on inner sides on back or on top of synch panel for hot air exhaust, including cost of thermostat ON/OFF switches wire mesh, air filters and all accessories / wiring, complete in all respects.</p> <p><b>Tube light with rod</b> to be installed inside each cubicle with <b>micro switch</b> on each door.</p> <p>On/Off push buttons, On/Off indication light, PFI relay, make for switching in &amp; out out the capacitors in , control fuses, auto/manual selector switch, 415 volts 3 phase delta connected capacitors make BTB/Nokian and ON/OFF indicating lamps.</p> <p><b>MAGNETIC CONTACTORS; PFI CONTACTOR SHALL HAVE INBUILT DAMPING RESISTANCE, RELAY MUST HAVE CHARGING / DISCHARGING RATE SELECTION</b></p> <p>a APFI Plant <b>37 KVAR</b></p> <p>Complete in all respect as per single line diagram. <b><u>Thimbles must be covered with fire retardant tape.</u></b> <b><u>Fire resistance pad must be installed on panel top plates.</u></b></p> <p><b>Sub Total</b></p>	44	Nos		
2.0	<b>CABLE TRAYS &amp; LADDERS</b>				
2.01	<p><b>Powder Coated Ceiling Suspended / Horizontal/ Vertical Cable Tray</b></p> <p>Fabrication, supply at site and installation of <b>Degreased, De-rusted, Hot Dip Galvanized Perforated</b> cable tray with cover made of <b>G.I. sheet</b> 8 ft. to 10 ft. long with sides 4" high with cover to be installed on wall, or in vertical, or above false ceiling in horizontal position or as shown on drawing, including cost of following:</p> <p>-2 M.S threaded hanging rod 1/2" dia. Length 12" or as required as per site. -M.S strip 2" wide x 1/4" thick. -Hilti rawal bolts as per required quantity &amp; size. -Complete hanging system shall be installed at every 36".</p>				

S. No.	Description	Qty	Unit	Rate	Amount
a	<p>The cable tray shall be complete in all respects including cost of all accessories / materials. Cable tray shall be of the following sizes.</p> <p style="text-align: center;"><b>For Power</b></p> <p>9" X 4" MS Cable Tray 16 SWG &amp; MS Cover 18 SWG</p> <p><b>Important Note:</b> Actual length of the cable tray shall be measured at site duly by the contractor under the presence of Engineer Incharge, complete in all respects. Above mentioned lengths are the estimated lengths which are required at site.</p> <p>The contractor shall submit the shop drawings, samples of the brand selected for procurement of cable trays, complete compliance report with BOQ specs prior to the procurement.</p> <p><b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.</p> <p><u>Sub Total</u></p>	0	Rft		
<b>2.0</b>	<b>POWER CABLES AND CONDUITS</b>				
2.01	<p>Supply at site, installation, testing and commissioning of <b>PVC/XLPE insulated PVC sheathed Non armoured 99.9% pure Copper conductor / Aluminum Conductor power cable 600 / 1000 Volt grade</b> manufactured by any one of the manufacturers as mentioned in Annexure in preinstalled cable tray / trenches cables to be installed as per routes shown on drawings including cost of all necessary materials, connections of cables and identification tags at both ends, cables lugs properly crimped at both ends for the following sizes complete in all respects.</p> <p>Actual length of cables to be installed shall be practically measured at site by the Contractor, duly authenticated by the employers electrical engineer before placing the order with the manufacturer, however, approximate length of cables are shown herewith. Payments shall be made as per actual length installed.</p> <p><b>- Power Cables:</b></p> <p style="text-align: center;"><b>ats to 60HP Pumps isolator box</b></p> <p>i 4 Core 50mm.sq. /XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 40HP Pumps isolator box</b></p> <p>ii 4 Core 25mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 20 HP Pumps isolator box</b></p>				
		1,144	Rm		
		792	Rm		

<b>S. No.</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
iii	4 Core 16mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.  <b>ats db to submersible pump isolator</b>  <b>ats db to aerator isolator box</b>	9,328	Rm		
iv	5 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	15,360	Rm		
v	5 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	3,840	Rm		
vi	1 Core 10mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		
vii	1 Core 6mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		
viii	1 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	32,580	Rm		
ix	1 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	32,580	Rm		
-	<b><u>Circuit Protective Conductor</u></b>				
x	1Core 16mm.sq. XLPE/PVC Ins 600/1000V Cable.	11,264	Rm		

S. No.	Description	Qty	Unit	Rate	Amount
2.02	<b>P.V.C. Conduit and Accessories</b>  Supply at site and installation of heavy duty pipe class D Pipes to be installed under ground, including cost of excavation , including cost of all PVC pipe accessories like bends, sockets, laying of PVC pipe with 4" thick layer of sand beneath pipe, protection and sand tape above pipe, refilling of excavations with sweet earth, ramming, watering cost of labour, material, complete in all respects.	300	Rft		
i	2" dia. PVC conduit	19200	Rmtr		
ii	4" dia. PVC conduit	3840	Rmtr		
	<b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.				
<b>3</b>	<b><u>Clean Agent Fire Suppression for Ele &amp; IT</u></b>				
3.01	Supply at site, installation, testing and comissioning of UL Listed Fire extinguishing PEX tubing system for Switchgear Panels, comprising of maximum 3.5 Meters long PEX tube as per requirement Five layered (adhesive resin glue inner / outer layerd, barrier layer, Inner outer layer designed to endure with inner pressure and gas barrier layer to prevent inner gas permeation), fire detection ability before temp rising upto 120 deg centigrade, filled with Novec1230 / approved fire extinguishing agent, complete in all respects. Make Erase Tube (Eyelogy) / Approved eqv. The contractor shall provide product's complete technical literature & compliance with UL certification prior to the procurement, complete in all respects. <b>2 Meter /DB Panel</b>	44	Nos		
	<b>Sub Total</b>				

S. No.	Description	Qty	Unit	Rate	Amount
4.0	<b>Store Room Electrification</b>				
	<b>Note:-</b> For list of approved manufacturer's see Annexure "A".				
4.01	Supply and wiring of first light from DB MCB with 2x2.5mmsq single core insulated 300/500 volt grade cables(P+N) and 2.5mmsq cable as protective conductor (PC) in & including 1" dia Class-Electrical PVC conduit installed/ recessed in walls / R.C.C. Slab, on ceiling or as required as per site conditions. Complete with all conduit accessories junction boxes, pull boxes as required complete in all respects as per specifications and drawings.	141	Each		
b	Same as item No. 1.05 above but point to point wiring with 3 x 1.5mmsq PVC insulated Cu.Cond cable (P+N+E), complete in all respects.	0	Each		
4.02	Wiring of one 15A power sockets from DB MCB to outlet with 2x 4mmsq single core cables (P+N) and 4 mmsq as CPC from DB to point including cost of one Nos. 15A 3 pin switch socket outlet make as approved by consultant & including 1" dia Class-Electrical PVC conduit recessed in walls/R.C.C. slab, or on surface of ceiling including all conduits accessories, junction boxes, pull boxes etc. installed on & including 16 SWG sheet steel boards recessed in walls /columns, Complete in all respects.	141	Each		
4.03	Providing ,installation ,testing and commissioning of the following <b>lighting fixture</b> including all accessories like mounting arrangement, electronic ballast, drivery circuitry etc. Complete in all respects.  General Technical Specification includes color temperature ranging from 2700K to 6000K (As per the Consultant / Architect Approval), CRI:80, having lumen efficay of atleast 80 lumen/watt and operational power factor of 0.9 Must have IEC CE driver and chipset report ,osram / philips/approved equiv. <b><u>Imp Note: All lighting fixtures and fans will be according to the choice of architect/engr.incharge, complete in all respects. Contractor/manufacturer to get techincal submittals of all lighting fixtures approved along with the submission of DIALux/Eqv Illumination study along LM 79, 80 &amp; 81 report, prior to the procurement complete in all respects.</u></b>				
i	1x15W LED downlight SMD type.	256	Nos		
ii	Supply and installation of <b>following fan</b> ,complete as per specifications and drawings. Wall bracket fan (energy efficient copper wire, 3 speed mode, metal body)	0	Each		

<b>S. No.</b>	<b>Description</b>	<b>Qty</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
	<b>Sub Total</b>				
	<b>Total Carried Over to Summary of Costs</b>				
	<b>18% GST</b>				
	<b>Total (Incl of GST)</b>				

**Note:**

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 1) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 2) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
  - 3) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.
  - 4) MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.

**Signed & Stamped Of Contractor**

**SHRIMP ESTATE AT  
58NB-Phase-2**

**BOQ for Genset & Internal  
Electrification**

**SUMMARY OF COST**

**VOLUME-2 Genset**

1.0	Genset (35 KVA) x 9 Nos	Rs.
2.0	Genset (15 KVA) x 3+5 Nos	Rs.

**Total Rs.**

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**VOLUME-4 Power Cabling & Internal Electrification**

1.0	Power Cabling, Internal Electrification, Conduit, Pump Room Electrification	Rs.
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**Total Rs.**

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**Grand Total Rs.  
(Incl of Taxes)**

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S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b><u>DIESEL GENERATOR SET</u></b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

ix	Governor: Electronic Governor with ECM Module.			
x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.			
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 35 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>b</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c16mmsq Cable + 1c 16mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	

	<p><b><u>Sound Attenuated Canopy</u></b></p> <p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b><u>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading.</u></b> The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>			
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p> <p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>	<b>1</b>	<b>No.</b>	
<b>f</b>	<p><b>RCC Foundation</b></p> <p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p> <p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p> <p><b>Note</b> <b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p>	<b>1</b>	<b>No.</b>	
		<b>1</b>	<b>Job</b>	
		<b>1</b>	<b>Job</b>	

**2.25 Hr Load Testing will be carried out during FAT with following Protocol**  
**(For two persons and as per standard principal protocols):**

- 1) 15 min @ 50% Load**
- 2) 30 min @ 75% Load**
- 3) 1 hr @ 100 % Load**
- 4) 30 min @ 110% Load**

In this regards the said expances of boarding & lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .

**Note:**

It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.

The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.

*1 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer from Engine & Alternator.  
 Engine Cummins/Perkins/FPT  
 Alternator: Leory Sormer / Stamford*

Total / Genset	<b>Nos</b>	1		
Total Pond Cluster	<b>Nos</b>	9		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
 MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.

- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

S. No.	Description	Qty	Unit	Rate	Amount
1	<p><b>DIESEL GENERATOR SET</b></p> <p>Supply at site, Installation at designated location including Loading, Unloading and Lifting (If Required), connection of cables, testing and commissioning of water cooled NEW diesel generating sets suitable for operation at <b>50 deg C and 70% relative humidity</b> manufactured by any one of the manufacturers as specified in annexure "A".</p> <p>Assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with electronic governor to give regulation to BS: 514 class A1.</p> <p>Equipped with balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, set of spare oil/fuel filters engine panel with oil pressure and water temperature gauge, pressure and water temperature gauge, (Electrical), alternator, electronic voltage regulator and governor, radio interference suppressors, electronic tachometer frequency meter voltmeter with selector switch, Ammeter with selector switch, hour runs meter, KWH meter, KW (total and per phase) KVA total and per phase.</p> <p>Power factor (Ave, total and per phase. KVAR (total) KVAR hour % of rated load, emergency stop push button, radiator, with water level switch, suitable for 400 / 230 volts, 50 cycles/second, at 1500 rpm @ 110% Loading, for 3 phase 4 wire system, including cost of all necessary material / accessories, daily fuel tank and conforming to technical specifications mentioned below.</p> <p><b><i>The Generator will have Vibration Isolators in order to reduce the vibration effect caused by the running of generator</i></b></p> <p><b><i>The Generator shall comply at minimum with ISO-8528 G-2 class performance parameters.</i></b></p> <p><b><i>The contractor shall submit no-performance degradation letter under required (50deg C/70%RH) ambient conditions from genset/engine manufacturer.</i></b></p> <p><b><u>General Specifications of Alternator</u></b></p> <p>i Voltage : 400 Volt at 100% PRP &amp; 110% at SPR @ 0.8 Power Factor</p> <p>ii Load Step: Max Load Step at 100% Loading</p> <p>iii Frequency : 50Hz</p> <p>iv Power Factor : 0.8</p> <p>v Insulation Class : Class H</p> <p>vi Stator Pitch : 2/3</p> <p>vii Ingress Protection : IP-23</p> <p>viii Voltage Regulation : As per ISO-8528 G-2 Class</p>				

ix	Governor: Electronic Governor with ECM Module.			
x	Protection Breaker: 4 Pole Adjustable MCCB / ACB (LSIG) with Electronic Trip make Terasaki (Japan) / Legrand (EU) / ABB (EU) Current Rating & RC rating will be dependent on the KVA Rating & Power System.			
xi	Generator Module should display following parameters (but not limited to following): -KVA, KW, KVAR & % KW Loading -Load Current (I1, I2 & I3) -V(L-L) & V(L-N) -Frequency(Hz) -Power Factor -Engine Temperature -Coolant Temperature -Engine Oil Temperature -Engine Oil Pressure -Fuel Consumption (L/Hr) -Engine & Alternator Emergency Alarms -Emergency Trip Alarms & Ground Fault Alarms -Make Deepsea / Approved Eqv			
xii	Cable From Alternator to Breaker Box: Single Core PVC/PVC Copper Conductor cables rated at 110% Loading at 0.8 Power Factor & 400VAC, make Fast/Newage/Pakistan cables.			
xii	Designated staff by Client to be trained at site imparting all necessary information regarding general maintenance & start up procedure of generator alongwith written gurantee of spare parts availability			
xii	Emission: Nox,CO,HC,PM or any other emission gases should meet the relevant EPA standard, Punjab Govt.			
<b>a</b>	<b>Supply of 15 kVA PRP Diesel Generator with inbuilt 8 Hrs Day Tanks</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>Installation in all respects of above mentioned PRP Diesel Generator with 8 hrs Day Tank</b>	<b>1</b>	<b>No.</b>	
<b>c</b>	<b>ATS Panel (AC3 Contactor Based with Module for ATS &amp; Allied Accessories, Energy KWHr Data &amp; Voltage Protection Features)</b>	<b>1</b>	<b>No.</b>	
<b>d</b>	<b>4c10mmsq Cable + 1c 10mmsq Cable(CPC) CU/PVC/PVC</b>	<b>50</b>	<b>Mtr</b>	
	<b><u>Sound Attenuated Canopy</u></b>			

	<p>Supply and Installation of <b>sound attenuated canopy</b> made of 14 SWG M.S sheet of size to be given by manufacturer with inspection gates on each side with locking mechanism one door for electric panel inspection having glass for instruments visibility and louvers for air intake. The canopy will result <b>75 dba noise level at distance of one meter from outside of its walls @ 100% generator loading</b>. The canopy will be air dry painted. The hallow area of canopy will be filled with glass wool. The canopy shall be made by manufacturer approved by Architect complete in all respect with all necessary accessories / materials. Canopy shall be installed if instructed by Client.</p>				
<b>d</b>	<p><b>Weather Proof Sound Attenuated Canopy</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Floating Foundation of Generator</u></b></p> <p>Providing and constructing of <b>RCC foundation with 1:2:4 steel reinforcement</b> as per design and requirement of generator manufacturer or as per structural design to be given by Consultant, including thermapore 1" thick on all the four sides of generator, M.S steel bars, as per size required, refilling of excavation area. Thickness and specs of Floating Foundation shall be as per structural design, all necessary materials, complete in all respects.</p>				
<b>f</b>	<p><b>RCC Foundation</b></p>	<b>1</b>	<b>No.</b>		
	<p><b><u>Control Cables</u></b></p> <p>Supply, Installation, connection, testing and commissioning of <b>control cables</b> 6mm.sq. 4 core cable wire PVC/PVC manufactured by Pakistan Cables or as specified in Annexure "A" in and including cost of PVC conduit concealed in walls, floors, slabs, for 50 Metere maximum and complete in all respect.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Transportation</u></b></p> <p>Moving of Diesel generator to the designated location / floor excluding the cost of lifting of generator by necessary means (crane, etc.), as per the site conditions, complete in all respects.</p>	<b>1</b>	<b>Job</b>		
	<p><b><u>Note</u></b></p> <p><b><u>FAT at Factory Floor of Manufacturer test in accord to ISO 8528 but not limited and On Load Test as Follows:</u></b></p> <p><b>2.25 Hr Load Testing will be carried out during FAT with following Protocol</b>  <b>(For two persons and as per standard principal protocols):</b>  <b>1) 15 min @ 50% Load</b>  <b>2) 30 min @ 75% Load</b>  <b>3) 1 hr @ 100 % Load</b>  <b>4) 30 min @ 110% Load</b></p>				

<p>In this regards the said expances of boarding &amp; lodgging arrangments for bringing the cocnern verification authorities (atleast 2 persons) to the manufacturing floor shall be borned by the supplier .</p> <p><b>Note:</b> It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.</p> <p>The contractor shall submit MAR technical specifications and generator shop drawings for approval duly by the consultant, prior to the procurement of equipment complet in all respects.</p> <p><i>1 - The engine offered must be Make and manufactured in the European region.</i></p> <p><i>2 - The local coupler must possess a valid authorized dealership certificate and shall be required to submit an official OEM (Original Equipment Manufacturer) Authorization Letter issued directly by the principal manufacturer.</i></p>				
Total / Genset	<b>Nos</b>	8		
Total Pond Cluster	<b>Nos</b>	8		
GST @ 18%				
Total inclusive of GST				

**Note:**

- 1) It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 2) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
- 3) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
- 4) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.  
MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.
- 5) Anyother Requirement , not mentioned, but required by Landlord Team for proper functioning of system, complete in all respects.

**Signed & Stamped Of Contractor**

**ELECTRICAL & ALLIED WORKS**

Vol-4

S. No.	Description	Qty	Unit	Rate	Amount
1	<b>LT SWITCHGEARS</b>				
1.01	<p><b>Main Panel Board+ ATS Panels + DBs as per SLD</b></p> <p>Switchgear: Terasaki Japan / Legrand EU / ABB / Approved as per Annex-A  PFI Relay &amp; Capacitors: Shizuki / Nokian EU /EPCOS  Digital Voltmeter / Ammeters &amp; Energy Analyzers: Smart Controller UK / Lovato EU / Sinusoid  <b>Energy Analyzer SS-04 with RS-485 Port &amp; Digital Output for Serial Communication</b>  Supply installation and commissioning of key tagged type <b>Distribution Boards fabricated from 16 SWG sheet steel degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron thickness in approved color</b>, comprising of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below.</p> <p>complete with internal wiring earthing , neutral link, termination blocks and cable chamber at the top of incoming 3 phase moulded case circuit breakers or earth leakage circuit breakers (as specified) and outgoing single phase Miniature circuit breakers (having magnetic &amp; thermal trip devices) as given below, complete with internal wiring earthing, neutral link, termination blocks and cable chamber at the top of the DB.</p> <p>Each D.B. shall have Digital Voltmeter, Voltmeter / Selector switch, LED Phase indication lights &amp; control fuses on incoming. All breakers &amp; instrumentation and other materials shall be as listed in Annexure "A" it shall be manufactured by any one of the manufacturers as mentioned in Annexure "A" and <b>conforming to and complete as per the single line diagram.</b></p> <p>All incoming and outgoing breakers shall be <b>accessible by opening the front door</b> having additional M.S. sheet cover. Gaskets shall also be provided where necessary. All MCBs/MPCB/MCCBs/Accessories shall be suitable to operate <b>without any de-rating at 50°C ambient temperature</b> and shall be of one make only and not a mixture of more than one make.</p> <p><b>Cable Glands</b> Make/Brand:Brass Alloy and should be Appropriatsize as per the incoming &amp; O/G cables</p> <p><b>Terminal Block</b> Make/Brand: Imported, should be Appropriate size as per the O/G cables  <b>Exhaust Fan</b> Make/Brand: Imported and should be installed in every floor standing cubical on the side/top including the necessary range of thermostate &amp; filter.The size should not be less than 6" in dia.</p>	19	Nos		

S. No.	Description	Qty	Unit	Rate	Amount
	<p><b>Tube Light</b> with Microswitch Make/Brand:Imported, should be installed in every floor standing cubical inside.</p> <p><b>Distribution Board/ACP</b> should be Frame 16 SWG IP-65</p> <p><b>Safety Punch Plates</b>, the punch plates of all switchgear's cubical should be of back-a-lite material and phase separators for each MCCB/ACBs.</p> <p>2 spaces in each phase to accommodate the future expansion in each distribution board, LT and Sub Mains.</p> <p><b>Paint</b> should be All cubical shall be painted in textured white colour.</p> <p>Fishnet Flexible Earth Strips to be used for earthing housing of panels</p> <p>Phase Separators should be used.</p> <p>Busbars should be of pure copper 99.9% with tinned coating (for rust free) and have insulated color coding sleeves.</p> <p>MCCB SP of 2Amp should be used for fuse purpose instead of control fuse.</p> <p>Note: Dimension, Panel/DB Structure, Mounting Arrangement &amp; Cable Incoming/Outgoings of All Panels/DBs shall be duly verified by the Contractor under the presence of Engineer Incharge Prior to Fabrication &amp; Delivery of Panels</p> <p>The above mentioned points are common in almost all the switchgear, the contractor / manufacturer is advised to incorporate all above mentioned points with other ammendments during manufacturing of switchgear.</p>				

S. No.	Description	Qty	Unit	Rate	Amount
1.02	<b>Automatic Power Factor Improvement Plant</b>				
	<p>Supply, installation &amp; commissioning of sheet metal clad totally enclosed free standing, front excess <b>Power factor improvement plant</b> to be installed with Main LT Switch Board, fabricated from <b>16 SWG M.S. sheet steel</b> &amp; doors from <b>16 SWG M.S. sheet steel, degreased and de-rusted, hot dip Phosphated finished with electro-static powder coating of atleast 100 micron</b> thickness of approved color, <b>415 volts, 3 phase, 50Hz</b>, power factor improvement plant of automatically / manually controlled. complete with air contactors, HRC fuses for short circuit protection.</p> <p>Each cubicle to have <b>2 thermostatically controlled 220~240 Volts Operated robust exhaust fan 6"/8" dia.</b> to be installed on inner sides on back or on top of synch panel for hot air exhaust, including cost of thermostat ON/OFF switches wire mesh, air filters and all accessories / wiring, complete in all respects.</p> <p><b>Tube light with rod</b> to be installed inside each cubicle with <b>micro switch</b> on each door.</p> <p>On/Off push buttons, On/Off indication light, PFI relay, make for switching in &amp; out out the capacitors in , control fuses, auto/manual selector switch, 415 volts 3 phase delta connected capacitors make BTB/Nokian and ON/OFF indicating lamps.</p> <p><b>MAGNETIC CONTACTORS; PFI CONTACTOR SHALL HAVE INBUILT DAMPING RESISTANCE, RELAY MUST HAVE CHARGING / DISCHARGING RATE SELECTION</b></p> <p>a APFI Plant <b>50 KVAR</b> Complete in all respect as per single line diagram.</p> <p>b APFI Plant <b>25 KVAR</b> Complete in all respect as per single line diagram. <b><i>Thimbles must be covered with fire retardant tape.</i></b> <b><i>Fire resistance pad must be installed on panel top plates.</i></b></p> <p><b>Sub Total</b></p>	9	Nos		-
		8	Nos		-
					-
2.0	<b>CABLE TRAYS &amp; LADDERS</b>				
2.01	<p><b>Powder Coated Ceiling Suspended / Horizontal/ Vertical Cable Tray</b></p> <p>Fabrication, supply at site and installation of <b>Degreased, De-rusted, Hot Dip Galvanized Perforated</b> cable tray with cover made of <b>G.I. sheet</b> 8 ft. to 10 ft. long with sides 4" high with cover to be installed on wall, or in vertical, or above false ceiling in horizontal position or as shown on drawing, including cost of following:</p> <p>-2 M.S threaded hanging rod 1/2" dia. Length 12" or as required as per site.</p> <p>-M.S strip 2" wide x 1/4" thick.</p> <p>-Hilti rawal bolts as per required quantity &amp; size.</p> <p>-Complete hanging system shall be installed at every 36".</p>				

S. No.	Description	Qty	Unit	Rate	Amount
a	<p>The cable tray shall be complete in all respects including cost of all accessories / materials. Cable tray shall be of the following sizes.</p> <p style="text-align: center;"><b>For Power</b></p> <p>9" X 4" MS Cable Tray 16 SWG &amp; MS Cover 18 SWG</p> <p><b>Important Note:</b> Actual length of the cable tray shall be measured at site duly by the contractor under the presence of Engineer Incharge, complete in all respects. Above mentioned lengths are the estimated lengths which are required at site.</p> <p>The contractor shall submit the shop drawings, samples of the brand selected for procurement of cable trays, complete compliance report with BOQ specs prior to the procurement.</p> <p><b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.</p> <p><b>Sub Total</b></p>	0	Rft		-
<b>2.0</b>	<b>POWER CABLES AND CONDUITS</b>				
2.01	<p>Supply at site, installation, testing and commissioning of <b>PVC/XLPE insulated PVC sheathed Non armoured 99.9% pure Copper conductor / Aluminum Conductor power cable 600 / 1000 Volt grade</b> manufactured by any one of the manufacturers as mentioned in Annexure in preinstalled cable tray / trenches cables to be installed as per routes shown on drawings including cost of all necessary materials, connections of cables and identification tags at both ends, cables lugs properly crimped at both ends for the following sizes complete in all respects.</p> <p>Actual length of cables to be installed shall be practically measured at site by the Contractor, duly authenticated by the employers electrical engineer before placing the order with the manufacturer, however, approximate length of cables are shown herewith. Payments shall be made as per actual length installed.</p> <p><b>- Power Cables:</b></p> <p style="text-align: center;"><b>ats to 60HP Pumps isolator box</b></p> <p>i 4 Core 35mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 40HP Pumps isolator box</b></p> <p>ii 4 Core 25mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p> <p style="text-align: center;"><b>ats to 20 HP Pumps isolator box</b></p> <p>iii 4 Core 16mm.sq. XLPE/SWA/PVC Ins 600/1000V Cable.</p>				
		600	Rm		-
		288	Rm		-
		3,168	Rm		-

S. No.	Description	Qty	Unit	Rate	Amount
	<b>ats db to aerator isolator box</b>				
iv	5 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	4,920	Rm		-
iv	5 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	1,230	Rm		-
iv	1 Core 10mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		-
iv	1 Core 6mm.sq. Cu/PVC/PVC Ins Cable.	1,000	Rm		-
iv	1 Core 4mm.sq. Cu/PVC/PVC Ins Cable.	12,450	Rm		-
iv	1 Core 2.5mm.sq. Cu/PVC/PVC Ins Cable.	13,254	Rm		-
-	<b><u>Circuit Protective Conductor</u></b>				
viii	1Core 16mm.sq. Al/XLPE/PVC Ins 600/1000V Cable.	4,056	Rm		-
2.02	<b>P.V.C. Conduit and Accessories</b>				
	Supply at site and installation of heavy duty pipe class D Pipes to be installed under ground, including cost of excavation , including cost of all PVC pipe accessories like bends, sockets, laying of PVC pipe with 4" thick layer of sand beneath pipe, protection and sand tape above pipe, refilling of excavations with sweet earth, ramming, watering cost of labour, material, complete in all respects.	250	Rft		-
i	2" dia. PVC conduit	6150	Rmtr		-
ii	4" dia. PVC conduit	1640	Rmtr		-
	<b>Note:</b> Contractor is advised to confirm the sizes, running lengths and termination as per site conditions before commencement of work. All the conduits / cable tray crossings through partition walls shall be property sealed by fire retardant material after installation.				
					-
3	<b><u>Clean Agent Fire Suppression for Ele &amp; IT</u></b>				

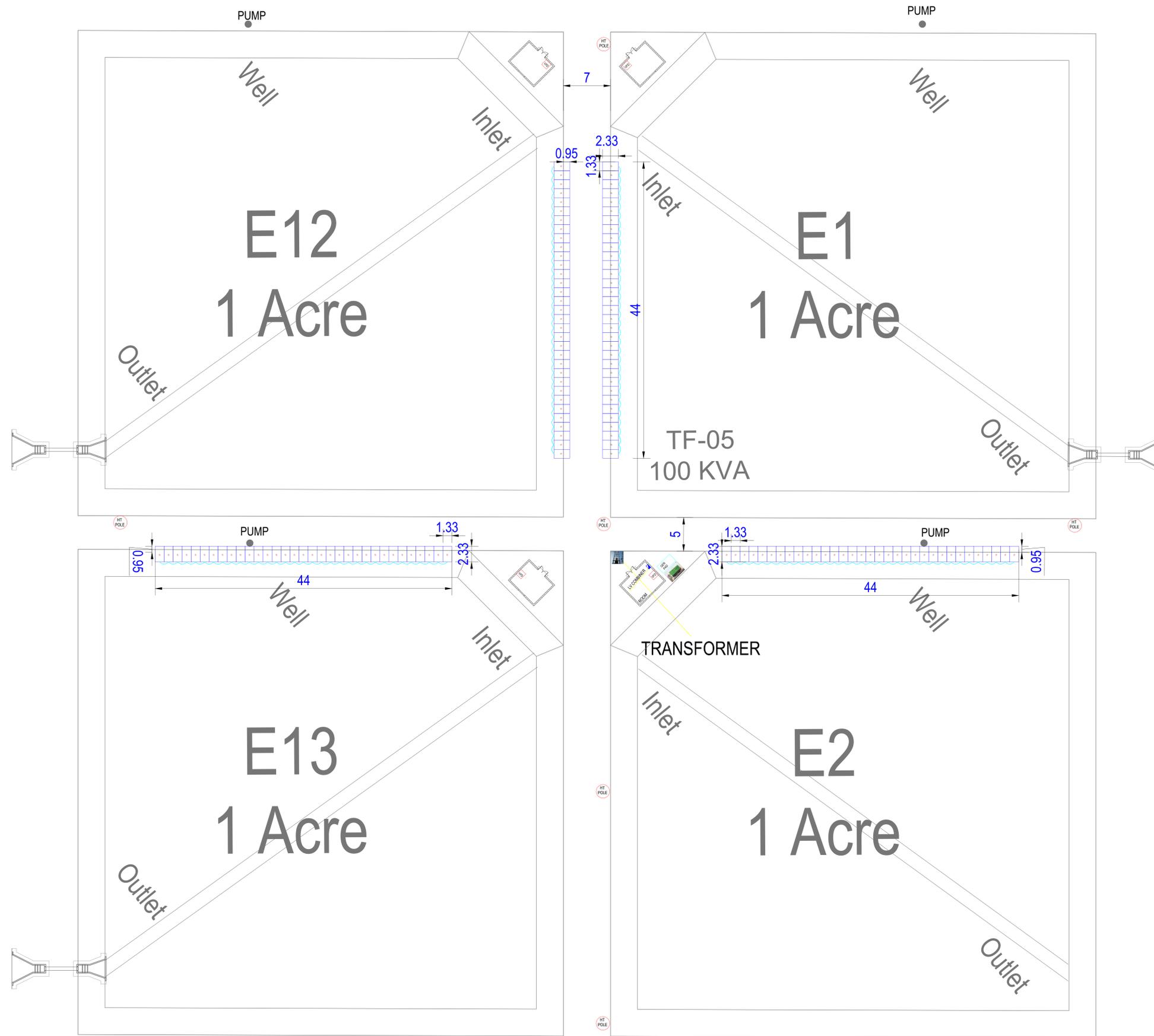
S. No.	Description	Qty	Unit	Rate	Amount
3.01	Supply at site, installation, testing and commissioning of UL Listed Fire extinguishing PEX tubing system for Switchgear Panels, comprising of maximum 3.5 Meters long PEX tube as per requirement Five layered (adhesive resin glue inner / outer layer, barrier layer, Inner outer layer designed to endure with inner pressure and gas barrier layer to prevent inner gas permeation), fire detection ability before temp rising upto 120 deg centigrade, filled with Novec1230 / approved fire extinguishing agent, complete in all respects. Make Erase Tube (Eyelogy) / Approved eqv. The contractor shall provide product's complete technical literature & compliance with UL certification prior to the procurement, complete in all respects. <b>2 Meter /DB Panel</b>	15	Nos		-
	<b>Sub Total</b>				-
<b>4.0</b>	<b>Store Room Electrification</b>				
	<b>Note:-</b> For list of approved manufacturer's see Annexure "A".				
4.01	Supply and wiring of first light from DB MCB with 2x2.5mmsq single core insulated 300/500 volt grade cables(P+N) and 2.5mmsq cable as protective conductor (PC) in & including 1" dia Class-Electrical PVC conduit installed/ recessed in walls / R.C.C. Slab, on ceiling or as required as per site conditions. Complete with all conduit accessories junction boxes, pull boxes as required complete in all respects as per specifications and drawings.	41	Each		-
b	Same as item No. 1.05 above but point to point wiring with 3 x 1.5mmsq PVC insulated Cu.Cond cable (P+N+E), complete in all respects.	0	Each		-
4.02	Wiring of one 15A power sockets from DB MCB to outlet with 2x 4mmsq single core cables (P+N) and 4 mmsq as CPC from DB to point including cost of one Nos. 15A 3 pin switch socket outlet make as approved by consultant & including 1" dia Class-Electrical PVC conduit recessed in walls/R.C.C. slab, or on surface of ceiling including all conduits accessories, junction boxes, pull boxes etc. installed on & including 16 SWG sheet steel boards recessed in walls /columns, Complete in all respects.	41	Each		-
4.03	Providing ,installation ,testing and commissioning of the following <b>lighting fixture</b> including all accessories like mounting arrangement, electronic ballast, drivery circuitry etc. Complete in all respects.				

S. No.	Description	Qty	Unit	Rate	Amount
	General Technical Specification includes color temperature ranging from 2700K to 6000K (As per the Consultant / Architect Approval), CRI:80, having lumen efficacy of atleast 80 lumen/watt and operational power factor of 0.9 Must have IEC CE driver and chipset report ,osram / philips/approved equiv. <b><u>Imp Note: All lighting fixtures and fans will be according to the choice of architect/engr.incharge, complete in all respects. Contractor/manufacturer to get technical submittals of all lighting fixtures approved along with the submission of DIALux/Eqv Illumination study along LM 79, 80 &amp; 81 report, prior to the procurement complete in all respects.</u></b>				
i	1x15W LED downlight SMD type.	82	Nos		-
ii	Supply and installation of <b>following fan</b> ,complete as per specifications and drawings. Wall bracket fan (energy efficient copper wire, 3 speed mode, metal body)	0	Each		-
	<b>Sub Total</b>				-
	<b>Total Carried Over to Summary of Costs</b>				-
	<b>18% GST</b>				-
	<b>Total (Incl of GST)</b>				-

## Note:

- It should be clearly understood by the contractor / bidder that the above mentioned items shall be complete in all respects, including cost of necessary materials / accessories whether mentioned or not but are required for proper functioning of the system shall be deemed to be included in the cost of each above mentioned items, no extra charge shall be paid or claimed by the contractor / bidder.
- 1) Contractor has to make sure all contingencies due to site constraints and authorities/landlord variations. Any modification and subsequent cost impact owing to Engineer Incharge approval shall be catered in the cost.
  - 2) Furthermore the contractor shall establish sections and routing as per the site conditions and shall submit shop drawings of MEP systems before execution to Engineer Incharge.
  - 3) MAR (Material Approval Request) of all items comprising of technical compliance and specifications, product genuineness certificate shall be submitted to consultant's office.
  - 4) MIR(Material Inspection Request) shall be carried out by Engineer Incharge in light of approved MARs.

Signed &amp; Stamped Of Contractor



CLIENT :  
**A D F**  
 (SWARC)

PROJECT :  
 SHRIMPESTATE SARGODHA  
 AT CHAK-58NB

TITLE :  
 4 POND CLUSTER

LOCATION:  
 CHAK-58NB  
 PUNJAB

DRAWN BY:

BELONGS TO:

SECTION:  
 ARCHITECTURE

DATE:  
**JAN-2026**

DWG NO:  
**SP-01**

PROJECT CODE:  
 -----









### 8.11. Bid Security Form

*(Applicable in case of Bank Guarantee only)*

[To be signed & stamped by the Bidder and reproduced on the letter head. To be attached with Financial Bid]

Whereas [name of the Bidder] (hereinafter called "the Bidder") has submitted its Bid dated [date of submission of Bid] for the supply of [name and/or description of the goods] (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that WE [*name of bank*] of [*name of country*], having our registered office at [*address of bank*] (hereinafter called "the Bank"), are bound unto [*name of Procuring Agency*] (hereinafter called "the Procuring Agency") in the sum of for which payment well and truly to be made to the said Procuring Agency, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws its Bid during the period of Bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of its Bid by the Procuring Agency during the period of Bid validity:
  - (a) fails or refuses to execute the Contract Form, if required; or
  - (b) fails or refuses to furnish the Performance Guarantee, in accordance with the Instructions to Bidders;

we undertake to pay to the Procuring Agency up to the above amount upon receipt of its first written demand, without the Procuring Agency having to substantiate its demand, provided that in its demand the Procuring Agency will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including sixty (60) days after the period of Bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

---

*[Signature of the bank]*

**8.12. INTEGRITY PACT**

[declaration of fees, commission and brokerage etc. payable by the suppliers of goods, services & works in contracts worth Rs. 10.00 million or more]

Contract No. Dated Contract Value: Contract Title:

..... [name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

Without limiting the generality of the foregoing, [name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fees etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultation fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

[name of Supplier] accepts full responsibility and strict liability for making any false declaration, not making full disclosure, misrepresenting facts or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right, interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other rights and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or

kickback given by [name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Name of Buyer: ..... Name of Seller/Supplier: .....  
Signature: ..... Signature: .....  
[Seal] [Seal]

### **8.13. Proposed Program of Works**

***[To be signed and stamped and presented on Bidder's letter head]***

Bidder shall provide a program in a bar-chart/CPM/PERT form showing the sequence of work items by which he proposes to complete the work of the entire Contract. The program should indicate the sequence of work items and the period of time during which he proposes to complete the Works including the activities like designing, schedule of submittal of drawings, ordering and procurement of materials, manufacturing, delivering, construction of civil works, erection, testing and commissioning of Works to be supplied under the Contract.

#### **8.14. Method of Performing Works**

**[To be signed and stamped and presented on Bidder's letter head]**

The bidder is required to submit a narrative outlining the method of performing the Works. The narrative should indicate in detail and include but not be limited to:

The sequence and methods in which he proposes to carry out the Works, including the number of shifts per day and hours per shift, he expects to work.

A list of all major items of constructional and erection plant, tools and vehicles proposed to be used in carrying out the Works at Site, including number of each kind, make, type, capacity of all equipment, working condition, which shall be deployed by him for Civil Work and Erection, Testing and Commissioning of the Works, in sufficient detail to demonstrate fully that the equipment will meet all the requirements of the Technical Provisions.

The procedure for installation of equipment and transportation of equipment and materials to the site.

Details regarding mobilization in Pakistan, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.

Organization chart indicating head office & field office personnel involved in management, supervision and engineering of the Works to be done under the Contract.

**Section IX- Check List**

**[To be signed and stamped and presented on Bidder's letter head]**

The provision of this checklist is essential prerequisite along with submission of tenders (with technical proposal).

Sr. #	Detail	Responsive	Non-responsive
1	Bid Security of <b>2%</b> (i.e., <b>Rs. 16,426,936 (Sixteen million four hundred twenty six thousand nine hundred thirty six only)</b> ) in the form of a pay-order or demand draft favoring <b>"PMU Shrimp Aquaculture Punjab, Lahore"</b> shall reach to PMU, at 9-A-Bahawalpur Road Chauburji, Lahore – Pakistan before the opening of the bid (Please mention the title of the procurement on envelope). If original bid security is not delivered before the opening of the bid, the bidder shall be disqualified for further proceeding. The Bid Security should be valid for a period not less than 6 months and a scanned copy must be attached in the financial envelope of the <b>EPADS Portal</b> .		
2	Evidence of the bidder registration / Incorporation.		
3	Active Registration with Income Tax Authorities (National Tax Number NTN) at least three years old		
4	Copy of active Registration with Sales Tax Authorities (STRN)		
5	Financial Bid Form (as per <b>form 8.1 of Bidding documents</b> ) on letter head of the firm, duly signed and stamped.		
6	Bidder's JV/Consortium Members Information Form (as per <b>form 8.2 of Bidding documents</b> ) on letter head of the firm, duly signed and stamped.		
7	Manufacturer's Authorization Form (as per <b>form 8.3 of bidding documents</b> ).		
8	Bidder Profile Form (as per <b>form 8.4 of Bidding documents</b> ) on letter head of the firm dully signed and stamped.		
9	General Information Form (as per <b>form 8.5 of Bidding documents</b> ) on letter head of the firm duly signed and stamped.		
10	Affidavit (as per <b>form 8.6</b> ) on non-judicial Stamp Paper of Rs. 100/-		

11	Performance Guarantee Form (as per <b>form 8.7</b> of Bidding documents) on letter head of the firm, duly signed and stamped.		
12	Technical Bid Form (as per <b>form 8.8</b> of Bidding documents) on letter head of the firm duly signed and stamped.		
13	Financial Bid Form (as per <b>form 8.10</b> of Bidding documents) on letter head of the firm duly signed and stamped.		
14	Bid Security Form (as per <b>form 8.11</b> of Bidding documents).		
15	Integrity Pact Form (as per <b>form 8.12</b> of Bidding documents).		
16	Proposed Program of work (as per <b>form 8.13</b> of Bidding documents).		
17	Method of Performing Works (as per <b>form 8.14</b> of Bidding documents).		

**Stamp & Signature of Bidder** \_\_\_\_\_