



WATER AND POWER DEPARTMENT, GILGIT
BALTISTAN



9.11 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT-I)

**BIDDING DOCUMENTS
ON EPC/TURNKEY BASIS
(SINGLE STAGE TWO ENVELOPE)**

VOLUME – I



November 2025



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9.11 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN LOT-I

INDEX TO BIDDING DOCUMENTS

VOLUME – I

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DRAFT INVITATION FOR BIDS

Contract No. and Title: ICB-01 EPC/Turnkey Contracts for Implementation of Rooftop Solarization of Gilgit Baltistan (18.15 MW_{DC}, in 3 Lots)

1. The Water and Power Department, Gilgit Baltistan, Pakistan (the “Employer”), has allocated PSDP funds for the implementation of the 100 MW_{DC} Distributed Solarization of Gilgit Baltistan Project. As a part of this Project, the present Invitation for Bids relates to Rooftop Solarization works aggregating 18.15 MW_{DC}. The Employer has divided these works into three separate Lots for procurement on an Engineering, Procurement, and Construction (EPC) / Turnkey basis. Bids are open to all Bidders eligible in accordance with the Bidding Documents.
2. The Employer invites sealed Bids (Technical and Financial Bids) from eligible Bidders as defined under Clause ITB.4 of Instruction to Bidders for one, **several, or all Lots** listed below. However, **each Lot shall be awarded under a separate Contract, and no Bidder shall be awarded more than one Lot.** The Works comprise the detailed engineering design, construction, supply, erection, installation, testing, and commissioning of Rooftop Solar PV Plants with integrated Battery Energy Storage Systems (BESS), followed by a Defects Notification Period of three (3) years, and provision of Operation and Maintenance services for three(3) years, further extendable on the option of the Employer as specified in the Bidding Documents.

A foreign Bidder may participate only as part of a joint venture with a Pakistani constructor duly registered/licensed with the Pakistan Engineering Council (PEC). This requirement is prescribed in the Bidding Data Sheet (BDS) pursuant to the Procuring Agency’s authority under Rules 18–20 of the Gilgit-Baltistan Public Procurement Rules, 2022, and the PEC registration requirements applicable to foreign constructors. The Works mainly comprise the following:

Sr. NO	DISTRICT NAME	TOTAL NUMBER OF BUILDINGS	PV (kWp)	BESS (kWh)	Bid Security Amount (PKR) For Each Lot
LOT I (Gilgit Region): 9.11 MW_{dc} and 4.952 MWh					
1	Gilgit	78	5,229	2,755	18 million
2	Hunza	61	1,533	844	
3	Nagar	56	965	533	
4	Ghizer	41	1,379	820	
LOT II (Baltistan Region): 5.70 MW_{dc} and 3.892 MWh					
1	Skardu	78	4,155	2,839	10 million
2	Ghanche	42	652	347	
3	Shigar	35	530	481	
4	Kharmang	20	368	225	
LOT III (Diامر-Astore Region): 3.34 MW_{dc} and 2.269 MWh					
1	Astore	41	1,246	722	5 million
2	Chillas	47	2,097	1,547	



3. International Competitive Bidding will be conducted in accordance with the Gilgit-Baltistan Public Procurement Rules, 2022, under the "Single Stage - Two Envelope" Bidding Procedure (Rule 39 (b)), separately for each Lot.

Bidders may obtain further information, inspect, and acquire the complete set of Bidding Documents for the desired Lot(s) from the **Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com**
4. Interested Bidders may purchase a complete set of Bidding Documents for any Lot on submission of a written application to the above office and upon payment of a non-refundable fee of PKR 20,000 (Pakistani Rupees Twenty Thousand Only) per Lot. Requests for delivery of Bidding Documents can be made by sending a written application to the above Office. The application must include a pay order/demand draft in favor of the Project Director for the non-refundable fee of PKR 20,000/- per Lot and charges of PKR 5,000/- for local delivery or PKR 30,000 for overseas delivery per set or proof of online submission in the **account Titled "Executive Engineer Billing Division W&PD" IBAN NO: PK72MPBL0286027140132801**. The documents will be sent by courier. No liability will be accepted for loss or late delivery.
5. Each Bid must be submitted separately for each Lot and must be accompanied by a Bid Security for the corresponding amount specified in the table of this RFP, in the form of a bank guarantee from a scheduled bank in Pakistan or from a foreign bank, duly counter-guaranteed by a scheduled bank in Pakistan. The Bid Security must be valid for a period of not less than 180 days after the date of Bid opening. Bids for the desired Lot(s) must be delivered to the address above on or before 1330 hrs (Pakistan Standard Time) on December 26, 2025.
6. Technical Bids will be opened for each Lot immediately at 1400 hours on the same day at the address above, in the presence of Bidders' representatives who choose to attend at the same address.
7. Bidders are permitted to submit Bids for one, several, or all Lots. However, in the interest of ensuring wider participation and effective implementation, the Employer shall award only one (1) Lot to any Bidder (whether participating individually or as a part of joint venture).
8. A Pre-Bid meeting will be held as follows. Bidders are strongly encouraged to attend.
 - Date: December 12, 2025
 - Time: 1100 hrs
 - Venue: **Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan**
9. This advertisement is also available on GBPPRA website <https://www.gbppra.gov.pk/> and W&PD GB Website <https://wpdqb.gov.pk/> .

Office of Project Director

100 MW Distributed Solarization of Gilgit Baltistan Project
Water and Power Department
Gilgit Baltistan, Pakistan

Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com

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PART-I: BIDDING PROCEDURES

SECTION I - INSTRUCTIONS TO BIDDERS (ITB)

A. General

<p>1. Scope of Bid</p>	<p>1.1 The Employer, as specified in the BDS, issues these Bidding Documents for the execution and completion of the Engineering, Procurement and Construction (EPC) / Turnkey Works for Distributed Solar Photovoltaic Plants as described in Volume-II (Employer's Requirements). The name, identification and number of lots (contracts) of this RFB are specified in the BDS.</p> <p>1.2 Unless otherwise stated, throughout these Bidding Documents definitions and interpretations shall be as prescribed in the Section V (General Conditions).</p> <p>1.3 Throughout these Bidding Documents:</p> <ul style="list-style-type: none">(a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, fax, including if specified in the BDS, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;(b) "The word "Bidding Documents" is synonymous with "Bid", the word "Bidding Documents" or "Bidder" with "Bidder" and the words "Bidding Documents" and "request for bids documents" with "bidding document(s)", as applicable."(c) if the context so requires, "singular" means "plural" and vice versa.(d) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Employer. It excludes the Employer's official public holidays;(e) "Works" refers to Works, subject of these Bidding Documents, to be executed on EPC/Turnkey contracting arrangement;(f) "ES" means environmental and social(g) "Contractor's Personnel" is as defined in Sub-Clause 1.1.14 of the General Conditions; and(h) "Employer's Personnel" is as defined in Sub-Clause 1.1.29 of the General Conditions.
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	<p>(i) “Taking Over” is defined as the taking over at the end of the EPC phase and the simultaneous start of the O&M phase of the particular Section as per relevant conditions of the Contract, which shall not constitute final acceptance or a waiver of defects.</p>
<p>2. Source of Funds</p>	<p>2.1 The Employer has received funds from Government of Pakistan towards the cost of the Project named in the BDS. The Employer intends to apply a portion of the funds to eligible payments under the Contract for which these Bidding Documents are issued.</p>
<p>3. Fraud and Corruption</p>	<p>3.1 The Employer will reject a Bid if it determines that the Bidder recommended for award, or any of its personnel, or its agents, or its sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract under this Bidding process.</p> <p>3.2 The Employer will blacklist and hence forthwith debar a Bidder or individual, at any time, in accordance with the prevailing Gilgit-Baltistan Public Procurement Rules, 2022 (Rule 22)</p> <p>The Bidder shall sign and stamp the Integrity Pact provided in Contract Forms and Schedules of the Bidding Documents for all government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the Bidder non-responsive.</p>
<p>4. Eligible Bidders</p>	<p>4.1 A Bidder may be a firm that is a private entity, a state-owned enterprise or institution subject to ITB 4.8 or any combination of such entities in the form of a joint venture (JV) under an existing agreement. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified in the BDS, there is no limit on the number of members in a JV.</p> <p>4.2 The Bidder (single entity or each member in the JV) shall be duly licensed by the Pakistan Engineering Council (PEC). In case, the bidder is a single entity it shall have valid PEC licence in category C1 and in case of JV, the combined value of limits of all the JV members shall not be less than that of C1. The Bidder (single entity or any member in the JV) shall also be registered with the Private Power and Infrastructure Board (the “PPIB”) and have a valid PPIB Certificate (applicable for the Local Firm, if certificate</p>

	<p>yet not issued valid payment proof is acceptable) issued under AEDB Certification Regulations, 2021.</p> <p>However, a foreign firm may submit a valid PEC provisional license in a relevant category with its Bid but shall obtain and submit a full PEC license before signing of the Contract and commencement of Works</p> <p>Foreign firm shall not be eligible to participate in Bidding process individually. Foreign firm shall enter into joint venture with Pakistani firm registered with the Pakistan Engineering Council in equivalent/compatible category and submit the joint venture agreement delineating inter alia the division of responsibilities among each JV member, to the Employer before participating in Bidding process in accordance with PEC Construction and Operation of Engineering Works Byelaws, 1987.</p> <p>4.3 Pakistani firm must be on Active Taxpayer List of the Federal Board of Revenue and provincial revenue authority/ board where applicable.</p> <p>4.4 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:</p> <ul style="list-style-type: none">(a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or(b) receives or has received any direct or indirect subsidy from another Bidder; or(c) has the same legal representative as another Bidder; or(d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the Bid of another Bidder, or influence the decisions of the Employer regarding this Bidding process; or(e) any of its affiliates participates as a consultant in the preparation of the Employer's Requirements for the Works that are the subject of the Bid; or(f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer as the Employer's Representative for the Contract implementation; or(g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly
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	<p>controls, is controlled by, or is under common control with that firm; or</p> <p>(h) has a close business or family relationship with a professional staff of the Employer (or of the project implementing agency) who: (i) are directly or indirectly involved in the preparation of the Bidding Documents or Employer's requirements of the Contract, and/or the Bid evaluation process of such Contract; or (ii) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Employer throughout the Bidding process and execution of the Contract.</p> <p>4.5 A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid for the same Lot, except for permitted alternative Bids for the same Lot. However, a Bidder may participate in more than one Lot. For the avoidance of doubt, a subcontractor cannot be a member of a JV and a subcontractor at the same time in the Bidding process. Such participation shall result in the disqualification of all Bids in all Lots in which the said firm is involved. However, a firm that is not an individual Bidder or a JV member in a Bid may participate as a subcontractor in more than one Bid.</p> <p>4.6 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.10. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed sub-contractors or sub-consultants for any part of the Contract including related Services.</p> <p>4.7 All members constituting the Bidder including proposed subcontractors do not appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and the Gilgit-Baltistan Public Procurement Regulatory Authority (GBPPRA) and other relevant federal/provincial authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.</p> <p>4.8 Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Employer, that they (i) are legally and financially</p>
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	<p>autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.</p> <p>4.9 A Bidder shall not be under suspension from submitting Bids by the Employer as the result of the operation of a Bid Securing Declaration.</p> <p>4.10 Eligible countries to participate in this Bidding process shall be all countries, except those restricted under the laws, rules, or policies of Pakistan or Gilgit-Baltistan, or under international obligations (e.g., UN sanctions). Any country-specific restrictions, if applicable, will be notified in the BDS.</p> <p>4.11 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.</p>
<p>5. Eligible Materials, Equipment, and Services</p>	<p>5.1 The materials, equipment and services to be supplied under the Contract may have their origin in any country subject to the restrictions specified in the laws of Pakistan, the Gilgit-Baltistan Public Procurement Rules, 2022, or any applicable international obligations (including UN sanctions) and all expenditures under the Contract will not contravene such restrictions. At the Employer’s request, Bidders may be required to provide evidence of the origin of materials, equipment and services.</p>

B. Contents of Bidding Documents

<p>6. Sections of Bidding Document</p>	<p>6.1 The Bidding Documents consist of two (02) Volumes, Volume-I and Volume-II which include all the sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8:</p> <p>VOLUME-I: BIDDING PROCEDURES AND CONDITIONS OF CONTRACT</p> <p>Part-I: Bidding Procedures</p> <p>Section I - Instructions to Bidders (ITB) Section II - Bid Data Sheet (BDS) Section III - Evaluation and Qualification Criteria Section IV - Bid Forms</p> <p>Part-II: Conditions of Contract and Contract Forms and Schedules</p> <p>Section V - General Conditions Section VI - Particular Conditions Part A - Contract Data Part B - Special Provisions</p>
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	<p>Section VII - Contracts Forms and Schedules</p> <p>VOLUME-II: EMPLOYER’S REQUIREMENTS</p> <p>Section I - Scope of Works Section II - General Project Requirements Section III - DC Systems Section IV - AC Systems Section V - Civil & Structure Works Section VI - Operation and Maintenance Annexure I - Drawings</p> <p>6.2 The Invitation to Bids issued by the Employer, is not part of this Bidding Documents.</p> <p>6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the document, responses to requests for clarification, the Minutes of the pre-Bid meeting (if any), or Addenda to the Bidding Documents in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.</p> <p>6.4 The Bidder is expected to examine all instructions, forms, terms, and Employer’s requirements in the Bidding Documents and to furnish with its Bid all information or documentation as is required by the Bidding Documents.</p>
<p>7. -</p>	<p>7.1 A Bidder requiring any clarification of the Bidding Documents shall contact the Employer in writing at the Employer’s address specified in the BDS or raise its enquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. The Employer will respond to any request for clarification within the time given in the BDS, provided that such request is received prior to the deadline for submission of Bids within a period specified in the BDS. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Documents as a result of a request for clarification, it shall do so following the procedure under ITB 8.</p> <p>7.2 The Bidder is advised to visit and examine the Site of the Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract. The costs of visiting the site shall be at the Bidder’s own expense.</p> <p>7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and</p>

	<p>lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.</p> <p>7.4 The Bidder’s designated representative is invited to attend a pre-Bid meeting and/or a site visit, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.</p> <p>7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than three days before the meeting.</p> <p>7.6 Minutes of the pre-Bid meeting, including the text of the questions raised without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3. Any modification to the Bidding Documents that may become necessary as a result of the pre-Bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITB 8 and not through the minutes of the pre-Bid meeting.</p>
<p>8. Amendment of Bidding Documents</p>	<p>8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Documents by issuing addenda.</p> <p>8.2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Employer in accordance with ITB 6.3.</p> <p>8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 23.2.</p>
<p>9. Cost of Bids</p>	<p>9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer will in no case be responsible or liable for those costs regardless to the conduct or outcome of the Bidding process.</p>

<p>10. Contacting the Employer</p>	<p>10.1 From the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the Bid, it should do so in writing.</p> <p>10.2 If a Bidder tries to directly influence the Employer or otherwise interfere in the Bid evaluation process and the Contract award decision, its Bid may be rejected.</p>
<p>11. Language of Bids</p>	<p>11.1 Unless otherwise specified in the BDS, the Bid prepared by the Bidder and all correspondence and documents related to the Bid exchanged by the Bidder and the Employer shall be written in the English Language. Any printed literature furnished by the Bidder as part of its Bid may be in a language not specified in the BDS, as long as such literature is accompanied by a translation of its pertinent passages into the language of the Bid, in which case, for purposes of interpretation of the Bid, the translation shall govern.</p>

C. Preparation of Bids

<p>12. Documents Comprising the Bid</p>	<p>12.1 The Bid shall comprise two Parts, namely the Technical Bid and the Financial Bid. These two Bids shall be submitted simultaneously in two (02) separate sealed envelopes (single-stage, two-envelope Bidding Process). One envelope shall contain only information relating to the Technical Bid and the other, only information relating to the Financial Bid. These two envelopes shall be enclosed in a separate sealed outer envelope marked “ORIGINAL BID”.</p> <p>12.2 The Technical Bid submitted by the Bidder shall comprise the following:</p> <ul style="list-style-type: none"> (a) Letter of Technical Bid, prepared in accordance with ITB 13; (b) Security: Bid Security in accordance with ITB 19; (c) Alternative Technical Bid, if permissible in accordance with ITB 14; (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 21.1; (e) documentary evidence that the Bidder is eligible and qualified to perform the Contract if its Bid is accepted, in accordance with ITB 17; (f) documentary evidence that the Works offered by the Bidder conform to the Bidding Documents, in accordance with ITB 18;
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	<p>(g) Bidders shall give details of all departures in their Technical Bid with respect to the contractual terms and conditions and/or to the required technical features specified in the performance and/or functional requirements, that they would like the Employer to consider during the evaluation of the Technical Bid;</p> <p>(h) in the case of a Technical Bid submitted by a JV, JV agreement, indicating at least the parts of the Works to be executed by the respective members;</p> <p>(i) list of subcontractors, in accordance with ITB 18.3;</p> <p>(j) any other document required in the BDS or elsewhere.</p> <p>12.3 The Financial Bid submitted by the Bidder shall comprise the following:</p> <p>(a) Letter of Bid - Financial Bid: prepared in accordance with ITB 13;</p> <p>(b) Schedule of Rates and Prices: completed in accordance with ITB 15 and ITB 16;</p> <p>(c) Alternative Financial Bid: if permissible in accordance with ITB 14;</p> <p>(d) Financial Disclosure: The Bidder shall furnish in the Letter of Financial Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid; and</p> <p>(e) Other: any other document required in the BDS or elsewhere.</p> <p>12.4 The Technical Bid shall not include any financial information related to the Bid Price. Where material financial information related to the BidPrice is contained in the Technical Bid, the Bid shall be declared non-responsive.</p>
<p>13. Letter of Bid, and Schedules</p>	<p>13.1 The Bidder shall complete the Letter of Technical Bid and Letter of Financial Bid using the relevant forms furnished in Section IV (Bid Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 21.3. All blank spaces shall be filled in with the information requested.</p>
<p>14. Alternative Technical Bids</p>	<p>14.1 Alternative Bids are not permitted.</p>

<p>15. Bid Prices</p>	<p>15.1 The Bidders shall fill up the Schedule of Rates and Prices attached to this Bidding Documents indicating the Lump Sum amounts of the works to be performed under the Contract. Prices on the Schedule of Rates and Prices shall be entered keeping in view the instructions contained in the Preamble to the Schedule of Rates and Prices. The Bidders shall quote for the entire Works on a “single responsibility” basis such that the Bid Price, subject to any adjustments, in accordance with the Contract, covers all the Contractor’s obligations under the Contract. The Works shall include any work which is necessary to satisfy the Employer’s Requirements and Schedules, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.</p> <p>15.2 The cost of any items that the Bidder may have omitted is deemed to be included in the total Bid Price and will not be paid for separately by the Employer.</p> <p>15.3 All indirect taxes i.e., custom duties, sales taxes, VAT levies, other charges and similar taxes payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of Bids, shall be included in the rates and prices and the Bid Price submitted by the Bidder. However, the Employer shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax Withholding Tax. Turnover Tax, Super Tax etc.) payable by the Contractor and the Contractor’s Personnel.</p> <p>15.4 In the case of Fixed Price, prices quoted by the Bidder shall be fixed during the Bidder’s performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.</p>
<p>16. Bid Currencies</p>	<p>16.1 The currency of the Bid and the currency of payments shall be Pakistani Rupee (PKR) only and further referred to as “the local currency” except where expressly permitted in the BDS for a portion of foreign currency costs.</p> <p>For imported Plant and Materials quoted in PKR, the prices quoted by the Bidder shall not be subject to adjustment during performance of the Contract on account of exchange rate parity.</p> <p>16.2 A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer’s country shall bear all costs and risks for arranging such currencies including exchange rate parity.</p>

<p>17. Documents Establishing the Qualification of the Bidder</p>	<p>17.1 The Bidder shall meet the qualification criteria as provided in Section III (Evaluation and Qualification Criteria).</p>
<p>18. Documents Establishing Conformity of the Works</p>	<p>18.1 Pursuant to ITB 12.2(f), the Bidder shall furnish, as part of its Bid documents establishing the conformity to the Bidding Documents of the Works that the Bidder proposes to execute on EPC/Turnkey basis under the Contract.</p> <p>18.2 The documentary evidence of the conformity of the Works with the Bidding Documents may be in the form of literature, drawings and data, and shall include:</p> <ul style="list-style-type: none"> (a) the documents specified in Section IV (Bid Forms) - Technical Bid. (b) detailed description of the essential technical and functional/performance characteristics of the proposed Works, in response to the Employer’s Requirements. (c) adequate evidence demonstrating the substantial responsiveness of the Works to the Employer’s Requirements. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative standards, in its technical Bid, provided that it demonstrates to the Employer’s satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Performance / Functional requirements specified by the Employer. <p>18.3 The Bidder shall be responsible for ensuring that any proposed subcontractor complies with the requirements of ITB 4, and that any Works to be provided by the subcontractor comply with the requirements of ITB 5 and ITB 18.1.</p>
<p>19. Securing the Bid</p>	<p>19.1 The Bidder shall furnish as part of its Bid, a Bid Security in original form in the amount specified in the BDS in PKR or an equivalent amount in a freely convertible currency.</p> <p>19.2 The Bid security shall be in the form of an unconditional bank guarantee issued by a Scheduled Bank in Pakistan operating or branch in Gilgit or a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan operating or branch in Gilgit</p> <p>19.3 The Bid Security shall be submitted either using the Bid Security Form included in Section IV (Bid Forms) or in another</p>

	<p>substantially similar format approved by the Employer prior to Bid submission. In either case, the form must include the complete name and address of the Bidder. The Bid Security shall be valid for at least twenty-eight days (28) beyond the original date of expiry of the Bid validity, or beyond any extended date if requested under ITB 20.2.</p> <p>19.4 Any Bid not accompanied by a substantially responsive Bid Security shall be rejected by the Employer as non-responsive.</p> <p>19.5 The Bid Security of the Bidders shall be returned as promptly as possible once the successful Bidder has furnished the required Performance Security and signed the Contract except the Bid Security of bidders declared non-responsive at the technical evaluation shall be returned with their Financial Bid after the evaluation of Technical Bid.</p> <p>19.6 The Bid Security may be forfeited:</p> <p>(a) if a Bidder withdraws its Bid prior to the expiry date of the Bid validity specified by the Bidder on the Letter of Bid or any extended date provided by the Bidder; or</p> <p>(b) if the successful Bidder:</p> <p>(i) fails to accept the correction of his Bid Price in accordance with ITB 36.3; or</p> <p>(ii) fails to furnish a Performance Security, in accordance with ITB 45; or</p> <p>(iii) fails to sign the Contract, in accordance with ITB 44; or</p> <p>(iv) is found involved in corrupt and fraudulent practices, in accordance with ITB 3.</p> <p>19.7 The Bid Security of a JV shall be in the name of the JV that submits the Bid. If the JV has not been legally constituted into a legally enforceable JV at the time of submission of Bids, the Bid Security shall be in the name of either JV member(s).</p>
<p>20. Period of Validity of Bids</p>	<p>20.1 Bids shall remain valid for the period specified in the BDS after the deadline for submission of Bids or any extended date if amended by the Employer in accordance with ITB 8. A Bid that is not valid until the date specified in the BDS, or any extended date if amended by the Employer in accordance with ITB 8, shall be rejected by the Employer as non-responsive.</p> <p>20.2 In exceptional circumstances, prior to the date of expiry of the Bid validity, the Employer may request that the Bidders extend the date of validity for a specified additional period which may not be</p>

	<p>more than the original Bid validity period. The request and the responses to the request shall be made in writing. A Bidder may refuse the request without risking forfeiting the Bid Security. A Bidder agreeing to the request will not be required or permitted to modify its Bid but will be required to ensure that the Bid Security is extended for a correspondingly longer period, pursuant to ITB 19.3.</p>
<p>21. Format and signing of Bid</p>	<p>21.1 The original and all copies of the Bid, each consisting of the documents listed in ITB 12, shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder. The authorization must be in writing as specified in the BDS and included in the Bid pursuant to ITB 12.2(d). The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid where entries or amendments have been made shall be signed or initialled by the person signing the Bid.</p> <p>21.2 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.</p> <p>21.3 The Bid shall contain no interlineations, erasures, or overwriting, except to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.</p> <p>21.4 The Bidder shall furnish in the Letter of Financial Bid (Section IV) information regarding commissions or gratuities, if any, paid or to be paid to agents relating to this procurement and to the execution of the Contract should the Bidder be successful.</p>

D. Submission of Bids

<p>22. Submission, Sealing and Marking of Bids</p>	<p>22.1 Unless the BDS states that Bids are to be submitted electronically the following procedures shall apply</p> <p>(a) The Bidder shall deliver the Bid in two separate, sealed envelopes. One envelope containing the Technical Bid and the other the Financial Bid. These two envelopes shall be enclosed in a sealed outer envelope and clearly marked "Bid - Original". in accordance with Rule 39(b) of the Gilgit-Baltistan Public Procurement Rules, 2022 (Single Stage – Two Envelope procedure).</p>
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	<p>(b) In addition, the Bidder shall prepare copies of the Bid, in the number specified in the BDS. Copies of the Technical Bid shall be placed in a separate sealed envelope marked “Copies: Technical Bid”. Copies of the Financial Bid shall be placed in a separate sealed envelope marked “Copies: Financial Bid”. The Bidder shall place both of these envelopes in a separate, sealed outer envelope marked “Bid - Copies”. In the event of any discrepancy between the original and the copies, the original shall prevail.</p> <p>The Bidder shall also provide complete searchable PDF version as well as Word, Excel etc., versions of the Technical Bid only on flash drive provided that in case of discrepancy, the hard copy shall prevail</p> <p>22.2 The inner and outer envelopes shall:</p> <p>(a) bear the name and address of the Bidder.</p> <p>(b) be addressed to the Employer, at the address given in the BDS for ITB 23.1; and</p> <p>(c) bear the name of the Bid, as specified in the BDS for ITB 1.1, and the statement “Do Not Open Before [time and date],” to be completed with the time and date specified in the BDS for ITB 23.1.</p> <p>22.3 If the outer envelope is not sealed and marked as required by ITB 22.1 and ITB 22.2, the Employer will assume no responsibility for the Bid’s misplacement or premature opening.</p>
<p>23. Deadline for Submission of Bids</p>	<p>23.1 Bids must be received by the Employer at the address specified, and no later than the time and date specified, in the BDS.</p> <p>23.2 The Employer may, at its discretion, extend this deadline for submission of Bids by amending the Bidding Documents in accordance with ITB 8.3, in which case all rights and obligations of the Employer and Bidders will thereafter be subject to the deadline as extended.</p>
<p>24. Late Bids</p>	<p>24.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 23. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.</p>
<p>25. Withdrawal, Substitution,</p>	<p>25.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted, and before the deadline for submission of Bids,</p>

<p>and Modification of Bids</p>	<p>by sending a written notice, duly signed by an authorized representative, including a copy of the authorization in accordance with ITB 21.1, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:</p> <p>(a) prepared and submitted in accordance with ITB 21 and ITB 22 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “Withdrawal,” “Substitution, (“Technical Bid” and/or “Financial Bid”)” “Modification (“Technical Bid” and/or “Financial Bid”);” and</p> <p>(b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 23.</p>
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E. Opening of Technical Bids

<p>26. Opening of Technical Bids by Employer</p>	<p>26.1 Except as in the cases specified in ITB 24 and ITB 25, the Employer shall conduct the Technical Bids' opening in public, in the presence of Bidders` designated representatives and anyone who chooses to attend, and at the address, date and time specified in the BDS.</p> <p>26.2 First, the written notice of withdrawal in the 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.</p> <p>26.3 Next, envelopes marked “Substitution” shall be opened and read out and exchanged with the corresponding Technical Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid opening.</p> <p>26.4 Next, envelopes marked “Modification” shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening.</p> <p>26.5 Next, all other envelopes marked “Technical Bid” shall be opened one at a time. All envelopes marked “Financial Bid” shall remain sealed and kept by the Employer in safe custody</p>
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	<p>until they are opened at a later public opening, following the evaluation of the Technical Bid of the Bidders. On opening the Technical Bid envelopes, the Employer shall read out: the name of the Bidder and whether there is a modification; the presence or absence of a Bid Security; and other details as the Employer, at its discretion, may consider appropriate.</p> <p>26.6 Only Technical Bids that are opened and read out at Bid opening shall be considered further. At the Bid opening the Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with ITB 24.1).</p> <p>26.7 The Employer shall prepare a record of the Technical Bids of public opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.</p>
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F. Evaluation of Bids - General Provisions

<p>27. Confidentiality</p>	<p>27.1 Information relating to the evaluation of the Technical Bid shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding Process until the announcement of evaluation of the Technical Bid in accordance with ITB 33.</p> <p>27.2 Information relating to the evaluation of the Financial Bid and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding Process until the announcement of final evaluation report.</p> <p>27.3 Any effort by a Bidder to influence the Employer in the evaluation of the Bids may result in the rejection of its Bid.</p> <p>27.4 Notwithstanding ITB 27.1 and ITB 27.2, from the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the Bidding Process, it should do so in writing.</p>
<p>28. Clarification of Bids</p>	<p>28.1 To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid including breakdowns of unit rates and lump sum prices. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be</p>

	<p>in writing. However, any clarification shall not affect the prices or the Bid evaluation parameters</p> <p>28.2 The Employer may, at its discretion, ask any Bidder for confirmation/submission of missing information to clarify its Bid. However, the Employer does not have an obligation to request any additional information or clarification with respect to missing or deficient information in a Bid. The Employer may reject any Bid as non-responsive if found materially incomplete, obscure, irregular or omitting any material information required to be submitted in accordance with the Bidding Documents.</p> <p>28.3 If a Bidder does not provide clarifications of its Bid by the date and time set reasonably in the Employer’s request for clarification, the Employer may proceed with the evaluation based on the information submitted in the Bid without waiting for the Bidder’s response.</p>
<p>29. Deviations, Reservations, and Omissions</p>	<p>29.1 During the evaluation of Bids, the following definitions apply:</p> <ul style="list-style-type: none"> (a) “Deviation” is a departure from the requirements specified in the Bidding documents. (b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and (c) “Omission” is the failure to submit part or all of the information or documentation required in the Bidding Documents.

G. Evaluation of Technical Bids

<p>30. Determination of Responsiveness of Technical Parts</p>	<p>30.1 The Employer will examine the Technical Bids submitted by Bidders, to determine whether they are complete, have been properly signed, and are generally in order.</p> <p>30.2 The Employer’s determination of a Technical Bids’ substantial responsiveness is to be based on the contents of the Bid itself. For purposes of this determination, a substantially responsive Bid is one that materially conforms to the requirements of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:</p> <ul style="list-style-type: none"> (a) if accepted, would:
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	<p>(i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or</p> <p>(ii) limit in any substantial way, inconsistent with the Bidding Documents, the Employer’s rights or the Bidder’s obligations under the proposed Contract; or</p> <p>(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.</p> <p>30.3 Provided that a Technical Bid is substantially responsive, the Employer may waive any nonmaterial nonconformity in the Bid.</p> <p>30.4 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements.</p> <p>30.5 The Employer will also determine if the Bids contain departures from the requirements of the Bidding Documents (e.g., documentary evidence, responsiveness of the technical Bid, etc.) in such numbers or of such nature that the Bid cannot reasonably be expected to become responsive within the framework of the single-stage process. In this case, the Bid shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.</p>
<p>31. Evaluation of Bidder’s Eligibility and Qualification</p>	<p>31.1 The Employer shall ascertain to its satisfaction that, on the basis of documentary evidence submitted in accordance with ITB 12.2 (e), and Section III (Evaluation and Qualification Criteria) that the Bidder is eligible and qualified to satisfactorily perform the Contract.</p> <p>31.2 Only Bids that meet the eligibility and qualification criteria as specified in Section III (Evaluation and Qualification Criteria) shall be considered for further evaluation.</p>
<p>32. Evaluation of Technical Bids</p>	<p>32.1 The Employer’s evaluation of Technical Bids will be carried out as specified in Section III (Evaluation and Qualification Criteria).</p> <p>32.2 The Employer will carry out a detailed technical evaluation of each Technical Bid that was determined to be substantially responsive in accordance with ITB 30, in order to determine</p>

	<p>whether the technical aspects of the Bid are responsive to the requirements set forth in the Bidding Documents.</p> <p>32.3 Only Bids that are substantially responsive to the Bidding Documents shall have their envelopes marked “FINANCIAL BID” opened at the second public opening.</p>
<p>33. Notification of Evaluation of Technical Bids</p>	<p>33.1 Following the completion of the evaluation of the Technical Bids, the Employer shall announce the results technical bids’ evaluation report and make the following notifications in accordance with Gilgit Baltistan Public Procurement Rules, 2022:</p> <p>(a) Notify in writing those Bidders whose Bids were considered substantially non-responsive to the requirements in the Bid, advising them of the following information:</p> <ul style="list-style-type: none"> (i) the justification on which their Technical Bids have been considered to be non-responsive; (ii) their envelope marked “Financial Bid” will be returned to them unopened completion of grievance redressal proceedings, if any, in accordance with Rule 51 of the Gilgit-Baltistan Public Procurement Rules, 2022; <p>(b) simultaneously, notify in writing those Bidders whose Bids were considered substantially responsive to the requirements in the Bid, advising them that their Bid has been evaluated as substantially responsive to the Bid; and</p> <p>(c) notify all Bidders the date, time and location of the public opening of the envelopes marked ‘Financial Bid’.</p>

H. Opening of Financial Bids

<p>34. Public Opening of Financial Bids</p>	<p>34.1 The Financial Bids will be opened in public by the Employer in the presence of Bidders, or their designated representatives, and anyone else who chooses to attend. Each envelope marked “Financial Bid” shall be inspected to confirm that it has remained sealed and unopened. These envelopes shall then be opened by the Employer</p> <p>The Employer shall read out the names of each Bidder, the Bid Price, including any discounts and any other details as the Employer may consider appropriate. Only discounts read out at the public opening shall be considered for evaluation. The Letter of Financial Bid</p>
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	<p>and the Schedule of Rates and Prices are to be initialled by representatives of the Employer.</p> <p>34.2 The Employer shall prepare a record of the Financial Bids' opening that shall include, as a minimum:</p> <ul style="list-style-type: none"> (a) the name of the Bidders whose Financial Bids were opened. (b) the Bid Prices, including any discounts. <p>34.3 The Bidders whose envelopes marked "Financial Bid" have been opened, or their representatives who are present, shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.</p>
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I. Evaluation of Financial Bid

<p>35. Nonmaterial Nonconformities</p>	<p>35.1 Provided that a Bid is substantially responsive, and Bids have been invited on single responsibility basis in accordance with ITB 15, the Employer:</p> <ul style="list-style-type: none"> (a) may waive any nonconformities in the Bid; or (b) may request that the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid. <p>35.2 Provided that a Bid is substantially responsive, and Bids have been invited to include any part of the Works to be paid according to work done in accordance with ITB 15, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component by adding the average price of the item or component quoted by substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bidders, the Employer shall use its best estimate.</p>
<p>36. Arithmetic Correction</p>	<p>36.1 If Bids have been invited on single responsibility basis in accordance with ITB 15, the Bidder is deemed to have included all prices in the (lump sum) Total Bid Price. Arithmetical corrections shall therefore not be made, except that where there is a discrepancy between the amount in words and the amount figures, the amount in words shall prevail.</p>

	<p>36.2 If Bids have been invited to include any part of the Works to be paid according to work done in accordance with ITB 15, the Employer shall correct arithmetical errors only for the price for such part of the Works on the following basis:</p> <ul style="list-style-type: none"> (a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Bid Price, the former shall prevail, and the latter will be corrected accordingly. (b) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) above. <p>36.3 A Bidder shall be requested to accept the correction of arithmetical errors. Failure to accept the correction in accordance with ITB 36.1 and ITB 36.2 shall result in the rejection of the Bid and forfeiture of Bid Security in accordance with ITB 19.6(b)(i).</p>
<p>37. Evaluation Process Financial Bids</p>	<p>37.1 To evaluate and compare the Financial Bids, the Employer shall consider the following:</p> <ul style="list-style-type: none"> (a) the Bid Price, excluding provisional sums, if any. (b) price adjustment for correction of arithmetic errors, in accordance with ITB 36; (c) price adjustment due to discounts offered in accordance with ITB 15.4; and (d) price adjustment due to quantifiable nonmaterial nonconformities, in accordance with ITB 35.2. <p>37.2 If price adjustment is allowed, in accordance with ITB 15.3(BDS), the estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.</p>
<p>38. Abnormally Low Bids</p>	<p>38.1 An Abnormally Low Bid is one where the Bid Price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid Price.</p> <p>38.2 In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder, including detailed price analyses of its Bid Price in relation to the subject matter of the contract, scope, proposed</p>

	<p>methodology, schedule, allocation of risks and responsibilities and any other requirements of the Bidding Documents.</p> <p>38.3 After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.</p>
<p>39. Unbalanced or Front-Loaded Bids</p>	<p>39.1 If the Bid that is evaluated as the lowest evaluated cost is, in the Employer’s opinion, seriously unbalanced or front loaded the Employer may require the Bidder to provide written clarifications. Clarifications may include price analyses to demonstrate the consistency of the Bid Prices with the scope of the Works, proposed methodology, schedule and any other requirements of the Bidding Documents.</p> <p>39.2 After the evaluation of the information and price analyses presented by the Bidder, the Employer may:</p> <ul style="list-style-type: none"> (a) accept the Bid, or (b) if appropriate, require that the additional Performance Security be provided, at the expense of the Bidder, to a level to secure the risk of the Employer due to such seriously unbalancing or front loading under the scenario that the successful Bidder defaults under the contract; or (c) reject the Bid.

J. Determination of the Most Advantageous Bid

<p>40. Most Advantageous Bid (MAB)</p>	<p>40.1 The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria, and whose Bid has been determined to be:</p> <ul style="list-style-type: none"> (a) substantially responsive to the requirements of the Bidding Documents; and (b) the lowest evaluated Bid Price.
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K. Award of Contract

<p>41. Award Criteria and Notification of Evaluation of Financial Bids</p>	<p>41.1 Subject to ITB 42.1, the Employer shall award the Contract to the Bidder whose Bid has been determined as the Most Advantageous Bid provided that such Bidder has been determined to be qualified to satisfactorily perform the Contract in accordance with ITB 40 and ITB 40(A).</p> <p>41.2 The Employer shall also announce the results of the Bids evaluation in the form of final evaluation report at least Twelve (12) days prior to award of the Contract in accordance with Gilgit Baltistan Public Procurement Rules, 2022, and redressal</p>
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	<p>of the grievances, if any, in accordance with Gilgit Baltistan Public Procurement Rules, 2022.</p>
<p>42. Employer’s Right to Annul the Bidding Process</p>	<p>42.1 Notwithstanding ITB 41.1, the Employer reserves the right to annul the Bidding Process and reject all Bids, at any time prior to Contract award, without thereby incurring any liability to the affected Bidders or any obligation. In case of annulment, all Bids (unopened Financial Bids, if any) submitted and specifically, Bid securities shall be promptly (but not later than 14 days) returned to the Bidders.</p> <p>The Employer shall upon request communicate to any Bidder who submitted a Bid, the grounds for its rejection of all Bids but is not required to justify those grounds. Rejection of all Bids shall be notified to all Bidders promptly.</p>
<p>43. Notification of Award</p>	<p>43.1 Prior to expiration of the period of Bid validity prescribed by the Employer, the Employer will notify the successful Bidder in writing (“Letter of Acceptance”) that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the “Contract Price”).</p> <p>The Letter of Acceptance will also state the remedies with respect to ITB 38 and ITB 39 if applicable.</p> <p>43.2 No negotiation with the Bidder having submitted most advantageous Bid or any other Bidder shall be permitted, however, Employer may have clarification meetings before issuing Letter of Acceptance to get clarified any item in the Bid evaluation report.</p> <p>43.3 The Letter of Acceptance/notification of award and its acknowledgement/acceptance by the Bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.</p> <p>43.4 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and also return their Bid Securities in accordance with ITB 19.5.</p>
<p>44. Signing of Contract</p>	<p>44.1 Within 7 days or within such period as may be extended by the Employer in writing, provided that the total period does not exceed the Bid validity period from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will notify the successful Bidder to depute its representative with appropriate Power of Attorney to</p>

	<p>sign the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the Parties.</p> <p>44.2 The formal Agreement between the Employer and the successful Bidder shall be executed within 7 days of the receipt of the above stated notification by the successful Bidder from the Employer. or within such period as may be extended by the Employer in writing, provided that the total period does not exceed the Bid validity period</p>
<p>45. Performance Security</p>	<p>45.1 Within fourteen (14) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security in the form of Bank Guarantee and the amount, in accordance with the Conditions of Contract, and additional Performance Security if applicable under ITB 39.2 (b), using the Performance Security Form included in Section VII (Contract Forms) or another form acceptable to the Employer. Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid security. In that event the Employer may award the Contract to the next advantageous Bid.</p>
<p>46. Procurement Related Complaint</p>	<p>46.1 The procedures for making a Procurement-related Complaint are as specified in the BDS.</p>
<p>47. Instructions not Part of Contract</p>	<p>47.1 Bids shall be prepared and submitted in accordance with the Instructions to Bidders which are provided to assist the Bidders in preparing Bids but do not constitute part of the Contract.</p>

SECTION II - BID DATA SHEET (BDS)

A. General

ITB 1.1	<p>The reference number of the Request for Bids is: PD/100MW/SPP/1(1)/2025/ The Employer is: Water and Power Department, Gilgit Baltistan, Pakistan</p> <p>Employer’s Representative: Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,Email: pd100mwpsolar@gmail.com</p> <p>The Works for Distributed Solar Photovoltaic Plants are divided into three (3) Lots corresponding to different geographical regions of Gilgit-Baltistan as follows:</p> <ul style="list-style-type: none"> • Lot I (Gilgit Region) • Lot II (Baltistan Region) • Lot III (Diamer-Astore Region) <p>Each Lot is comprised of a separate set of Bidding Documents. These Bidding Documents relate to Lot -1 named as:</p> <p>9.11 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT- I)</p> <p>The Bidding Process is: Single Stage, Two-Envelope.</p>
ITB 1.3 (a)	Electronic Procurement System: not Applicable.
ITB 2.1	The name of the Project is: 100 MW_{DC} DISTRIBUTED SOLARIZATION OF GILGIT BALTISTAN
ITB 4.1	Maximum number of members in the JV shall be: Three (03)

B. Contents of Bidding Documents

ITB 7.1	<p>For Clarification of Bid purposes only, the Employer’s address is:</p> <p>Project Director, 100 MW_{DC} Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,</p> <p>Email: pd100mwpsolar@gmail.com</p> <p>Requests for clarification should be received by the Employer no later than:</p> <p>14 Days before deadline for submission of Bids.</p> <p>The Employer’s response shall not be later than seven (07) days before deadline of submission of Bids.</p>
ITB 7.4	A Pre-Bid Meeting shall take place at the following date, time and place:

	<p>Date: December 12, 2025 Time: 1100 hrs. Venue: Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan.</p>
ITB 11.1	<p>The language of the Bid is: English. All correspondence exchange shall be in English language. Language for translation of supporting documents and printed literature is English.</p>

C. Preparation of Bids

ITB 12.3 (e)	The Bidder shall submit with its Bid the following additional documents: None
ITB 15.1	<p>List of Schedule of Rates & Prices is as follows: Schedule No. A1 EPC Works for Rooftop Solar Schedule No. A2 O&M Works and Services Schedule No. A3 Grand Summary Schedule No. A4 Mandatory Spare Parts Schedule No. A5 Recommended Spare Parts</p>
ITB 15.3	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.
ITB 16.3	<p>Insert the following additional Sub-Clause at the end of Clause 16: The exchange rate parity in respect of Seventy percent (70%) of the EPC Price shall be adjusted in accordance with item (g) of Sub-Clause 14.15 of Part A [Contract Data] of Section VI – Particular Conditions of Contract.</p>
ITB 19.1	The amount of the Bid Security shall be: PKR 18 million
ITB 20.1	The Bid shall be valid for a period: 180 days .
ITB 21.1	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Power of Attorney as per Section IV (Bid Forms) .

D. Submission of Bids

ITB 22.1	<p>The following procedures shall apply.</p> <p>(a) The Bidder shall submit the Bid Lot-wise in two separate, sealed envelopes for each Lot (in case, participating more than One Lot). One envelope containing the Technical Bid and the other the Financial Bid. These two envelopes shall be enclosed in a sealed outer envelope and clearly marked “Bid - Original”. in accordance with Rule 39(b) of the Gilgit-Baltistan Public Procurement Rules, 2022 (Single Stage – Two Envelope procedure).</p> <p>(b) In addition to Original Bid, the Bidder shall prepare Three (3) copies of the Bid for each participating Lot(s) independently by following the procedure described below:</p> <p>Copies of the Technical Bid shall be placed in a separate sealed envelope marked “Copies: Technical Bid”. Copies of the Financial Bid shall be placed in a separate sealed envelope marked “Copies:</p>
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	<p>Financial Bid”. The Bidder shall place both of these envelopes in a separate, sealed outer envelope marked “Bid - Copies”. In the event of any discrepancy between the original and the copies, the original shall prevail.</p> <p>The Bidder shall also provide complete searchable PDF version as well as Word, Excel etc., versions of the Technical Bid only on flash drive, provided that in case of discrepancy, the hard copy shall prevail</p>
<p>ITB 23.1</p>	<p>For Bid Submission Purposes only, the Employer’s address is:</p> <p>Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,Email: pd100mwpvssolar@gmail.com</p> <p>Date: December 26, 2025 Time: on or before 1330 hrs.</p>

E. Opening of Technical Bids

<p>ITB 26.1</p>	<p>The Bid Opening shall take place at:</p> <p>Date: December 26, 2025 Time: 1400 hrs. Venue: Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan</p> <p>Add the following additional Sub-Clause 26.1.1 at the end of Sub-Clause 26.1:</p> <p>26.1.1: Technical Bids for all Lots (1 to 3) will be opened simultaneously on the above said date, time and place in accordance with ITB 26 and evaluated first.</p>
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F. Opening of Financial Bids

<p>ITB 34.1</p>	<p>Opening and Evaluation of Financial Bids (Lot-wise Procedure)</p> <p>Upon completion of the technical evaluation for all Lots, announcement of the results, and expiration of the grievance period prescribed under the Gilgit-Baltistan Public Procurement Rules, 2022, the Employer shall open the Financial Bids sequentially, Lot by Lot, commencing with the Lot designated for award first, as identified in these Bidding Documents. The opening of Financial Bids for each Lot shall be conducted in accordance with ITB 34 in the following manner:</p> <ol style="list-style-type: none"> a) The Date, time, and location for the opening of Financial Bids for a given Lot shall be communicated only to the Bidders who have been declared technically qualified and responsive for that specific Lot. b) The Financial Bids for Lot 1 shall be opened first, in accordance with ITB 34, at the date, time, and location to be notified by the Employer solely to the technically qualified and responsive Bidders for Lot 1. Such
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	<p>Financial Bids shall be evaluated in accordance with the relevant provisions of these Bidding Documents.</p> <p>c) Upon declaration of a Bidder as the lowest evaluated and successful Bidder for a particular Lot, any Financial Bids submitted by that Bidder for the remaining Lots (if any) shall remain unopened and shall be returned to the Bidder.</p> <p>d) Following the award of Lot 1, the Financial Bids for Lot 2 shall be opened in accordance with the procedure set forth above and evaluated solely among the remaining technically qualified and responsive Bidders for Lot 2 (excluding any Bidder already declared successful for Lot 1). The same procedure shall apply to Lot 3 as well.</p>
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K. Award of Contract

ITB 41.1	<p>Each designated Lot shall be awarded sequentially. The Bidder determined to be the lowest evaluated and successful Bidder for a specific Lot, in accordance with ITB Clause 40, shall be awarded the Contract for that Lot. Upon such award, the Financial Bids submitted by the same Bidder for all remaining Lots shall become null and void. These Financial Bids shall remain unopened and shall be returned to the Bidder in their original, sealed condition.</p>
ITB 46.1	<p>The Procurement related complaints will be dealt in accordance with Rule 51 of Gilgit Baltistan Public Procurement Rules, 2022.</p> <p>If a Bidder wishes to make a Procurement-related Complaint, the Bidder shall submit its complaint following these procedures, in writing (by the quickest means available, such as by email), to:</p> <p>Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpvsolar@gmail.com</p>

SECTION III - EVALUATION AND QUALIFICATION CRITERIA

This Section contains the criteria that the Employer shall use to evaluate Bids and qualify Bidders. No other factors, methods or criteria shall be used other than specified in this Bidding Documents.

To establish the Bidder's qualification to perform the Contract, the Bidder shall provide the information requested in the corresponding Qualification Forms included in Section IV, Bid Forms. The information provided in the Forms shall be substantiated with valid documentary evidence otherwise the requirement will not be considered as complied. The Employer reserves the right to obtain information regarding performance of the Bidder on their previously awarded contracts/ works and verify the same, provided that such verification is limited to the disclosed qualification and evaluation criteria in this Section and Section IV (Bid Forms).

Wherever a Bidder is required to state a monetary amount, the Bidder should indicate the equivalent PKR using the rate of exchange determined as follows:

- a. for construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amount for that year is to be converted) was originally established; or
- b. value of single contract - Exchange rate prevailing on the date of the contract.

The source of exchange rate shall be:

TT Selling rate as published by the State Bank of Pakistan provided on the following website:

www.sbp.org.pk

Any error in determining the exchange rates in the Bid may be corrected by the Employer.

The values for construction turnover, financial data and value of single contract shall further be escalated @10% per annum up to the deadline for submission of the Bids, as a project-specific adjustment factor, solely for the purpose of meeting the qualification criteria Sub-Factors 3.1, 3.2 and 4.2

Qualification

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
1. Eligibility							
1.1 (a)	Pakistan Engineering Council (PEC) Licensing	Licensing by Pakistan Engineering Council (PEC) in accordance with ITB 4.2	Must meet requirement	N/A	Must meet requirement	N/A	Provisional/Standard PEC License. Foreign firm must submit JV Agreement with Pakistani firm
1.1 (b)	Private Power and Infrastructure Board (the "PPIB")	Registered with the PPIB in accordance with ITB 4.2.	Must meet requirement	N/A	N/A	Must meet requirement	For Local Firms Only
1.2	Pakistani Firm Tax Registration	Requirement of Pakistani firm on Active Taxpayer List (ATL) in accordance with ITB 4.3	Must meet requirement	N/A	Must meet requirement	N/A	Foreign firms must submit proof of registration for income tax in

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
							their home jurisdiction and an undertaking to comply with Pakistani tax laws upon award of contract
1.3	Conflict of Interest	No conflicts of interest in accordance with ITB 4.4	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Bid
1.4	Nationality	Nationality in accordance with ITB 4.6	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI 1.1 and 1.2, with attachments
1.5	Eligibility w.r.t Debarment/ Blacklisting	Not having been debarred/blacklisted in accordance with ITB 4.7	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid
1.6	State-owned Entity of the	Bidder is required to meet the conditions of ITB 4.8	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI 1.1 and 1.2, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
	Employer's Country						
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of Contractor's default since during the last ten (10) years prior to the bid submission deadline	Must meet requirement ¹	N/A	Must meet requirement ²	N/A	Form CON 2
2.2	Suspension Based on Execution of Bid/Bid Securing Declaration by the Employer	Not under suspension based on execution of a Bid/Bid Securing Declaration pursuant to ITB 4.9.	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid

¹ Non-performance, as decided by the Employer, shall include all contracts where (a) non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Non-performance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Non-performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

² This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
2.3	Pending Litigation	Bidder's financial position and prospective long-term profitability still sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON 2
2.4	Litigation History	No consistent history of court/arbitral award decisions against the Bidder ³ during the last ten (10) years prior to the bid submission deadline	Must meet requirement	N/A	Must meet requirement	N/A	Form CON 2
3. Financial Situation and Performance							
3.1	Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN 3.1, with attachments

³ The Bidder shall provide accurate information on the related Form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last ten years. A consistent history of awards against the Bidder or any member of a joint venture may result in rejection of the Bid.

Eligibility and Qualification Criteria			Compliance Requirements			Document / Form	
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
		<p>cash flow requirements of Eq. PKR 400 million for the subject contract net of the Bidder's other commitments.</p> <p>(ii) The Bidder shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.</p> <p>(iii) The audited balance sheets acceptable to the Employer, for the last three (03) years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.</p>	<p>Must meet requirement</p> <p>Must meet requirement</p>	<p>Must meet requirement</p> <p>N/A</p>	<p>N/A</p> <p>Must meet requirement</p>	<p>N/A</p> <p>N/A</p>	

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
3.2	Average Annual Turnover	Minimum average annual turnover of Eq. PKR 1,000 million calculated as total certified payments received for contracts in progress and/or completed within the last three (03) years.	Must meet requirement	Must meet requirement	N/A	Must meet 40% of the requirement	Form FIN 3.2
4. Experience							
4.1	Bidder's Experience ⁴	The bidder must have registered his firm in Securities and Exchange Commission of Pakistan (SECP) on or before January 01, 2023. The Bidder shall have successfully completed projects, in the role of prime contractor or joint venture member, for each category below. For the purposes of this qualification, "single location" means works executed entirely within the same site boundary. Capacities achieved at multiple					

⁴To substantiate the above, Bidder shall submit authenticated user's certificate / Taking-Over / Performance / Defects Liability certificates or other relevant documents.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
		locations, even if under the same contract, shall not be aggregated to meet the requirement.					
		a) Successful execution and completion of at least one single-location solar PV project with capacity $\geq 250 \text{ KW}_{\text{DC}}$ and cumulative PV installation capacity of $\geq 2.5 \text{ MW}_{\text{DC}}$.	Must meet Requirement	Must meet Requirement	NA	NA	Form EXP 4.1
		b) Successful execution and completion of at least one single-location Battery Energy Storage System (BESS) installation of $\geq 100 \text{ kWh}$ and cumulative BESS installation capacity of $\geq 750 \text{ kWh}$.	Must meet Requirement	Must meet Requirement	NA	NA	Form EXP 4.1

5. Proposed Manufacturers

The capabilities of the manufacturers proposed by the Bidder for the following Major Equipment shall be evaluated for acceptability against the minimum criteria specified in Form TECH 6. The Bidder shall submit Manufacturer’s Authorization as per format provided in **Section IV (Bid Forms)** from each proposed manufacturer confirming their participation. Failure to propose at least one compliant manufacturer for any Major Equipment Category shall render the Bid non-responsive and subject to rejection.

Sr. No	Name of Major Equipment
1	PV Modules
2	Battery Energy Storage System
3	Hybrid Inverters

6. Key Personnel

The Bidder must demonstrate that it will have a suitably qualified (and in adequate numbers) minimum Key Personnel, as described in the table below.

The Bidder shall provide an organization chart which shall include the names of all Key Personnel. A separate site organisation chart shall clarify the site organization; The Bidder shall complete the relevant Form (Form PER-2) provided in **Section IV (Bid Forms)**.

No.	Position	Minimum Qualification	Total Work Experience [years]	Experience In Similar Work/ Position [years]
1	Project Manager/ Construction Manager	BSc Engineering (Elect/Mech)	15	10
2	Design Team Leader	BSc Engineering (Elect/Electronics)	12	10
3	Quality Control Engineer	BSc Engineering (Civil/Elect/Mech)	10	10
4	Civil / Structure Engineer	BSc Engineering (Civil/Structure)	10	5
5	Electrical Engineer	BSc Engineering (Elect)	10	5
6	PV Engineer	BSc Engineering (Elect)	8	5

SECTION IV - BID FORMS

1. Technical Forms and Schedules (To be Submitted with Technical Bid)

(a) Letter of Technical Bid

(b) Technical Bid Forms

- | | | |
|------|-------------|--|
| i. | Form TECH 1 | Design Methodology |
| ii. | Form TECH 2 | Schedule of Technical Data |
| iii. | Form TECH 3 | Methods Statement for Key Construction Activity |
| iv. | Form TECH 4 | Mobilization Schedule |
| v. | Form TECH 5 | Contractor's Personnel Detail & Organizational Chart |
| vi. | Form TECH 6 | Subcontractors & Manufacturers |

(c) Qualifications forms

- | | | |
|------|--------------|---|
| i. | Form ELI 1.1 | Bidder Information Form |
| ii. | Form ELI 1.2 | Bidder JV Information Form |
| iii. | Form CON 2 | Historical Contract Non-Performance, Pending
Litigation and Litigation History |
| iv. | Form FIN 3.1 | Financial Situation and Performance |
| v. | Form FIN 3.2 | Average Annual Turnover |
| vi. | Form EXP 4.1 | General Experience |
| vii. | Form EXP 4.2 | Specific Experience |

(d) Form of Bid Security (Bank Guarantee)

2. Financial Forms and Schedules (To be Submitted with Financial Bid)

(a) Letter of Financial Bid

(b) Schedules to Bid

- | | | |
|----|--------------|------------------------------|
| i. | Schedule – A | Schedule of Rates and Prices |
|----|--------------|------------------------------|

Letter of Technical Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

Place this Letter of Bid in the first envelope “TECHNICAL BID”.

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission:

Bidding Documents No: _____

To:

**Project Director,
100 MW Distributed Solarization of Gilgit Baltistan Project,
Water and Power Department Gilgit Baltistan,
Near K.I.U, Gilgit, Pakistan
Telephone No.: +92-5811-922609,
Fax No.: +92-5811-922619, 922185,
Email: pd100mwpvsolar@gmail.com**

Sir:

We, the undersigned Bidder, hereby submit our Bid, in two parts, namely:

- (a) the Technical Bid, and
- (b) The Financial Bid.

Having examined the Bidding Documents, including any Addenda issued in accordance with **ITB 8**, we, the undersigned, offer to execute the Works on an EPC/Turnkey basis, in full conformity with the said Bidding Documents and any Addenda.

We undertake, if our Bid is accepted, to commence the Works and achieve Completion within the respective times stated in the Bidding Documents.

We hereby submit as security for due performance of the undertakings and obligations of this Bid Security in the amount of PKR 18 million drawn in the favour of, or made payable to the Employer, Water and Power Department, Gilgit Baltistan, Pakistan and valid for a period of twenty-eight (28) days beyond the period of validity of Bid.

We hereby certify that we,

1. including any subcontractors or manufacturers for any part of the contract, meet the eligibility requirements and have no conflict of interest in accordance with **ITB 4**.
2. We are not participating, as a Bidder in more than one Bid in this Bidding process.

3. We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that appear in the list of debarred/blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and have not been declared debarred/blacklisted by foreign country, international organizations or other foreign institutions.;
4. We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption.
5. We confirm, if our Bid is accepted, that all members of the JV shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the JV shall not be altered without the prior consent of the Employer.
6. State-owned enterprise or institution: [select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of **ITB 4.8**];

We agree to abide by this Bid, which, in accordance with **ITB 12** and **ITB 13**, consists of this letter (Letter of Technical Bid) and enclosures as required in the Bidding Documents, until [insert day, month and year in accordance with **BDS 20.1**], and it shall remain binding upon us and may be accepted by you at any time on or before this date.

Until the formal final Contract is prepared and executed between us, this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us.

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

Name of the person duly authorized to sign the Bid on behalf of the Bidder:

** [insert complete name of person duly authorized to sign the Bid]

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

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

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

*: In the case of the Bid submitted by a Joint Venture, specify the name of the Joint Venture as Bidder.

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

Letter of Financial Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

Place this Letter of Bid in the second envelope “FINANCIAL BID”.

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission:

Bidding Documents No: _____

To:

**Project Director,
100 MW Distributed Solarization of Gilgit Baltistan Project,
Water and Power Department Gilgit Baltistan,
Near K.I.U, Gilgit, Pakistan,
Telephone No.: +92-5811-922609,
Fax No.: +92-5811-922619, 922185,
Email: pd100mwpsolar@gmail.com**

Dear Sir:

We, the undersigned, hereby submit the second part of our Bid, namely the **Financial Bid**, in accordance with the Instructions to Bidders and the requirements set forth in the Bidding Documents and Addenda

Having examined the Bidding Documents in their entirety, we offer to execute and complete the Works on an **EPC/Turnkey basis** for the following Bid Price, **exclusive of any discounts**,

Bid Price: [insert the Bid Price of in words and figures, indicating the various amounts and the respective currencies];

The discounts offered and the methodology for their application is:

- (i) The discounts offered are: [Specify in detail each discount offered]
- (ii) The exact method of calculations to determine the net price after application of discounts is shown below: [Specify in detail the method that shall be used to apply the discounts];

If our Bid is accepted, we undertake to provide an advance payment security and a Performance Security in the forms, in the amounts, and within the times specified in the Bidding Documents.

Undertakings

1. If our Bid is accepted, we undertake to provide an **Advance Payment Security** and **Performance Security** in the prescribed forms, amounts, and timelines specified in the Bidding Documents.

2. We agree to keep this Bid valid until [insert date as per BDS 20.1], and it shall remain binding upon us unless rejected or expired in accordance with the Bidding Documents.
3. We confirm that:
 - We, including our subcontractors, manufacturers, and suppliers, meet the **eligibility requirements** and are free of any conflict of interest in accordance with ITB 4.
 - Neither we nor any associated party are debarred/blacklisted under the laws of Pakistan or by any foreign or international organization.
 - We have not paid, and will not pay, any commissions, gratuities, or fees in connection with this Bid, **except as disclosed below in compliance with the Integrity Pact:**

Name of Recipient

Address Reason Amount

[Insert, if applicable; otherwise state “None”]

Acknowledgement

We acknowledge that the Employer is not bound to accept the lowest or any Bid it receives.

Until the formal Contract Agreement is executed, this Bid, together with your written acceptance (Letter of Acceptance), shall constitute a binding commitment between us, **subject to submission of the required Performance Security.**

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

Authorized Signatory: [insert complete name]

Title/Designation: [insert title of authorized person]

Signature: [insert signature]

Date: [insert date]

* In the case of a Joint Venture, specify the name of the JV as Bidder.

** The person signing the Bid must hold a valid Power of Attorney (attached with the Bid Schedules).

Schedules to Bid

1. Schedule-A Schedule of Rates and Prices

Schedule-A

Schedule of Rates and Prices

PREAMBLE

1. The Schedule of Prices shall be read in conjunction with the Instructions to Bidders, the Conditions of Contract, and the Employer's Requirements.
2. The Bidder shall submit prices for all items of the Works on an EPC/Turnkey basis, covering the complete scope of Work as described in, or implied from, these Bidding Documents. These include but are not limited to: engineering and design, procurement, manufacture, supply, transport, insurance, storage, installation, construction, civil works, testing, commissioning, documentation, training, provision of mandatory spare parts, obligations during the Defects Notification Period, operation and maintenance services for the durations specified in the Employer's Requirements, insurances, taxes and duties, performance security, and any other obligations necessary to execute and complete the Works and perform the Services in accordance with the Contract and the Employer's Requirements, whether or not specifically mentioned under an individual item.
3. The prices shall be fixed and firm and deemed to be included:
 - a. Contractor's overheads and profit, all applicable duties, taxes, levies, insurances, and other obligations of the Contractor as applicable on the Base Date, except where adjustments are expressly provided for under the Contract.
 - b. All costs of temporary works, site preparation, and construction facilities.
 - c. All obligations during the Defects Notification Period (DNP) including but not limited to rectification of defects, warranty obligations, and related support as per the Contract.
4. Each item in the Schedule of Prices shall be priced. Items unpriced shall be deemed included in other items.
5. The **Contract Price** shall mean the sum of:
 - a. the EPC Price (comprising all Rooftop Solar items, together with Mandatory Spare Parts);
 - b. the O&M Price (for Operation and Maintenance of Rooftop Solar, in accordance with the Contract and the Employer's Requirements);
 - c. the Provisional Sums.
6. **Mandatory Spare Parts:** The Contractor shall supply the Mandatory Spare Parts as defined in the designated Schedule. Their cost shall be included in the EPC Price, and no separate payment shall be made.
7. **Recommended Spare Parts:** The Bidder shall provide in the designated schedule a list of Recommended Spare Parts, including itemized prices. These prices shall not be included in the Grand Summary. The Employer may, at its sole discretion, procure such spares.
8. For the purpose of bid evaluation, the **Total Evaluated Price = EPC Price + O&M Price** shall be considered. For Contract award and execution, the Contract Price shall be the sum of the EPC Price, the O&M Price and the Provisional Sums.
9. A Provisional Sum is included in the Grand Summary for Employer's use at its discretion. The Provisional Sum shall be expended in whole or in part only on the instruction of the Employer's Representative in accordance with Sub-Clause 13.4 of the Conditions of Contract.

10. In case of discrepancy between a unit rate and its extended total, the unit rate shall prevail, subject to the lump-sum nature of the Contract.
11. In the event that the Employer determines that the distribution of prices is significantly unbalanced, either within a category of Works or across categories (including Rooftop Solar, and O&M), the Employer may:
 - a. require the Contractor to provide a detailed justification and itemized breakdown of any item of the Works; and/or
 - b. adjust the valuation and certification of interim payments so as to reflect the actual value of the Works executed.

Schedule No. A1 – EPC Works for Rooftop Solar

Item No.	Description (Design, Supply, Installation, Testing and Commissioning)	Price (PKR)
LOT I		
Sr. 1	ROOFTOP SOLAR – DISTRICT GILGIT	
A	Distributed Solar PV – Cumulative 5.229 MW _{DC} (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops in Gilgit District) including all civil & Structure works and AMI meter as defined under the technical specifications	
B	Battery Energy Storage System (BESS) – Cumulative ≥2.755 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
C	LV Equipment –switchgear, Bi-directional meter, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
D	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
E	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-01	Subtotal – Rooftop Solar – District Gilgit	
Sr. 2	ROOFTOP SOLAR – DISTRICT HUNZA	
A	Distributed Solar PV – Cumulative 1.797 MW _{DC} (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
B	Battery Energy Storage System (BESS) – Cumulative ≥1.144 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
C	LV Equipment –switchgear, Bi-directional meter, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
D	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
E	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-02	Subtotal – Rooftop Solar – District Hunza	

Sr. 3	ROOFTOP SOLAR – DISTRICT NAGAR	
A	Distributed Solar PV – Cumulative 0.965 MW _{DC} (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
B	Battery Energy Storage System (BESS) – Cumulative ≥0.533 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
C	LV Equipment –switchgear, Bi-directional meter, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
D	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
E	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-03	Subtotal – Rooftop Solar – District Nagar	
Sr. 4	ROOFTOP SOLAR – DISTRICT GHIZER	
A	Distributed Solar PV – Cumulative 1.379 MW _{DC} (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
B	Battery Energy Storage System (BESS) – Cumulative ≥0.820 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
C	LV Equipment –switchgear, Bi-directional meter, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
D	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
E	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-04	Subtotal – Rooftop Solar – District Ghizer	
	Total Price for LOT I (Sum of RS-01 to RS-04) to be carried to Schedule A3 – Grand Summary	

Schedule No. A2 – O&M Works and Services

Item No.	Description	Period	Price (PKR)
LOT I			
1	O&M of Rooftop Solar – District Gilgit	36 months	
2	O&M of Rooftop Solar – District Hunza	36 months	
3	O&M of Rooftop Solar – District Nagar	36 months	
4	O&M of Rooftop Solar – District Ghizer	36 months	
Total Price For O&M of LOT I (Sum of Sr. 1 to Sr. 4)			

Schedule No. A3 – Grand Summary

Reference	Description	Price (PKR)
EPC Price LOT I	Total Price of EPC Works for LOT I (Sum of RS-01 to RS-04 from Schedule No. A1)	
O&M Price LOT I	Total Price of O&M of Rooftop Solar for LOT I from Schedule No. A2	
PS for LOT I	Provisional Sum (as defined in Preamble)	21,429,500
Total	EPC Price + O&M Price + PS	

Schedule No. A4 – Mandatory Spare Parts

Sr. No.	Item Description	Quantity
1	PV modules	1% of the quantity installed for the Project
2	Inverter(s)	5% of the total of each type of inverter installed (rounded up to nearest whole number) or 1 inverter of each type, whichever is greater. 2% of the total of Wifi / Remote Monitoring Dongles installed for the Project
3	Batteries	1% of the quantity installed for the Project
4	PV Module Mounting structure	5% of the nut/ bolts / Rawal bolts / fasteners / Clamps / Washers etc. installed for the Project
5	Electrical system (LV). i.e. contactors/accessories	2% of the quantity installed for the Project
6	DC and AC cabling	4 mm² : 2% of the total DC Cable length installed for the Project 2% of the total AC Cable length for each size installed for the Project
7	DC & AC Breakers	25 A : 2% of the total DC Breakers installed for the Project 250 A : 2% of the total AC Breakers installed for the Project
8	Grounding Materials (Rods, Earthing Wire, Clamps, Connectors etc.)	2% of the quantity required for the Project.

Note:

- The Bidder shall price the Mandatory Spare Parts for each Rooftop Solar under the relevant EPC Price section of the Schedule of Rates and Prices.
- All spare batteries shall be delivered with a full manufacturer’s warranty period identical to that of the originally installed batteries. Any spare batteries with reduced warranty coverage shall not be counted toward the mandatory requirement.
- The mandatory spare parts listed herein are in addition to, and shall not reduce or replace, the Contractor’s obligations to rectify defects through manufacturer warranties or to replace damaged equipment through insurance claims. The Contractor shall not utilize the mandatory spare parts listed in this Schedule to discharge such warranty or insurance obligations. However, if such spares are used to meet an urgent requirement, the Contractor shall replenish them immediately so that the mandatory spare inventory remains complete throughout the O&M period.
- The Contractor shall maintain the mandatory spare parts in good, unused, and serviceable condition, properly stored and protected against deterioration, until the end of the O&M period. The inventory shall be handed over to the Employer at the end of the O&M period in the same serviceable condition as supplied.
- The condition and completeness of the mandatory spare parts inventory shall form an essential part of the final inspection of the Plant. Satisfactory handover of the inventory shall be a prerequisite for issuance of the Performance Certificate.

Schedule No. A5 – Recommended Spare Parts

Sr. No.	Item Description	Quantity	Unit Rate (PKR)	Total Price (PKR)
1				
2				
3				
4				
5				
	Total Price for Recommended Spare Parts <u>(NOT TO BE CARRIED TO A3 – GRAND SUMMARY)</u>			

Note:

List here above (or append a list in the form above) the prices for the recommended additional spare parts, which are recommended by the Bidder for purchase with the Plant. The recommended spare parts shall include any expendable and wear items for all new components furnished by Contractor. These shall be in addition to those specified and will not be considered for evaluation. Provide description for each recommended additional spare part, recommend a quantity and provide pricing. The cost of such additional recommended spare parts will not be considered in the evaluation of Bids.

It shall be understood that the purchase of any or all of the recommended additional spare parts will be at the option of the Employer. The option will be exercised at the time of Contract award, unless indicated otherwise.

Technical Bid Forms

1. Form TECH 1 Design Methodology
2. Form TECH 2 Schedule of Technical Data
3. Form TECH 3 Method Statement for Key Construction Activities
4. Form TECH 4 Mobilization Schedule
5. Form TECH 5 Contractor's Personnel Detail & Organizational Charts
6. Form TECH 6 Subcontractors & Manufacturers

Form TECH 1

Design Methodology

The Bidder shall provide a Design Philosophy and Operational Methodology for implementing the Rooftop Solarization. The submission shall demonstrate the Bidder's technical approach, and operational planning.

The Design Philosophy shall, at a minimum, cover the following:

1. Explanation of how the Employer's Requirements will be achieved.
2. Configuration, integration with PV and grid, and control.
3. Design approach for foundations and cable trenches.
4. Preventive and corrective O&M strategy, and training plan for local operators.
5. Fire safety, battery hazard management

Form TECH 2

'A'- Employer's Specified Data/Parameters

'B'- Bidder's Proposed Data/Parameters

'C'- Remarks Supporting the Proposed Deviation in Column 'B'

SPECIFIC PLANT DATA PHOTOVOLTAIC MODULES			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Rated Power: ≥ 600 Wp	Yes		
Tolerance: 0 ~ +3%	Yes		
Module Efficiency: ≥ 22%	Yes		
Operating Temperature: -40°C to +85°C	Yes		
Max System Voltage: 1500 V DC	Yes		
Fire Rating: IEC Class C, UL Type 29	Yes		
12-year product, 25 years performance	Yes		
IEC 61215, IEC 61730, IEC 62941, UL 61730	Yes		
Application/ Safety Class II as per IEC 61730	Yes		
Barcode Identification	Yes		
N type, half-cut, Topcon/HPBC	Yes		
≥ 50 mm Diameter Hail Resistant	Yes		

SPECIFIC PLANT DATA HYBRID INVERTER			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Battery Voltage: 24 V or above	Yes		
Battery Compatibility: Lithium-ion (LPF), Lead-acid	Yes		
Maximum Efficiency: ≥96.5%	Yes		
European Weighted Efficiency: ≥96%	Yes		
Grid Modes: Grid-tied, Off-grid, Backup	Yes		
Communication: Wi-Fi, Ethernet, RS485	Yes		
Protection Features: SPD, AFCI, GFDI, Anti-islanding, BMS	Yes		
Enclosure Protection: IP65	Yes		
Operating Temperature Range: -30°C to +60°C	Yes		
Warranty: 10 years	Yes		

SPECIFIC PLANT DATA AMI METER			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			

Model No.			
Country of Origin			
Battery Voltage: 24 V or above	Yes		

SPECIFIC PLANT DATA FOR BATTERY			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cell Chemistry: Lithium Iron Phosphate (LFP)	Yes		
Depth of Discharge (DoD): ≥ 90%	Yes		
Round-trip Efficiency: ≥ 90%	Yes		
Cycle Life: ≥ 6000 cycles @ 80% DoD	Yes		
Operating Voltage: 24 V or above	Yes		
Maximum Charge/Discharge Rate: ≥ 1 C	Yes		
Ambient Operating Temperature Range: -30°C to +50°C	Yes		
Ambient Charging Temperature: -30°C to +50°C (self-heating for sub-zero charging)	Yes		
Relative Humidity: 0–95% RH (non-condensing)	Yes		
Ingress Protection: IP65	Yes		
Noise Emission: ≤ 65 dB(A)	Yes		
Monitoring: BMS, mobile app, cloud-enabled	Yes		

SPECIFIC PLANT DATA DC CABLES			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cable Type: XLPO, Halogen free	Yes		
Conductor: Copper, ≥99.9% purity	Yes		
Earthing: Copper conductor/strip	Yes		
Flame Retardance	Yes		

SPECIFIC PLANT DATA AC CABLES			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cable Type: XLPE/PVC, UV & Flame Retardant	Yes		
Conductor: Copper, ≥99.9% purity	Yes		
Earthing: Copper conductor/strip	Yes		
Flame Retardance	Yes		

Form TECH 3

Method Statement for Key Construction Activities

The Bidder shall provide detailed method statements for the following key construction activities. Each method statement shall clearly describe:

- The proposed approach and sequence of works.
- The quality control and inspection regime.

The method statements shall demonstrate how the Bidder intends to complete the Works in accordance with the Employer's Requirements and international best practices.

Key Activities

The Bidder shall submit methodology for, but not limited to, the following:

- Submission of a detailed project schedule (using renowned project management software such as MS Project / P6) covering engineering, procurement and construction phases linked with work breakdown structure, milestones, and resources.
- Mobilization plan including logistics, safe transportation, and site establishment.
- Rooftop surveys
- Temporary site facilities, laydown areas, and storage.
- Foundations for PV modules, BESS, inverters, and switchgear.
- Delivery, handling, and storage of PV modules, mounting structures, BESS, and inverters.
- Erection and alignment of module mounting structures.
- Module installation, string wiring, and combiner boxes.

Form TECH 4

Mobilization Schedule

[Insert Mobilization Schedule]

Form TECH 5

Contractor’s Personnel Detail & Organizational Chart s

The Bidder shall provide an organization chart illustrating the proposed management structure and reporting lines for delivery of the Contract. For this organization chart, the Bidder must confirm deployment of atleast 15 no. of teams on site for timely / early completion of the works.

The Bidder shall also provide the names of Experts listed below.

No.	Position	Minimum Qualification	Total Work Experience [years]	Experience In Similar Work/ Position [years]
1	Project Manager/ Construction Manager	BSc Engineering (Elect/Mech)	15	10
2	Design Team Leader	BSc Engineering (Elect/Electronics)	12	10
3	Quality Control Engineer	BSc Engineering (Civil/Elect/Mech)	10	10
4	Civil / Structure Engineer	BSc Engineering (Civil/Structure)	10	5
5	Electrical Engineer	BSc Engineering (Elect)	10	5
6	PV Engineer	BSc Engineering (Elect)	8	5

Form PER-2
Resume and Declaration
Contractor’s Representative and Key Personnel

Name of Bidder

Position [#1]: [title of position]		
Personnel information	Name	Date of Birth
	Address	E-mail
	Professional Qualifications	
	Academic Qualifications	
	Language Proficiency: [language and levels of speaking, reading and writing skills]	
Details	Address of Employer	
	Telephone	Contact (Manager / Personnel Officer)
	Fax	
	Job Title	Years with Present Employer

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

Project	Role	Duration of involvement	Relevant experience
[main project details]	[role and responsibilities on the project]	[time in role]	[describe the experience relevant to this position]

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	Details
Commitment to Duration of Contract	[insert period (start and end dates) for which this Key Personnel is available to work on this contract]
Time Commitment	[insert the number of days/week/months/ that this Key Personnel will be engaged]

I understand that any misrepresentation or omission in this Form may:

- (a) be taken into consideration during Bid evaluation;
- (b) result in my disqualification from participating in the Bid;
- (c) result in my dismissal from the contract.

Name of Key Personnel: [insert name] _____

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Form TECH 6

Subcontractors & Manufacturers

a. Proposed Subcontractors

The following Subcontractors are proposed for carrying out the activity/sub-activity indicated. For any additional subcontractor (that is subsequently approved by the Employer), Bidders are free to propose but not more than three Subcontractors for each activity/sub-activity.

The bidder will submit the completed project of his proposed sub-contractors & Manufacturer.

Activity/Sub-Activity	Proposed Subcontractor's Name and Address	Nationality

b. Proposed Manufacturer

The Bidder shall propose up to three (3) manufacturers for each category of Major Equipment and Other Equipment listed below. The Employer will evaluate the acceptability of proposed manufacturers against the minimum criteria stated.

The Bidder shall provide credentials and supporting documents (such as manufacturer’s company profile, reference lists of similar projects, supply records, completion certificates, and any other relevant evidence) to establish that each proposed manufacturer meets the minimum requirements stated herein.

(I) Major Equipment

Sr. No.	Equipment	Minimum Manufacturer’s Requirement	Proposed Manufacturers
Proposed Manufacturer of Major Equipment			
1.	PV Modules	At least 05 Years of experience in manufacturing and supply of PV modules; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1.
			2.
			3.
2.	Battery Energy Storage System (BESS)	The proposed manufacturer of BESS shall have a minimum of five (05) years’ experience in the manufacturing and shall have successfully supplied at least 2 GWh of BESS during the last two (02) years Or At least 03 Years experience in manufacturing and supply of BESS; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1.
			2.
			3.
3.	Hybrid Inverters	The proposed manufacturer of inverters shall have a minimum of five (05) years’ experience in the manufacturing and shall have successfully supplied at least 2 GW of inverters during the last two (02) years Or At least 03 Years experience in manufacturing and supply of Hybrid Inverters; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1.
			2.
			3.

Note: Each Major Equipment Category listed above must include at least one proposed manufacturer that fully meets the corresponding minimum requirements. Failure to propose at least one compliant manufacturer for any Major Equipment Category shall render the Bid non-responsive and subject to rejection.

(II) Other Equipment

Proposed Manufacturer for Other Equipment			
1	LV/MV Panels	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.
2	LV/MV Cables	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.
3.	Distribution Boxes	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.

Note:

In case any proposed Manufacturer for Other Equipment is determined to be non-compliant with the specified minimum requirements, then the Bidder will be required to propose, without changing its Bid Price, an acceptable substitute manufacturer meeting the criteria for that Equipment prior to award of Contract.

Qualification Forms
Form ELI 1.1
Bidder Information Form

Date: _____
Page__ of __pages

Bidder's Name:
In case of Joint Venture (JV), name of each member:
Bidder's country of registration:
Bidder's year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
<p>1. Attached are copies of original documents of</p> <ul style="list-style-type: none"><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.6.<input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 4.1.<input type="checkbox"/> Tax Department Registration in accordance with ITB 4.3.<input type="checkbox"/> PEC Registration in accordance with ITB 4.2.<input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.8 documents establishing:<ul style="list-style-type: none">(a) Legal and financial autonomy(b) Operation under commercial law(c) Establishing that the Bidder is not under supervision of the Employer <p>2. Included are the organizational chart and a list of Board of Directors. All the Bidders shall also provide information on beneficial ownership using the Beneficial Ownership Disclosure Form.</p>

Form ELI 1.2

Bidder's JV Information Form

[To be completed for each member of Bidder's JV]

[Bidder will attach an executed JV Agreement according to PEC format on Stamp paper of worth Rs. 100 duly notarized]

Date: _____
Page __ of __ pages

Bidder's JV Name:
JV Member's name:
JV Member's country of registration:
JV Member's year of constitution/incorporation:
JV Member's legal address in country of constitution:
JV Member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.6. <input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> Tax Department Registration in accordance with ITB 4.3. <input type="checkbox"/> PEC Registration in accordance with ITB 4.2. <input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.8 documents establishing: (a) Legal and financial autonomy (b) Operation under commercial law (c) Establishing that the Bidder is not under supervision of the Employer
2. Included are the organizational chart and a list of Board of Directors. All the Bidders shall also provide information on beneficial ownership using the Beneficial Ownership Disclosure Form.

Form CON 2

Historical Contract Non-Performance, Pending Litigation and Litigation History

[This Form shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]

Bidder's Name: _____

Date: _____

Joint Venture Member's or Subcontractor's Name: _____

Page __ of __ pages

Non-Performed Contracts (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January 2015 as specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract non-performance in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.			
Year	Non-performed portion of Contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
	[Insert amount and percentage]	Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Reason(s) for non-performance: _____	
Pending Litigation (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3.			

Year of Dispute	Amount in Dispute (currency)	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in Dispute: _____ Party who initiated the dispute: ____ Status of dispute: _____	
Litigation History (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4. <input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
Year of Award	Outcome as Percentage of Net Worth	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in Dispute: _____ Party who initiated the dispute: ____ Reason(s) for Litigation and award decision: _____	

Form FIN 3.1

Financial Situation and Performance

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page ___ of ___ pages

1. Financial Data

Type of Financial information in (currency)	Historic information for previous three (03) years, (amount in currency, currency exchange rate,		
	Year 1	Year 2	Year 3
Statement of Financial Position (Information from Balance Sheet)			
Total Assets (TA)			
Total Liabilities (TL)			
Total Equity/Net Worth (NW)			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital (WC)			
Information from Income Statement			
Total Revenue (TR)			
Profits Before Taxes (PBT)			
Cash Flow Information			
Cash Flow from Operating Activities			

2. Sources of Finance

[The following table shall be filled in for the Bidder and all members combined in case of a Joint Venture]

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

No.	Source of Finance	Amount (Equivalent PKR)	Escalated Amount (Equivalent PKR)
1			
2			
3			

3. Financial documents

The Bidder and its JV members shall provide copies of financial statements for the last three (03) years pursuant to Section III, Evaluation and Qualification Criteria, Sub-factor 3.1. The financial statements shall:

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

Attached are copies of financial statements⁵ for the last three (03) years required above; and complying with the requirements. In case of local Bidder or local partner of a JV, his financial statements must stand authenticated through the Unique Document Identification Number (UDIN).

⁵ If the most recent set of financial statements is for a period earlier than 12 months from the date of Application, the reason for this should be justified sufficiently.

Current Contract Commitments / Works in Progress

Bidders and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Current PKR Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [Eq. PKR / month)]
1					
2					
3					
4					
5					

Form FIN 3.2

Average Annual Turnover

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page ___ of ___ pages

Annual Turnover Data				
Year	Amount Currency	Exchange Rate	Equivalent PKR	Escalated Equivalent PKR
Average Annual Turnover *				

* Total equivalent PKR for all years divided by the total number of years. See Section III, Evaluation and Qualification Criteria, Sub-factor 3.2.

Form EXP 4.1

Bidder's Experience

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page __ of __ pages

Similar Contract No.	Information		
Contract Identification			
Award date			
Completion date			
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			Eq. PKR _____ Escalated Eq. PKR _____
If member in a JV or Subcontractor, specify share in value in total Contract amount and roles and responsibilities	_____ %	_____ [insert total Contract amount in local currency]	Eq. PKR _____ Escalated Eq. PKR _____
	_____ _____ [Insert roles and responsibilities]		
Employer's Name:			
Address: Telephone/fax number E-mail:			

Form EXP 4.1 (cont.)

Bidder's Experience

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2 of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

9. Information about Board of Directors (details shall be provided regarding number of shares in the capital of the company as set opposite respective names)

1	2	3	4	5	6	7	8
Name and surname (In Block Letters)	CNIC No. (in case of foreigner, Passport No)	Father' s / Husband' s Name in Full	Current Nationality	Any other Nationality(ies)	Occupation	Residential address in full or the registered / principal office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)
			Total Number of Shares taken (in figure and words)				

10. Any other information incidental to or relevant to Beneficial Owner(s).

Name & Signature
 (Person authorized to issue notice on behalf of the company)

**Form of Bid Security
(Bank Guarantee)**

Bank Guarantee Executed on _____
(Date)

Expiry on _____
(Date)

Name of Guarantor with Address: _____

Name of Bidder with Address _____

Sum of Guaranteed amount in PKR _____ (Pak Rupees _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Bidder we, the Guarantor above named, are held and firmly bound unto _____ (hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated for _____ (Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum to the Employer, conditioned asunder:

- (1) that the Bid Security shall remain in force for a period twenty-eight (28) days beyond the Bid Validity date i.e., upto _____.
- (2) that in the event of;
 - a) the principal withdraws his Bid during the period of validity of Bid, or
 - b) the principal does not accept the correction of his Bid price, pursuant to sub-clause 36.3 of Instructions to Bidder, or
 - c) failure of the successful Bidder to
 - i. furnish the required Performance Security, in accordance with Clause-45 of Instructions to Bidders, or
 - ii. sign the proposed Contract Agreement, in accordance with Clause-44 of Instructions to Bidder,

then the entire sum be paid immediately to the said Employer as liquidated damages and not as penalty for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within Fourteen (14) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified or its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith unconditionally and irrevocably, pay the Employer the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge to decide, whether the Bidder has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security with in the time stated above, or has defaulted in fulfilling said requirements and the Guarantor shall pay without objection the said upon sum first written demand from the Employer forthwith and without any reference to the Bidder or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

GUARANTOR
(Schedule Bank)

WITNESS:

Signature _____

d) Name _____

Corporate Secretary (Seal)

Title _____

Corporate Guarantor (Seal)

2. _____

Name, Title &Address

Manufacturer's Authorization

Date: [insert date (as day, month and year) of bid submission]

ICB No.: [insert number of bidding process]

To: [insert complete name of the employer]

WHEREAS

We [insert complete name of the manufacturer or manufacturer's authorized agent], who are official manufacturers or agent authorized by the Manufacturer of [insert type of goods manufactured], having factories at [insert full address of manufacturer's factories], do hereby authorize [insert complete name of the bidder] to submit a bid which includes the supply of the following goods, manufactured by us and to subsequently negotiate and sign the Contract.

Goods to be supplied are:

- 1). ----- [Insert name and/or brief description of the goods]
- 2). -----

We hereby extend our full guarantee and warranty in accordance with the respective Provisions of the Contract, with respect to the goods offered by the above firm.

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

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

Title: [insert title]

Duly authorized to sign this Authorization on behalf of [insert complete name of the manufacturer]

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

-- Note --

The bidder shall require the manufacturer to fill out this form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the manufacturer.

**POWER OF ATTORNEY FOR SIGNING OF BID
POWER OF ATTORNEY**

[shall be on stamp paper of PKR 100]

Know all men by these presents, we _____(name and address of the registered office of the Bidder) do hereby constitute, appoint and authorize Mr. / Ms. _____R/o _____(name and address of residence) who is presently employed with us and holding the position of _____, as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to the bid of the (please state the name and address of the bidder) for Bidding Document No. _____: 9.11 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN, including signing and submission of all documents and providing information / responses to WATER AND POWER DEPARTMENT, GILGIT BALTISTAN, representing us in all matters in connection with our bid for the said Bidding Process.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and agree that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

For
(Signature)
(Name, Title, Email ID and Address)

Accepted
..... (Signature)
(Name, Title, Email ID and Address of the Attorney)

ACKNOWLEDGMENT

Before me, a Notary Public for and in the city of _____, this _____ of _____ 2025 personally came and appeared:

NAME IDENTIFICATION DOCUMENT

Known to me to be the same person/s who executed the foregoing Special Power of Attorney in Favor of _____ and acknowledged to me the same is/are his/her/their free and voluntary act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal, the date and place above written.

NOTARY PUBLIC

PART-II: CONDITIONS OF CONTRACT, STANDARD FORMS AND SCHEDULES

SECTION V - GENERAL CONDITIONS (GC)

Silver Book

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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for EPC/Turnkey Projects (“Silver book”) Second Edition 2017, reprinted 2022 with amendments” published by the Federation Internationale Des Ingenieurs Conseils (FIDIC) and the following “Particular Conditions” which are the amendments and additions to such General Conditions.

An original copy of the above FIDIC publication i.e. “Conditions of Contract for EPC/Turnkey Projects” must be obtained from FIDIC.

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E-mail: fidic@fidic.org

Website: www.fidic.org

FIDIC Code : ISBN13 : 978-2-88432-083-2

The successful Bidder after award of contract shall provide two (02) copies of above said “General Conditions” for incorporation in the Contract.

SECTION VI - PARTICULAR CONDITIONS

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

Part A - Contract Data

Sr. No.	Data Required	Sub-Clause	Data
1.	Defects Notification Period (DNP)	1.1.24	1,095 days
2.	Employer's Name and Address	1.1.27	Water and Power Department, Gilgit Baltistan, Pakistan 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpvsolar@gmail.com
3.	Employer's Representative (s)	1.1.30	Project Director
4.	Time for Completion	1.1.76	240 days for whole of the Works
5.	Agreed methods of electronic transmission:	1.3 (a)(ii)	Official email: pd100mwpvsolar@gmail.com
6.	Address of Employer for communications	1.3(d)	100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,
7.	Address of Employer's Representative (s) for communications	1.3(d)	Project Director 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,Email: pd100mwpvsolar@gmail.com
8.	Address of Contractor for communications	1.3(d)	(to be added later)
9.	Contract shall be governed by the law of:	1.4	Islamic Republic of Pakistan

10.	Ruling Language	1.4	English
11.	Language for Communications	1.4	English
12.	Number of additional paper copies of Contractor's Documents	1.8	Three (03)
13.	Total liability of the Contractor to the Employer under or in connection with the Contract	1.14	1.15 times of the Contract Price
14.	After the Contract comes into full force and effect, the Contractor shall be given right of access, and possession of all of the Site	2.1	The Employer shall give possession of the relevant part(s) of the Site to the Contractor as per requirements in accordance with the Programme submitted under Sub-Clause 8.3 [Programme], following the issuance of a written notice.
15.	Employer's Financial Arrangements	2.4	The Employer has received funds from the Government of Pakistan through PSDP towards the cost of the Project.
16.	Other Employer's Personnel	3.2	The Employer has appointed NESPAK Consultants to assist the Employer's Representative in the implementation of the contract. NESPAK shall act as the Employer's Delegated Assistant and shall perform such duties and exercise such authorities as are delegated to it under Part-B Special provisions.
17.	Performance Security (as percentages of the Contract Price in Currency/ies) percent: currency:	4.2	The Performance Security shall be maintained at ten percent (10%) of the Contract Price until expiry until issuance of the Performance Certificate.
18.	Maximum allowable	4.4(a)	20%

	accumulated value of work subcontracted (as a percentage of the Contract Price)		
19.	Parts of the Works for which subcontracting is not permitted:	4.4(b)	None
20.	Number of additional paper copies of progress reports	4.20	Eight (8)
21.	Normal working hours on site	6.5	Eight (08) hours per day under normal circumstances
22.	General Design Obligations	5.1 (b)	Clause 4 of Section II of Employer's Requirements is the essential obligation of the Contractor among the overall Employer's Requirements
23.	Number of additional paper copies of programmes	8.3	Six (06), including soft copy of the programme
24.	Delay Damages payable for each day of delay	8.8	0.10% of the EPC Price of the respective Section (as stated in the Schedule of Rates and Prices) for each day of delay beyond the Time for Completion of that Section
25.	Maximum amount of Delay Damages	8.8	10% of the EPC Price stated in the Contract Agreement
26.	Taking Over the Works and Sections	10.1	<p>The Works are divided into Sections as identified in Annexure-1 [List of Sections for the Works] to the Contract Data. Each Section shall be deemed to be completed when:</p> <p>(a) it has been executed and completed in accordance with the Contract, including the successful passing of the Tests on Completion applicable to such Section in accordance with Sub-Clause 9.4 [Tests on Completion]; and</p> <p>(b) a Taking-Over Certificate has been issued by the Employer for such Section in accordance with</p>

			<p>Sub-Clause 10.2 [Taking Over of Parts of the Works].</p> <p>The Contractor may apply for a Taking-Over Certificate for any Section, as defined in Annexure-1, upon fulfilment of the foregoing requirements. Upon issuance of the Taking-Over Certificate for a Section, the Defects Notification Period and the Contractor's obligations for operation and maintenance in respect of that Section shall commence from the date specified in such Taking-Over Certificate.</p> <p>Taking Over may be applied for, and granted, on a progressive basis, provided that a minimum of ten (10) buildings (refer to Annexure-1) within the relevant District have been completed, tested, and are ready for safe and reliable use, together with all associated civil, structural, and electrical works required for those buildings.</p> <p>The taking-over of the particular Section after completion of EPC phase does not absolve the Contractor from any liability as the O&M period has commenced immediately after taking-over.</p>
27.	Percentage rate to be applied to Provisional Sums for overhead charges and profit.	13.4(b)(ii)	10%.
28.	Total amount of Advance Payment: (as a percentage of the EPC Price stated in the Contract Agreement, excluding Provisional Sums)	14.2	20%.
29.	Currency/ies of Advance Payment	14.2	Pakistani Rupee (PKR) in which the Contract Price is payable
30.	Period of Payment of Advance Payment to the Contractor	14.2.2	Within 28 days after fulfilling the conditions prescribed in GCC

31.	Percentage deductions for the repayment of the Advance Payment	14.2.3	20% by following the methodology described in GCC
32.	Period of payment	14.3	One month
33.	Number of additional paper copies of Statements	14.3(b)	Four (04)
34.	Percentage of retention	14.3(iii)	Ten percent (10%) shall be deducted from each Interim Payment Certificate. Deductions shall continue until the cumulative total of Retention Money withheld reaches an amount equal to five percent (5%) of the Contract Price. No further deductions on account of retention shall be made thereafter.
35.	Limit of Retention Money	14.3(iii)	Five percent (5%) of the Contract Price.
36.	Plant and Materials for payment when shipped.	14.5(b)(i)	None
37.	Plant and Materials for payment when delivered to the Site	14.5(c)(i)	As per 'Schedule of Payments'
38.	Minimum amount of Interim Payment Certificates (IPC)	14.6.2	PKR 50 million
39.	Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [Interim Payment]	14.7(b)(i)	28 days
40.	Period for the Employer to make final payment to the Contractor	14.7(c)	56 days
41.	Financing charges for delayed	14.8	Not Applicable

	payment (percentage points above the average bank short-term lending rate as referred to under sub-paragraph (a))		
42.	Number of additional paper copies of draft Final Statement	14.11.1(b)	Four (04)
43.	Currencies for payment of Contract Price	14.15	Pakistani Rupee (PKR) only.
44.	Proportions or amounts of Local and Foreign Currencies are: Local: Foreign:	14.15(a)(i)	Local: 100% Foreign: Nil
45.	Currencies and proportions for payment of Delay Damages	14.15(c)	PKR only
46.	Rates of exchange	14.15(g)	The exchange rate parity in respect of seventy percent (70%) of the EPC Price shall be adjusted one-time at the time of issuance of letter of Acceptance using the following formula: Adjustment in the EPC Price = $[(\text{EPC Price} * 0.70) * \text{ER(Rev)}/\text{ER (B.D)} + (\text{EPC Price} * 0.30)]$ where: ER(Rev) = The revised TT selling rate of US Dollar as notified by the National Bank of Pakistan (NBP) on the date of issuance of letter of Acceptance. ER (B.D) = The TT selling rate of US Dollar as notified by the National Bank of Pakistan (NBP) on the Base Date of the Contract
47.	Forces of nature, the risks of which are allocated to the Contractor	17.2(d)	Climatic Conditions and Changes, Seasonal Rainfall, Thunderstorm, Flooding, Glacial Outbursts, Snowstorm, Land Sliding and Lightning

48.	<p>Permitted deductible limits:</p> <ul style="list-style-type: none"> i. Insurance required for the Works ii. Insurance required for Goods iii. Insurance required for liability for breach of Professional duty. iv. Insurance required against liability for fitness for purpose (if any is required) v. Insurance required for injury to persons and damage to property vi. Insurance required for injury to employees vii. Other insurances required by Laws and by local practice 	19.1	<ul style="list-style-type: none"> i. Ten percent (10%) of loss amount on each & every loss ii. Nil iii. Nil iv. Nil v. Nil vi. Nil vii. Nil
49.	<p>Periods for submission of insurance:</p> <ul style="list-style-type: none"> (a) Evidence of insurance (b) Relevant policies 	19.1.1 (a) & (b)	<ul style="list-style-type: none"> a) Not Later than Commencement Date. b) Within twenty-eight (28) days from the Commencement Date.
50.	Additional amount to be insured (as a percentage of the replacement	19.2.1(b)	Fifteen percent 15% of the replacement value

	value, if less or more than 15%).		
51.	List of risks arising from Exceptional Events which shall not be excluded from the insurance cover for the Works.	19.2.1(b)(iv)	Nil
52.	<ul style="list-style-type: none"> • Extent of insurance required for Goods • Amount of insurance required for Goods 	19.2.2	<ul style="list-style-type: none"> • From Ex-Works (i.e., works, factory, warehouse, etc.) to delivery at the Site. • Full replacement Value.
53.	Amount of insurance required for liability for breach of professional duty	19.2.3(a)	Full replacement value of the Works to be designed by the Contractor
54.	Insurance required against liability for fitness for purpose	19.2.3(b)	Yes
55.	Period of insurance required for liability for breach of professional duty	19.2.3	Until the date of issuance of Performance Certificate
56.	Amount of insurance required for injury to persons and damage to property.	19.2.4	<p>Injury to Person and Fatal case: In accordance with Workmen Compensation Act; and</p> <p>Damage to Property: PKR Five (05) Million</p> <p>without limit to the number of incidents for both of the above.</p>
57.	Other insurances required by Laws and by local	19.2.6	All insurances as applicable, to the extent of execution of the Project, under Federal and Provincial laws of Islamic Republic of Pakistan

	practice (give details.)		
58.	The language of arbitration shall be: The Place of Arbitration shall be: Rules of Arbitration:	21.6	English Gilgit, Pakistan The Arbitration Act 1940 (Pakistan)

Annexure -1 to Contract Data

List of Sections for the Works

1. The Works are divided into distinct Sections, as set out below.
2. For the Rooftop Solar Districts (RS-01 to RS-04), each individual Rooftop Solar District shall be deemed to constitute one Section.
3. Taking Over of each Section shall be carried out in accordance with the provisions of Sub-Clause 10.1 [Taking Over of the Works and Sections] of the Conditions of Contract.

List of Sections – Rooftop Solar

Section Ref.	Description	Location (District)
RS-01	Rooftop Solar – District Gilgit	Gilgit
RS-02	Rooftop Solar – District Hunza	Hunza
RS-03	Rooftop Solar – District Nagar	Nagar
RS-04	Rooftop Solar – District Ghizer	Ghizer

Note: Detailed Building wise list for above mentioned districts are attached in Employer's Requirements Section-I i.e. Scope of Work.

Part B - Special Provisions

Following Sub-Clauses are added after Sub-Clause 1.1.80.	
Sub-Clause 1.1.81 EPC Price	“ EPC Price ” means the lump-sum amount quoted by the Contractor for the Engineering, Procurement and Construction (EPC) Works, as set out in the Schedule of Rates and Prices (Schedule A), and subject to adjustments in accordance with the Contract.
Sub-Clause 1.1.82 ES	“ ES ” means environmental and social.”
Sub-Clause 1.1.83 O&M Price	“ O&M Price ” means the lump-sum price quoted separately by the Contractor for the Operation and Maintenance works and services as set out in the Schedule of Rates and Prices, subject to adjustments (if any) in accordance with the Contract.
Sub-Clause 1.1.84 Operation and Maintenance	“ Operation and Maintenance ” means the operation and maintenance of the Works as set out in the Contract and the Employer’s Requirements.”
Sub-Clause 1.2 Interpretation	“and” is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j). Sub-paragraph (k) is added: (k) “The word “Tender” is synonymous with “Bid”, the word “Tender” or “Bidder” with “Bidder” and the words “Tender documents” and “request for bids documents” with “bidding document(s)”, as applicable.”
Sub-Clause 1.5 Priority of Documents	Replace the list of documents from (a) to (i) with the following: a) the Contract Agreement; b) the Letter of Acceptance; c) the Letters of Technical and Financial Bids; d) the Particular Conditions Part A - Contract Data; e) the Particular Conditions Part B - Special Provisions; f) the General Conditions (GC); g) the Employer’s Requirements; h) the Schedule of Rates and Prices; i) the completed Schedules other than the Schedule of Rates and Prices; j) the Bid; k) the JV Agreement (if the Contractor is a JV); l) Code of Conduct for Contractor’s Personnel; m) any other document forming part of the Contract.

<p>Sub-Clause 1.6 Contract Agreement</p>	<p>In the last line of the 1st paragraph the text “shall be borne by the Employer” is substituted by “shall be reimbursed by the Employer to the Contractor”.</p>
<p>Sub-Clause 2.2 Assistance</p>	<p>Following paragraph is added at the end: Provided always that the Contractor shall have the sole responsibility for carrying out his obligations under this Sub-Clause.</p>
<p>Sub-Clause 3.2 Other Employer's Personnel</p>	<p>Following paragraph is added at the end of this Sub-Clause: In addition to providing assistance to the Employer's Representative, (Employer's Delegated Assistant) is delegated to exercise the following specific powers and authorities on behalf of the Employer's Representative:</p> <ul style="list-style-type: none"> (a) Sub-Clause 3.6 [Meetings] - convening and conducting progress meetings; (b) Sub-Clause 4.1 [Contractor's General Obligations] – monitor ongoing construction activities to verify compliance with approved design, specifications, quality standards, and good engineering practices. (c) Sub-Clause 4.4 [Subcontractors] - reviewing and providing consent for Subcontractors; (d) Sub-Clause 5.2 [Contractor's Documents] – review and comment on Contractor's design documents, drawings, specifications, and manuals for conformity with the Employer's Requirements within three (03) working days after receipt of Contractor's submittals; (e) Sub-Clause 7.3 [Inspection] – witness, verify, and report on the inspection and testing of equipment and material at manufacturer's works and at the Site; (f) Sub-Clause 8.3 [Programme] - reviewing, commenting on, and providing consent to the Programme; (g) Sub-Clause 8.7 [Rate of Progress] - monitoring and reporting on the rate of progress; (h) Sub-Clause 9.1 [Tests on Completion] – witness and verify the Tests on Completion, review results, and provide recommendations to the Employer's Representative regarding Taking-Over; (i) Sub-Clause 10.1 [Taking Over of the Works and Sections] – review the Contractor's application for Taking-Over and advise the Employer's Representative regarding compliance with contractual requirements;

	<p>(j) Sub-Clause 11.9 [Performance Certificate] – review the Contractor’s application for Performance Certificate and advise the Employer’s Representative regarding compliance with contractual requirements;</p> <p>(k) Sub-Clause 14.6 [Interim Payments] - reviewing, certifying, and processing applications for Interim Payment Certificates; and</p> <p>(l) Sub-Clause 14.9 [Release of Retention Money] - determining and certifying the release of Retention Money.</p> <p>The Employer's Representative reserves the right to, at any time and by written notice to the Contractor:</p> <ul style="list-style-type: none"> • delegate additional authorities or powers to the Employer’s Delegated Assistant; or • withdraw or modify any delegated authorities or powers previously granted to the Employer’s Delegated Assistant, <p>as may be necessary for the efficient administration and implementation of the Contract.</p> <p>Any action taken by the Employer’s Delegated Assistant within their delegated authority shall be deemed to have been taken by the Employer's Representative.</p>
<p>Sub-Clause 3.4 Instructions</p>	<p>Following is added at the end:</p> <p>"If the Employer's Representative or a delegated assistant:</p> <p>(a) gives an oral instruction;</p> <p>(b) receives a written confirmation of the instruction, from the Contractor, within two working days after giving the oral instruction; and</p> <p>(c) confirms the instruction within two working days after receiving the confirmation</p> <p>then the Contractor's confirmation shall constitute the written instruction of the Employer's Representative or delegated assistant (as the case may be)."</p>
<p>Sub-Clause 4.2 Performance Security</p>	<p><u>4.2.1 Contractor’s Obligations</u></p> <p>The first paragraph is substituted with the following:</p> <p>“The Contractor shall deliver the Performance Security, in the amount stated in the Contract Data, to the Employer within 14 days after the receipt of the Letter of Acceptance. The Performance Security shall be in the form of bank guarantee</p>

	<p>issued by, at the option of the Bidder, either (a) any scheduled bank in Pakistan with a branch in Gilgit or (b) a bank located outside Pakistan duly counter-guaranteed by a scheduled bank in Pakistan with a branch in Gilgit and shall be in the prescribed form.”</p> <p><u>4.2.2 Claims under the Performance Security</u></p> <p>Following paragraph is added at the end of bullet (e):</p> <p>“(f) failure by the Contractor to duly perform the Operation and Maintenance obligations as defined in the Contract and the Employer’s Requirements.”</p>
<p>Sub-Clause 4.3 Contractor’s Representative</p>	<p>The following sentence is added at the end of the Sub-Clause:</p> <p>“If any of these persons is not fluent in this language the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their delegated powers, functions and/or authority.”</p>
<p>Sub-Clause 4.4 Subcontractors</p>	<p>The following is added at the beginning of the second paragraph:</p> <p>“The Contractor shall require in all subcontracts relating to the Works that Subcontractors execute the Works in accordance with the Contract, including complying with the relevant ES requirements and the SEA/SH Prevention and Response Obligations.</p> <p>All subcontracts relating to the Works shall include a provision stipulating that the Subcontractor accepts that the Employer may disqualify the Subcontractor from being awarded a Government of Pakistan financed contract for a period of two years if the Subcontractor is determined to have failed to comply with its SEA/SH Prevention and Response Obligations.”</p> <p>The following is added at the end of the last paragraph of Sub-Clause 4.4:</p> <ul style="list-style-type: none"> i. “All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under subparagraph (a) of Sub-Clause 15.2.3 [After Termination]. ii. “All subcontracts relating to the Works shall include provisions which entitle the Employer to terminate the subcontract upon termination of the Contract Agreement”

	<p>Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Islamic Republic of Pakistan to be appointed as Subcontractors.” Provided further that the Subcontractor shall not have any claim, cause of action, suit, etc. for compensation, loss or damage against the Employer arising out of or in relation to the Contract Agreement</p> <p>Provided further that the Subcontractor shall be obligated and liable to perform and discharge all the obligations and liabilities owed by the Contractor to the Employer under the Contract Agreement to the extent of the Scope of Works or Services assigned to the Subcontractor.</p> <p>Provided further that the Subcontractor Scope of Works or Services shall not be deemed completed until and unless such Scope of Works or Services is completed to the satisfaction of the Employer under the Contract Agreement.</p>
<p>Sub-Clause 4.5 Nominated Subcontractors</p>	<p>This Sub-Clause is not applicable under this Contract.</p>
<p>Sub-Clause 4.6 Co-operation</p>	<p>On the second-last line of the first paragraph before “Contractor’s”, add “of the”.</p> <p>The following is added after the first paragraph: “The Contractor shall also, as stated in the Employer’s Requirements or as instructed by the Employer, cooperate with and allow appropriate opportunities for the Employer’s Personnel to conduct any environmental and social assessment.”</p>
<p>Sub-Clause 4.8 Health and Safety Obligations</p>	<p>The following are included after deleting “and” at the end of (f) and replacing “.” with “; and” at the end of (g):</p> <ul style="list-style-type: none"> (h) where a health service provider for the Contract is stated in the Employer’s Requirements, provide all reasonable assistance (room, accommodation, water etc.) to enable the service provider to perform its functions; (i) provide health and safety training of Contractor’s Personnel as appropriate and maintain training records; (j) actively engage the Contractor’s Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor’s Personnel, training on occupational safety

	<p>and health, and provision of personal protective equipment without expense to the Contractor's Personnel;</p> <p>(k) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health.</p> <p>(l) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;</p> <p>(m) subject to Sub-Clause 4.6, where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and</p> <p>(n) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment."</p> <p>The second and third paragraphs are replaced with the following:</p> <p>"Subject to Sub-Clause 4.1, the Contractor shall submit to the Employer for Review a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works. The procedures for Review of the health and safety manual and its updates shall be as described in Sub-Clause 5.2 (Contractor's Documents).</p> <p>The health and safety manual shall set out all the health and safety requirements under the Contract,</p> <p>(a) which shall include at a minimum:</p> <p>(i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control</p>
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	<p>measures for chemical, physical and biological substances and agents;</p> <ul style="list-style-type: none"> (ii) details of the training to be provided, records to be kept; (iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning); (iv) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, (v) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labour; (vi) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation and welfare facilities are provided by the Contractor in accordance with Sub-Clause 6.6; and <p>(b) any other requirements stated in the Employer's Requirements."</p> <p>The paragraph starting with: "In addition to the reporting requirement of..." is deleted and is further addressed in Sub-Clause 4.20 of the Special Provisions.</p>
<p>Sub-Clause 4.15 Access Route</p>	<p>The following is added at the end of Sub-Clause 4.15: "The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party</p>

	<p>associated with the use of, if any, Contractor's Equipment on public roads or other public infrastructure.</p> <p>The Contractor shall monitor and use road safety incidents and accidents reports to identify negative safety issues and establish and implement necessary measures to resolve them."</p>
<p>Sub-Clause 4.16 Transport of Goods</p>	<p>The following is added at the end:</p> <p>The Contractor shall duly consider the nature, volume and weight of the Goods for the safe inland transportation up to the Site. After consultation with the Employer, the Contractor shall, at its own risk and cost, use the most appropriate route for transporting the Goods without causing the impediments to the public transport and without causing any delay to the approved Programme of the Works.</p>
<p>Sub-Clause 4.18 Protection of the Environment</p>	<p>The sub-paragraph (b) is deleted, and the following paragraph is added at the end of Sub-Clause:</p> <p>"In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor's operations, the Contractor shall agree with the Employer the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its own cost to the satisfaction of the Employer."</p>
<p>Sub-Clause 4.20 Progress Reports</p>	<p>At the end of sub-paragraph (g) the word "and" is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with ":", and the following new sub-paragraphs are added as:</p> <ul style="list-style-type: none"> (i) planned programme for the execution of the Works for next 56 days to enable Employer's Representative to determine its programme of inspection and testing; (j) monthly summary of daily job record indicating weather conditions, deployment of Contractor's Equipment, labour employment, local material procurement and material import, if any; and (k) salient contractual and project information.
<p>Sub-Clause 4.21 Security of the Site</p>	<p>Following is added at the end of the Sub-Clause:</p> <p>"Subject to Sub-Clause 4.1, the Contractor shall submit for the Employer's No-objection a security management plan that sets out the security arrangements for the Site.</p> <p>The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor's</p>

	<p>Personnel, Employer’s Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Employer’s Requirements.</p> <p>The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.</p> <p>In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 4.23 Archaeological and Geological Findings</p>	<p>The first paragraph is replaced with the following:</p> <p>“All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:</p> <ul style="list-style-type: none"> (a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor’s Personnel or other persons from removing or damaging any of these findings; (b) train relevant Contractor’s Personnel on appropriate actions to be taken in the event of such findings; and (c) implement any other action consistent with the requirements of the Employer’s Requirements and relevant Laws.”
<p>The following Sub-Clauses 4.24 to 4.26 are added at the end of Sub-Clause 4.23</p>	
<p>Sub-Clause 4.24 Suppliers (other than Subcontractors)</p>	<p>4.24.1 Forced Labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labour including trafficked persons as described in Sub-Clause 6.21. If forced labour/trafficking cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.2 Child labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labour as described in Sub-Clause 6.22. If child labour cases</p>

	<p>are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.3 Serious Safety Issues</p> <p>The Contractor, including its Subcontractors, shall comply with all applicable safety obligations, including as stated in Sub-Clauses 4.4, 4.8 and 6.7. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to adopt procedures, and mitigation measures adequate to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.4 Obtaining natural resource materials in relation to supplier</p> <p>The Contractor shall obtain natural resource materials from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from riverbeds or beaches.</p> <p>If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats</p>
<p>Sub-Clause 4.25 Code of Conduct</p>	<p>The following is added as Sub-Clause 4.25:</p> <p>“The Code of Conduct for Contractor’s Personnel (ES) signed by the Contractor will apply to Contractor’s Personnel (as defined in Sub-Clause 1.1.14 of the General Conditions), to ensure compliance with the Contractor’s Environmental and Social (ES) obligations under the Contract. The Contractor shall take all necessary measures to ensure that each Contractor’s Personnel is made aware of the Code of Conduct including specific behaviours that are prohibited and understands the consequences of engaging in such prohibited behaviours.</p>

	<p>These measures include providing instructions and documentation that can be understood by the Contractor’s Personnel and seeking to obtain that person’s signature acknowledging receipt of such instructions and/or documentation, as appropriate.</p> <p>The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project-affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor’s Personnel, Employer’s Personnel and the local community.</p> <p>The Contractor’s Management Strategy and Implementation Plans shall include appropriate processes for the Contractor to verify compliance with these obligations”</p>
<p>Sub-Clause 5.4 Technical Standards and Regulations</p>	<p>The following is added as a second paragraph after first paragraph:</p> <p>“If so, stated in the Employer’s Requirements, the Contractor shall:</p> <ul style="list-style-type: none"> (a) take into account climate change considerations in the design of structural elements of the Works and new buildings if any; and (b) apply the concept of universal access to the design and construction of structures and new buildings if any (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances.)
<p>Sub-Clause 6.1 Engagement of Staff and Labour</p>	<p>The following is added at the end of the Sub-Clause</p> <p>Contractor shall employ 30 % of project staff and labour from sources within Pakistan, particularly labour from the towns and villages directly affected”</p>
<p>Sub-Clause 6.5 Working Hours</p>	<p>The following is added at the end of the Sub-Clause</p> <p>“The Contractor shall provide the Contractor’s Personnel annual holiday and sick, maternity and family leave, as required by applicable Laws or as stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 6.6 Facilities for Staff and Labor</p>	<p>The following is added as the last paragraph:</p> <p>“If stated in the Employer’s Requirements, the Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the Contractor’s Personnel. The Contractor shall also provide similar facilities</p>

	<p>for the Employer’s Personnel as stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 6.7 Health and Safety of Personnel</p>	<p>In the second paragraph, replace “The Contractor” with: “Except as otherwise stated in the Employer’s Requirements, the Contractor...”</p> <p>The following paragraph is added at the end of the Sub-Clause: “In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Employer’s Representative may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Employer’s Representative may determine to be reasonably necessary for such purpose. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Employer’s Representative immediately by the quickest available means.”</p>
<p>Sub-Clause 6.8 Contractor’s Superintendence</p>	<p>Insert at the end of sub-paragraph (a) of this Sub-Clause: "Or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"</p> <p>The following text is added at the end of this Sub-Clause: “The Contractor’s authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council. The Contractor’s authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.”</p>
<p>Sub-Clause 6.9 Contractor’s Personnel</p>	<p>The following is included after deleting “or” at the end of (e) and replacing “.” with “; or” at the end of (f): “(g) undertakes behaviour which breaches the Code of Conduct for Contractor’s Personnel (ES).”</p> <p>The last paragraph is deleted and is replaced with the following: If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience. In the case of replacement of the</p>

	<p>Contractor’s Representative, Sub-Clause 4.3 [Contractor’s Representative] shall apply. In the case of replacement of Key Personnel (if any), Sub-Clause 6.12 [Key Personnel] shall apply.</p> <p>Subject to the requirements in Sub-Clause 4.3 [Contractor’s Representative] and 6.12 [Key Personnel], and notwithstanding any requirement from the Employer to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor’s Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above.”</p>
<p>Sub-Clause 6.12 Key Personnel</p>	<p>The following is inserted at the end of the last paragraph:</p> <p>“If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available at its own cost during all working hours in a number deemed sufficient by the Employer.”</p>
<p>The following Sub-Clauses 6.13 to 6.28 have been added after Sub-Clause 6.12.</p>	
<p>Sub-Clause 6.13 Foreign Personnel</p>	<p>The Contractor may bring into the Islamic Republic of Pakistan any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national or government permission required for bringing in the Contractor’s personnel.</p> <p>The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.</p>
<p>Sub-Clause 6.14 Supply of Foodstuffs</p>	<p>The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Employer’s Requirements at reasonable prices for the Contractor’s Personnel for the purposes of or in connection with the Contract</p>
<p>Sub-Clause 6.15 Supply of Water</p>	<p>The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor’s Personnel.</p>

<p>Sub-Clause 6.16 Measures against Insect and Pest Nuisance</p>	<p>The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.</p>
<p>Sub-Clause 6.17 Alcoholic Liquor or Drugs</p>	<p>The Contractor shall not, otherwise than in accordance with the Laws of the Islamic Republic of Pakistan, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.</p>
<p>Sub-Clause 6.18 Arms and Ammunition</p>	<p>The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so</p>
<p>Sub-Clause 6.19 Festivals and Religious Customs</p>	<p>The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs</p>
<p>Sub-Clause 6.20 Funeral Arrangements</p>	<p>The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.</p>
<p>Sub-Clause 6.21 Forced Labour</p>	<p>The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.</p> <p>No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harbouring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.</p>
<p>Sub-Clause 6.22 Child Labour</p>	<p>(a) The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in the Islamic Republic of Pakistan.</p>
<p>Sub-Clause 6.23 Employment Records of Workers</p>	<p>The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Employer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Contractor's Records].</p>

<p>Sub-Clause 6.24 Workers Organization</p>	<p>The Contractor shall comply with the relevant labour laws of Islamic Republic of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.</p>
<p>Sub-Clause 6.25 Non-Discrimination and Equal Opportunity</p>	<p>The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (in accordance with Sub-Clause 6.22).</p>
<p>Sub-Clause 6.26 Training of Contractor's Personnel</p>	<p>The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training referred to in Sub-Clause 4.8.</p> <p>As stated in the Employer's Requirements or as instructed by the Employer's Representative, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be trained on ES aspects of the Contract by the Employer's Personnel.</p> <p>The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.</p>
<p>Sub-Clause 6.27 Compliance by Subcontractors</p>	<p>The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.</p>
<p>Sub-Clause 6.28 Epidemics</p>	<p>In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.</p>

<p>Sub-Clause 7.3 Inspection</p>	<p>The following is added in the first paragraph after “Employer’s Personnel” “(including the consultants, referred in Sub-Clause 3.2, and third parties, such as independent experts)”</p> <p>The following is added as (b) (iv):</p> <p>“(iv) carryout environmental and social audit, and”</p>
<p>Sub-Clause 7.4 Testing by the Contractor</p>	<p>The second paragraph is modified to start as: “Except as otherwise specified in the Contract, the Contractor shall perform all the required tests of all the Equipment and Plant installed under the scope of the Works as specified in the Employer’s Requirements and/or as directed by the Employer’s Representative.”</p>
<p>Sub-Clause 7.7 Ownership of Plant and Materials</p>	<p>The following is added before the first paragraph: “Except as otherwise provided in the Contract,”</p> <p>The following is added at the end of the Sub-Clause: “No Plant and/or Materials that is the property of the Employer shall be removed from the Site. If it becomes necessary to:</p> <ul style="list-style-type: none"> (i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Employer Representative requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or (ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Employer Representative clearly identifying the item(s) of Plant and/or Materials to be replaced and giving details of the due date of delivery to the Site of the replacement item(s). <p>Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure that such an item is not moved except for its delivery to the Site.</p> <p>The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or</p>

	Materials that has become the property of the Employer under this Sub-Clause."
The following Sub-Clauses 7.9 to 7.10 are added after Sub-clause 7.8	
Sub-Clause 7.9 Use of Pakistani Materials and Services	The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.
Sub-Clause 7.10 Factory Acceptance Test	Factory acceptance tests (FATs) shall be witnessed by the Employer's Personnel (including the Employer's Representatives, referred in Sub-Clause 3.2, and third parties, such as independent experts). All cost in connection with witnessing of the factory acceptance tests by the Employer's Personnel shall be borne by the Contractor. These shall include costs of air travel from Pakistan to place of inspection / testing and back, hotel accommodation / boarding / lodging, inland transportation and USD 200 and PKR 10,000 daily allowance per day per person for inspection, testing to be conducted outside and inside Pakistan respectively for each visit of every person to witness these tests.
Sub-Clause 8.1 Commencement of Work	The Commencement Date shall be the date notified by the Employer to the Contractor in writing after: a. The Contract Agreement has been signed and has come into full force and effect in accordance with Sub-Clause 1.6 [Contract Agreement]; and b. The Employer has granted the Contractor reasonable access and possession of the Site necessary for the commencement of the Works. Such notice shall be given not later than twenty-eight (28) days after the Contract Agreement comes into full force and effect. The Employer shall give this notice at least fourteen (14) days before the Commencement Date.
Sub-Clause 8.5 Extension of Time for Completion	Society of Construction Law Delay and Disruption Protocol 2 nd Edition February 2017 governing guideline for determining the EOT and EOT related cost claims. Or PEC Guidelines for EOT
Sub-Clause 11.7 Right of access after Taking Over	In the first paragraph, the text "the date 28 days after" is deleted.
Sub-Clause 11.9 Performance Certificate	The following are included after deleting "and" at the end of (a) and replacing "." with "; and" at the end of (b):

	<p>“(c) upon successful completion of the Operation and Maintenance by the Contractor to the satisfaction of the Employer’s Representative.”</p>
<p>Sub-Clause 12.1 Procedure for Tests after Completion</p>	<p>The 2nd para of this Sub-Clause is modified as follows: The section-wise “Tests after Completion” of the Works shall be carried out upon expiry of the Operation and Maintenance (O&M) Period and prior to the issuance of the Performance Certificate, as defined in Section II (General Project Requirements) of Volume 2 of the Employer’s Requirements.</p>
<p>Sub-Clause 13.6 Adjustments for Changes in Laws</p>	<p>The following is added at the end of the Sub-Clause: “All taxes, duties and other levies payable by the Contractor/Subcontractor under the Contract, as per the Law of Islamic Republic of Pakistan, shall be dealt as per the following:</p> <p>a) Local Direct Taxes</p> <p>It is implied that the Contractor has taken all the risks into account while submitting the rates and prices and the Bid Price. The Employer shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax WHT. Turnover Tax, Super Tax etc) payable by the Contractor and the Contractor’s Personnel.</p> <p>Any change (increase/decrease) in the rate of Direct Taxes i.e., Income Tax/WHT. Turnover Tax. Super Tax etc shall be the liability of the Contractor and the Contract Price shall not be adjusted.</p> <p>b) Local Indirect Taxes</p> <p>If rate of indirect taxes i.e., sales taxes, custom duties, VAT levies, other charges or similar Taxes levied on the Contractor’s invoice which are to be borne by the Employer are increased or decreased, a new tax or duty is introduced, an existing tax or duty is abolished or any change in interpretation or application of any tax or duty occurs after the Base Date during the course of performance of the Contract, an equitable adjustment/ compensation of the Contract Price will be made to the Contractor by the Employer.</p> <p>Notwithstanding the foregoing, the Contractor shall not be entitled to an Extension of Time if the relevant delay has already been taken into account in the determination of a</p>

	<p>previous Extension of Time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].</p>
<p>Sub-Clause 13.7 Adjustments for Changes in Cost</p>	<p>In the first paragraph, the text “the Particular Conditions” is replaced by “the Contract”.</p>
<p>Sub-Clause 14.1 The Contract Price</p>	<p>The following is added at the end of paragraph (b) the Sub-Clause:</p> <p>“Notwithstanding the provisions of subparagraph (b), the taxation shall be dealt as follows:</p> <p>Foreign Taxation</p> <p>The Contractor shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside Pakistan.</p> <p>Local Taxation</p> <p>All taxes, duties and other levies payable by the Contractor/Subcontractor under the Contract, as per the Law of Pakistan, shall be dealt as per the following:</p> <p><u>a) Local Direct Taxes</u></p> <p>It is implied that the Contractor has taken all the risks into account while submitting the Bid Price. The Employer shall not be responsible for any present or future direct taxes (Income tax/Corporate Tax WHT, Turnover Tax, Super Tax etc.) payable by the Contractor and the Contractor’s Personnel.</p> <p><u>b) Local Indirect Taxes</u></p> <p>All local indirect taxes i.e. sales taxes, custom duties, VAT levies other charges or similar taxes levied on the Contractor’s invoice prevailing at the Base Date as per the Laws of Islamic Republic of Pakistan are included in the Contract Price. The Contractor shall be responsible to provide the evidence to the Employer upto his satisfaction that all the applicable local indirect taxes has been paid by the Contractor, while submitting application for interim payment under Sub-Clause 14.3 [Application for Interim Payment].</p> <p>Nothing in the Contract shall relieve the Contractor from his liability to bear and pay any tax under this Contract as per the law of land.</p>

	<p>Withholding of Advance Income Tax</p> <p>All payments (gross) as payable to the Contractor/Subcontractor will be subject to Withholding Tax/Advance Tax at prescribed rate at the time of payment. The deduction of advance income tax from the gross payable bills shall be made in accordance with prevalent income tax laws of the Government of Pakistan. These deductions shall be deposited in the Government Treasury by the Employer to the account of the Contractor within prescribed period.</p> <p>The Employer shall within 28 days of making any such deduction provide to the Contractor a certificate of tax deducted and deposited in the Government Treasury.</p> <p>Provincial Sales Tax on Services</p> <p>Subject to the relevant provisions of the Provincial Sales Tax Act on Services, all payments (gross) as payable to the Contractor/Sub-contractor in relation to Works/services will be subject to withholding sales tax at the prevalent rates at the time of payment.</p>
<p>Sub-Clause 14.2 Advance Payment</p>	<p><u>14.2.1 Advance Payment Guarantee</u></p> <p>The entity issuing the Advance Payment Guarantee and its form shall be asunder:</p> <p>The Advance Payment Guarantee shall be in the form of Guarantee issued by (a) a Scheduled Bank in Pakistan with branch in Gilgit or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan with branch in Gilgit.</p> <p>In case of Joint Venture, the Advance Payment Guarantee(s) shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.</p> <p><u>14.2.2 Advance Payment</u></p> <p>The period of advance payment of “14 days” is replaced by “as stated in the Contract Data”.</p>
<p>Sub-Clause 14.4 Schedule of Payments</p>	<p>The entire text of this Sub-Clause is replaced with the following; The Contract Price will be paid according to the Schedule of Payments included in the Contract.</p>
<p>Sub-Clause 14.7 Payment</p>	<p>Following is added at the end of the Sub-Clause after the words “specified in the Contract”: “Or through crossed cheque in Favor of the Contractor or JV partners. The Payment to JV partners may be made at the</p>

	request of the Joint Ventures in the ratio of their shares specified by them.”
Sub-Clause 14.8 Delayed Payment	In the third line of first paragraph, the words “compounded monthly” are deleted. The text of second paragraph is replaced with the following: “The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data.”
Sub-Clause 15.1 Notice to Correct	“and” is deleted from (b) and “.” is replaced by: “; and” in (c). The following is then added as (d) “(d) specify the time within which the Contractor shall respond to the Notice to Correct.” In the third para, “shall immediately respond” is replaced with: “shall respond within the time specified in (d)”. Further, in the third para., “to comply with the time specified in the Notice to Correct.” is replaced with: “to comply with the time specified in (c).”
Sub-Clause 15.2 Termination for Contractor’s Default	<u>15.2.1 Notice</u> Sub-paragraph (h), following is added after the words “corrupt, fraudulent, collusive or coercive practice”: “as defined in Gilgit Baltistan Public Procurement Rules, 2022”
Sub-Clause 15.4 Payment after Termination for Contractor’s Default	The following text is added at the end of this Sub-Clause: “The Employer shall be entitled to sell any of the Contractor’s Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors.”
The following Sub-Clauses 17.7 is added after Sub-Clause 17.6	
Sub-Clause 17.7 Use of Employer’s Accommodation/Facilities	“The Contractor shall take full responsibility for the care of the items of the Employer’s facilities and/or accommodation, if any, as detailed in the Employer’s Requirements, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer. If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor’s risk and cost.”

<p>Sub-Clause 18.1 Exceptional Events</p>	<p>The words “or disorder” are replaced with “, disorder or sabotage” in sub-paragraph (c).</p>
<p>Sub-Clause 19.1 General Requirements</p>	<p>Following text is added at the end of first paragraph: “The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer’s consent.”</p> <p>Following text is added at the end of third paragraph: “The Contractor shall, within the respective periods stated in the Contract Data submit to the Employer Representative a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5.”</p>
<p>The following Sub-Clause 19.2.7 is added after Sub-Clause 19.2.6:</p>	
<p>Sub-Clause 19.2.7 Insurance Company</p>	<p>“The Contractor shall be obliged to place all insurances described in this Clause with any reputable/reliable insurers, acceptable to the Employer, rated by PACRA/VIS of minimum rating AA.</p>
<p>Sub-Clause 20.1 Claims</p>	<p>In sub-paragraph a), and b) the words “any additional payment” are replaced with “payment”.</p>
<p>Sub-Clause 21.6 Arbitration</p>	<p>The word “international” is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following: “The Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;”</p>
<p>The Following new Clauses 23, 24, 25 and 26 are added.</p>	
<p>Clause 23 Integrity Pact</p>	<p>If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to:</p> <ul style="list-style-type: none"> (a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder’s fee or kickback given by the Contractor or any of his Subcontractors, agent or servants; (b) terminate the Contract; and (c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other

	<p>corrupt business practices of the Contractor or any of his Subcontractors, agent or servants.</p> <p>The termination under sub-paragraph (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub-paragraph (a) and (c) of this Sub-Clause.</p>
<p>Clause 24</p> <p>Operation and Maintenance Obligations</p>	<p><u>24.1 General Requirements</u></p> <p>The Contractor shall perform the Operation and Maintenance (“O&M”) obligations in accordance with the Employer’s Requirements (Section V), the Contract, and any revisions agreed in writing between the Parties. The Contractor shall also comply with the approved Operation and Maintenance Manuals. No material modification to O&M methods or arrangements shall be made without the prior written consent of the Employer’s Representative.</p> <p>During the O&M period, the Contractor shall ensure that the Works remain fit for their intended purpose and shall carry out all preventive, corrective, and routine maintenance necessary to achieve this. The Contractor shall deploy adequately qualified and experienced operations and maintenance personnel. The names, qualifications, and experience of such personnel shall be submitted for the Employer’s Representative’s approval prior to engagement.</p> <p><u>24.2 Commencement and Period of Operation and Maintenance</u></p> <p>(a) The O&M obligations shall commence from the date stated in the Taking-Over Certificate issued under Clause 10 [Taking Over of the Works and Sections] of the Conditions of Contract in parallel with the DNP. For this purpose:</p> <ul style="list-style-type: none"> • Each District shall be considered a Section, provided that a minimum of ten (10) buildings have been taken over in that District. <p>(b) Unless otherwise stated in the Employer’s Requirements:</p> <ul style="list-style-type: none"> • O&M period shall be Thirty-Six (36) months for each District. <p>(c) The Contractor shall carry out O&M in full compliance with the Employer’s Requirements, Sub-Clause 5.6 [As-Built Records], and Sub-Clause 5.7 [Operation and Maintenance Manuals].</p>

	<p>(d) Any proposed modification to approved O&M documents shall be submitted with a written justification to the Employer’s Representative and shall not be implemented until written consent is provided. Such consent shall not relieve the Contractor from any responsibility under the Contract.</p> <p><u>24.3 Delivery of Spare Parts</u></p> <p>The Contractor shall supply and maintain on Site (or at such location as designated by the Employer) the mandatory spare parts, consumables, and tools specified in the Employer’s Requirements and Schedule A5. The Contractor shall ensure that such items are new, fit for purpose, and compliant with the Contract.</p> <p>Mandatory spare parts shall be maintained in original condition throughout the O&M period and handed over to the Employer at its completion. These mandatory spare parts are in addition to, and shall not replace, the Contractor’s obligations to rectify defects through manufacturer warranties or replace damaged equipment through insurance claims. If any mandatory spare is utilized to meet an urgent requirement, the Contractor shall immediately replenish it with an equivalent item meeting the Contract requirements.</p> <p><u>24.4 Training</u></p> <p>The Contractor shall conduct training of the Employer’s personnel in accordance with the programme, scope, and schedule specified in the Employer’s Requirements. The Contractor shall provide suitably qualified training staff, all training materials, and practical on-site sessions to enable the Employer’s personnel to operate and maintain the Works after the expiry of the O&M period.</p>
<p>Clause 25</p> <p>Contractor’s Obligations Regarding Performance Guarantees</p>	<p><u>25.1 Performance Guarantees</u></p> <p>The Contractor shall achieve the Performance Guarantees specified in the Schedule C [Schedule of Performance Guarantees] upon completion of the Tests on Completion of the Works.</p> <p>During the O&M Period, the Contractor shall operate and maintain the Works in accordance with the Employer’s Requirements and shall ensure that the Works meet or exceed the operational performance benchmarks stated in Schedule C.</p> <p><u>25.2 Failure to Achieve Performance Guarantees</u></p> <p>Failure by the Contractor to achieve any of the Performance Guarantees, either during the Tests on Completion or during</p>

	<p>the O&M Period, shall entitle the Employer to recover Performance Damages in the amounts and manner set out in Schedule C, without the need to prove actual loss.</p> <p>The application of Performance Damages shall be without prejudice to the Employer’s other rights under the Contract, except that the Employer’s entitlement to compensation for such failure shall be limited to the amounts expressly stated in Schedule C.</p>
<p>Clause 26 Incentives for Early Completion</p>	<p>If the Contractor achieves completion of the Works prior to the Time for Completion stated in the Contract Data, the Contractor shall be entitled to an early completion bonus.</p> <p>The amount of the bonus shall be calculated at 0.085% of the EPC Price (as stated in the Schedule of Rates and Prices) for each calendar day of early completion, subject to a maximum aggregate cap of 5% (five percent) of the EPC Price.</p> <p>The following conditions shall apply to the payment of the bonus under this Clause:</p> <ul style="list-style-type: none"> (a) For the purpose of determining early completion, the Time for Completion stated in the Contract Data shall be considered fixed and shall not be adjusted due to any extension of time granted under the Contract. (b) If the Contractor fails to achieve Taking-Over of all Sections within the Time for Completion, no early completion bonus shall be payable, regardless of whether one or more Sections were completed ahead of time.

SECTION VII - CONTRACT FORMS AND SCHEDULES

1. Form of Letter of Acceptance
2. Form of Contract Agreement
3. Form of Performance Security (Bank Guarantee)
4. Form of Mobilization Advance Bank Guarantee
5. Form of Code of Conduct for Contractor's Personnel (ES) Form
6. Form of Integrity Pact
7. Schedule-A: Schedule of Rates and Prices
8. Schedule-B: Schedule of Payments
9. Schedule-C: Schedule of Performance Guarantees

Form of Letter of Acceptance

[Letterhead paper of the Employer]

Ref:

[Date]

NAME OF CONTRACT: _____

CONTRACT NUMBER: _____

To: [name and address of the Contractor]

Letter of Acceptance

This is to notify you that your Bid dated [date] for execution of the [name of the Contract and identification number, as given in the Contract Data] for the Contract Price [amount in numbers and words] [name of currency], which amount includes the Provisional Sums of [amount in numbers and words] [name of currency], as corrected and modified in accordance with the Instructions to Bidders, is hereby accepted by [Name of the Employer].

You are hereby required to furnish the Performance Security in the form and the amount in accordance with ITB 45.1 within a period of fourteen (14) days after the receipt of Letter of Acceptance.

You shall depute your authorized representative with Power of Attorney to sign the Contract Agreement in the office of the undersigned within seven (07) days from the date of furnishing of acceptable Performance Security in accordance with ITB 45.1.

Please acknowledge receipt and confirm your acceptance of this Letter of Acceptance being sent in duplicate, by affixing your signature and stamp at the space provided below and return one copy thereof as soon as possible but not later than three (3) days from the date of receipt of this Letter of Acceptance.

We acknowledge that this Letter of Acceptance creates a binding Contract between us, and we undertake to fulfil all our obligations and duties in accordance with the terms of this Contract.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of the Employer: _____

Received and Accepted:

For and on behalf of

(the Contractor)

Signature: _____

Name: _____

Designation: _____

Stamp: _____

Date: _____

Form of Contract Agreement

THIS CONTRACT AGREEMENT (herein after called the “Agreement”) is made the _____ day of _____, _____, between _____ of _____ (hereinafter “the Employer”), of the one part, and _____ of _____ (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works, viz., _____ should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of such Works on EPC/Turnkey basis, remedying of any defects therein and performing the operation and maintenance works and services, for the total Contract Price of _____ [currency and amounts in figures] _____ [currency and amounts in words], comprising the following components:

- a. the EPC Price of _____ [currency and amounts in figures] _____ [currency and amounts in words];
- b. the O&M Price of _____ [currency and amounts in figures] _____ [currency and amounts in words];
- c. the Provisional Sums of _____ in _____ [currency and amounts in words].

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:
 - (a) the Contract Agreement;
 - (b) the Letter of Acceptance;
 - (c) the Letters of Technical and Financial Bids;
 - (d) the Particular Conditions Part A - Contract Data;
 - (e) the Particular Conditions Part B - Special Provisions;
 - (f) the General Conditions (GC)
 - (g) the Employer’s Requirements;
 - (h) the Schedule of Rates and Prices;
 - (i) the completed Schedules other than the Schedule of Rates and Prices;
 - (j) the Bid;
 - (k) the JV Agreement (if the Contractor is a JV);
 - (l) Code of Conduct for Contractor’s Personnel;
 - (m) any other document forming part of the Contract.

The addenda/corrigenda, if any, (excluding part relating to Instructions to Bidders along with Bid Data Sheet) shall be deemed to have been incorporated at the appropriate places in the “Documents forming the Contract”.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and to remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the Parties hereto have caused this Agreement to be on the day, month and year first before written in accordance with their respective laws.

Signature of Contactor

Signature of Employer

(Seal)

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness

Witness

(Name, Title and Address)

(Name, Title and Address)

**Form of Performance Security
(Bank Guarantee)**

Guarantee No. _____

Executed on _____

Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor with address: _____

Name of Contractor with address: _____

Guaranteed Amount (express in words and figures) _____

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Request for Bid including Contract Agreement, GCC, PCC and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Contractor we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the Guaranteed Amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Contractor has accepted the Employer's above said Letter of Acceptance for _____ (Name of Contract) for the _____ (Name of Project).

NOW THEREFORE, if the Contractor shall well and truly perform and fulfil all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfil all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 11, Defects After Taking Over, of Conditions of Contract and Clause 24, Operation and Maintenance Obligations are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____ (the Guarantor), waiving all objections and defense under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Contractor has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall decide whether the Contractor has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above

upon first written demand from the Employer forthwith and without any reference to the Contractor or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Guarantor

(Scheduled Bank in Pakistan / Gilgit)

WITNESS:

1. _____

Corporate Secretary (Seal)

Signature _____
Name _____
Title _____
Corporate Guarantor (Seal)

2. _____

Name, Title & Address

Form of Mobilization Advance Bank Guarantee

Guarantee No. _____ Date _____

WHEREAS _____ (hereinafter called the 'Employer')

has entered into a Contract for _____

(Particulars of Contract)

with _____ (hereinafter called the "Contractor").

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of _____ (_____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____ (hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above-mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____ whichever is earlier.

(Date)

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of _____ (_____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above-mentioned date, the advance payment is not fully adjusted.

Guarantor
(Scheduled Bank)

WITNESS:

Signature _____

1. _____

Name _____

Corporate Secretary (Seal)

Title _____

2. _____

Corporate Guarantor (Seal)

Name, Title & Address

Form of Code of Conduct for Contractor's Personnel (ES) Form

[Note to the Bidder: The minimum content of the Code of Conduct form as set out by the Employer shall not be substantially modified. However, the Bidder may add requirements as appropriate, including to take into account Contract-specific issues/risks.]

Code of Conduct for Contractor's Personnel

We are the Contractor, [enter name of Contractor]. We have signed a contract with Water and Power Department, Gilgit Baltistan, Pakistan for _____ [enter description of the Works]. These Works will be carried out at _____ [enter the Site and other locations where the Works will be carried out]. Our contract requires us to implement measures to address environmental and social risks related to the Works.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, labourers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "**Contractor's Personnel**" and are subject to this Code of Conduct.

This Code of Conduct identifies the behaviour that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behaviour will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

Required Conduct

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
 - a. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
 - b. wearing required personal protective equipment;
 - c. using appropriate measures relating to chemical, physical and biological substances and agents; and
 - d. following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;

6. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract
7. report violations of this Code of Conduct; and
8. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

Raising Concerns

If any person observes behaviour that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [enter name of the Contractor's Social Expert with relevant experience] in writing at this address [_____] or by telephone at [_____] or in person at [_____]; or
2. Call [_____] to reach the Contractor's hotline (if any) and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behaviour prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

Consequences of Violating the Code of Conduct

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor's contact person(s) with relevant experience] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

Form of Integrity Pact

[To be filled and signed by the Bidder]

Contract No. _____

Dated _____

Contract Value: _____

Contract Title: _____

_____ (Name of Bidder) 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 Bidder) 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 Bidder) 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 Bidder) 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 Bidder] 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 times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Bidder] 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 Employer:

Name of Bidder:

Signature:

Signature:

[Seal]

[Seal]

Schedule-B

Schedule of Payments

1. This Schedule of Payment shall be read in conjunction with the Schedule of Prices, the Conditions of Contract, and the Employer's Requirements.
2. Separate Schedules of Payment shall apply to the following phases of the Contract:

a) EPC Works – Rooftop Solar (per District)

Payments shall be made as percentages of the EPC Price of each District (RS-01, RS-02 ... RS-04), as defined in the Schedule A1 and Schedule B1. Percentages shall be applied to the lump-sum EPC Price of each District, irrespective of the number of individual buildings in that District. While Taking-Over Certificates may be issued progressively in accordance with Sub-Clause 10.1 [Taking Over of the Works and Sections] of the Particular Conditions, payments shall remain linked to the achievement of District-wise milestones as set out in this Schedule.

b) Operation and Maintenance (O&M) – Rooftop Solar (per District):

Payments shall be made in respect of the O&M Price quoted for each District, as set out in the Schedule A2 and Schedule B2.

3. The milestone percentages in this Schedule shall aggregate to one hundred percent (100%) of the respective EPC or O&M Price for each Section of Rooftop District, exclusive of the Advance Payment, which shall be recovered in accordance with Sub-Clause 14.2 [Advance Payment]. All milestone payments shall be subject to deductions for Advance Recovery and Retention.
4. An Advance Payment equivalent to twenty percent (20%) of the EPC Price shall be made. It shall be released against submission of an Advance Payment Guarantee in accordance with Sub-Clause 14.2 and shall be recovered from milestone payments as provided therein.
5. Retention Money shall be deducted at the rate as specified in Sub-Clause 14.3, from each gross milestone payment. Retention shall be released in the manner as specified in Sub-Clause 14.9 of the Particular Conditions of the Contract.
6. Payments under each milestone shall only become due following certification by the Employer's Representative confirming that the corresponding milestone has been achieved and shall be subject to the fulfilment of all stated prerequisites and conditions.

B1: EPC Works - Roof Top Solar (per District)

Milestone No.	Milestone Description	Payment (% of EPC Price for that District)	Pre-requisites / Conditions
1	Completion of Site Surveys and Approval of Design (cumulative for district)	10%	Reports and design package approved by Employer's Representative.
2	Delivery of PV, Inverter and BESS Equipment ($\geq 70\%$ of cumulative district capacity delivered at site or Employer's designated store after FAT)	50%	Equipment inspected, delivery certificates countersigned by the Employer's Representative
3	Completion of Mechanical/Electrical Installation ($\geq 70\%$ cumulative PV capacity installed across district buildings)	10%	Site inspection and certification.
4	TOCs issued for at least 50% of the total PV System Rating for the District.	15%	For each building included: all tests passed, associated civil/structural works finished, Employer's Representative issues TOC.
5	TOCs issued for 100% of the buildings in the District.	15%	For each building included: all tests passed, associated civil/structural works finished, Employer's Representative issues TOC.
	Total excluding Advance Payment	100%	

B2: Operation and Maintenance – Rooftop Solar (per District)

- The O&M Price for each District shall be paid in **Six equal bi-annual instalments** over the 36-month O&M period.
- The first instalment shall become due upon completion of six months of O&M of at least 50% of the buildings in the district, reckoned from the date of issuance of the last Taking-Over Certificate in that District.
- The second instalment shall become due upon completion of twelve months of O&M of 50% buildings in the district and so on. (two invoices for 50% and two invoice for next 50% means four invoices per years and twelve invoices for 03 years till completion of O&M.)
- Each instalment shall be subject to certification by the Employer's Representative confirming satisfactory O&M performance for the relevant period.

Schedule-C

Schedule of Performance Guarantees

1. General

- 1.1 This Schedule shall be read in conjunction with the Conditions of Contract, the Employer’s Requirements, and the Schedules of Prices and Payments.
- 1.2 The Contractor guarantees that the Works shall achieve the performance levels defined herein.
- 1.3 Failure to achieve the guaranteed performance levels shall subject the Contractor to the Performance Damages in accordance with this Schedule, without prejudice to the Employer’s other rights under the Contract.
- 1.4 The aggregate liability for the Performance Damages under this Schedule shall not exceed ten percent (10%) of the Contract Price, unless otherwise stated in the Particular Conditions.

2. EPC Works – Rooftop Solar

2.1 Guaranteed Performance Parameters:

- (a) For PV systems the Contractor guarantees that the **Actual PV Output (kW)** shall not be less than the **Ideal PV Output (kW)**.
- (b) The installed nameplate capacity shall match the approved capacity.
- (c) The outputs shall be assessed as follows:

$$\text{Actual PV Output} = \sum_{k=1}^n \text{Measured Voltage of string } k \times \text{Measured Current of string } k$$

$$\text{Ideal PV Output} = \sum_{k=1}^n \text{Adjusted Voltage of string } k \times \text{Adjusted Current of string } k$$

Where n = total nos. of strings on a site

2.2 Performance Damages for EPC Works of Rooftop Solar:

If the Actual PV Output is more than **10% lower** than the Ideal PV Output, the Contractor shall provide additional installed capacity equal to:

$$\text{Additional Capacity} = \frac{(\text{Ideal PV Output} - \text{Actual PV Output})}{\text{Ideal PV Output}} \times 2$$

The Contractor shall install the shortfall capacity at the same building. If sufficient space is not available, the shortfall shall be installed at another rooftop within the same district, at the Contractor’s cost.

The Contractor shall rectify the shortfall within **30 days**. If rectification is not achieved within this period, then the Contractor shall pay Performance Damages (PD) equal to:

$$\text{PD} = \frac{(\text{Ideal PV Output} - \text{Actual PV Output})}{\text{Ideal PV Output}} \times \frac{(\text{EPC Price of Rooftop Solar in the relevant District}) \times (\text{kWp rating of Building})}{\text{Total kWp in that District}} \times 1.5$$

3. O&M Works and Services – Rooftop Solar

3.1 Guaranteed Performance Parameters:

For rooftop solar systems the Contractor guarantees that installed systems shall maintain performance levels consistent with the approved EPC benchmarks and that no installed capacity shall be out of service for more than the permissible downtime defined in the Employer’s Requirements Section V.

3.2 Performance Damages for O&M Works and Services of Rooftop Solar:

During the contractual year of the O&M phase, the onsite Measured Annual Outage (MAO) shall be

$$\text{MAO (kWh)} = \sum_{k=1}^n \text{Duration of Outage of String } k \text{ in no. of days} \times 3.5 \times \text{STC Rating of Outaged String } k$$

Where n = total nos. of outaged strings on a site

Whereas Measured Annual Outage Permissible Limit (MAOPL) shall be

$$\text{MAOPL (kWh)} = 3.5 \times 18.25 \times \text{STC Rating of Installed PV Modules}$$

In case of measured annual outage > measured annual outaged permissible limit, the Contractor shall pay Performance Damages (PD) equal to:

$$\text{PD} = (\text{MAO} - \text{MAOPL}) \times \text{Rs. } 50/\text{kWh}$$



WATER AND POWER DEPARTMENT, GILGIT
BALTISTAN



9.11 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT-I)

**BIDDING DOCUMENTS
ON EPC/TURNKEY BASIS
(SINGLE STAGE TWO ENVELOPE)**

**VOLUME – II
EMPLOYER'S REQUIREMENTS**



November 2025



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9.11 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN LOT-I

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LIST OF ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current
ACB	Air Circuit Breaker
AFCI	Arc-Fault Circuit Interrupter
AMI	Advanced Metering Infrastructure
ASTM	American Society for Testing and Materials
BOQ	Bill of Quantities
BESS	Battery Energy Storage System
BMS	Battery Management System
BS	British Standard
DC	Direct Current
DHO	District Health Officer
DMS	Document Management System
DNP	Defects Notification Period
DoD	Depth of Discharge
ECC / CPC	Earth Continuity Conductor / Circuit Protective Conductor
EES	Electrical Energy Storage
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement & Construction
ER	Employer's Requirements
FAT	Factory Acceptance Test(s)
GB	Gilgit-Baltistan
GFDI	Ground-Fault Detection Interruption
GI	Galvanized Iron
HMI	Human-Machine Interface
HRC	High Rupturing Capacity
HSE	Health, Safety & Environment
I&T	Inspection & Testing
IBC	International Building Code
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEE	Initial Environmental Examination
IP	Ingress Protection
ITP	Inspection & Test Plan
KPI	Key Performance Indicator
LAA	Land Acquisition Act
LFP / LPF	Lithium Iron Phosphate
LID	Light-Induced Degradation
LV	Low Voltage
MCCB	Moulded Case Circuit Breaker
MCB	Miniature Circuit Breaker
MPPT	Maximum Power Point Tracking
MPR	Monthly Progress Report
MV	Medium Voltage
NADRA	National Database & Registration Authority
NEC	National Electrical Code

NEQS	National Environmental Quality Standards
O&M	Operation & Maintenance
OHS	Occupational Health & Safety
OEM	Original Equipment Manufacturer
PCAP	Pakistan Clean Air Program
PEPCO	Pakistan Electric Power Company
PID	Potential-Induced Degradation
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PR	Performance Ratio
PT (VT)	Potential (Voltage) Transformer
PV	Photovoltaic
RCC	Reinforced Cement Concrete
RF	Radio Frequency
RMS	Remote Monitoring System
SCADA	Supervisory Control and Data Acquisition
SIL	Safety Integrity Level
SOC	State of Charge
SOH	State of Health
SPD	Surge Protective Device
STC	Standard Test Conditions
TCP/IP	Transmission Control Protocol / Internet Protocol
TOPCon	Tunnel Oxide Passivated Contact
UL	Underwriters Laboratories
UV	Ultraviolet
VCB	Vacuum Circuit Breaker
XLPE	Cross-Linked Polyethylene
XLPO	Cross-Linked Polyolefin
CGI	Corrugated Galvanized Iron
HDPE	High-Density Polyethylene
PVC / UPVC	(Unplasticized) Polyvinyl Chloride
SWG	Standard Wire Gauge
DHQ	District Headquarters Hospital
FG/GPS/BHS/GHS/GMS/BPS	Federal/Government Primary/High/Model/ Boys'/Girls' Schools
KIU	Karakoram International University
LG&RD	Local Government & Rural Development
MI	Military Intelligence
NAB	National Accountability Bureau
PHE	Public Health Engineering
SE	Superintending Engineer
SP	Superintendent of Police
XEN	Executive Engineer

SECTION – I: SCOPE OF WORKS

1. INTRODUCTION

The Government of Gilgit-Baltistan (GB) is implementing a renewable energy initiative involving the installation of Rooftop Solarization with a cumulative capacity of 9.11 MWp across four districts: Gilgit, Hunza, Nagar and Ghizar.

The Project comprises:

- Rooftop Solar PV Systems on selected public-sector buildings across all four districts.

The Project also includes associated Battery Energy Storage Systems (BESS) and all related civil, electrical, and mechanical works required for a complete, operational, and grid-integrated system.

The Contractor shall deliver the Works on an EPC / Turnkey basis, including three (03) year Defects Notification Period (DNP) as well as carry out the post-commissioning Operation & Maintenance (O&M).

These Employer’s Requirements (ER) form an integral part of the Contract and shall be read in conjunction with the Conditions of Contract (CoC), the Schedule of Prices, and all other documents forming the Contract.

The purpose of these Employer’s Requirements is to define the scope, standards, and performance expectations of the Works, while allowing the Contractor flexibility in detailed design and execution, provided that the Contractor complies with the requirements set out herein.

The Contractor shall be fully responsible for the engineering, procurement, manufacturing, supply, construction, installation, testing, and commissioning of all equipment and systems to deliver a fully operational facility that meets the performance requirements of the Employer.

The Employer’s Requirements are organized in the following parts:

Section I – Introduction and Scope of Works

Section II – General Project Requirements

Section III – DC Systems

Section IV – AC Systems

Section V – Civil & Structure Works

Section VI – Operation and Maintenance Requirements

Annexure I – Drawings

This Section I provides overall description of the Project and also stipulate general and specific scope of the Works.

2. GENERAL SCOPE OF WORKS

The Contractor shall be responsible for the design, engineering, procurement, construction, installation, testing, commissioning, training, and handover of the complete Works. The scope shall include, but not be limited to, the following:

2.1 Site Preparation and Development

- Clearing, grading, compaction, slope stability, and drainage of project areas.
- Site leveling and stabilization to suit foundations and structures.

- Temporary construction facilities, storage yards, utilities, and construction power/water arrangements.

2.2 Civil Works

- Foundations for PV modules, inverters, and BESS units (where ever Required).
- Civil structures designed by local codes and international standards (ASTM, ACI, ISO), suitable for seismic, wind, and snow load conditions.

2.3 Solar PV and Mechanical Works

- Design, supply, and installation of PV modules, mounting structures, and auxiliaries.
- Rooftop mounting systems including ballast or non-penetrative types.
- Earthing and lightning protection.

2.4 Electrical Works

- AC systems: inverters, switchgear and protection.
- DC cabling, AC cabling, protection devices, synchronization, and control equipment.
- Modifications in existing LV systems for integration with solar plants where required.
- Rewiring for Fans, Lights and other serviceable loads as listed under Table-01.

2.5 Battery Energy Storage Systems (BESS)

- Supply, installation, testing, and commissioning of BESS integrated with PV and grid.
- BESS charge/discharge control and protection.

2.6 Centralized and De-Centralized Monitoring

- Remote monitoring system for PV and BESS.
- Centralized monitoring system at location designated by the Employer.

2.7 Testing, Commissioning, and Handover

- Factory Acceptance Tests
- Material Delivery Verification
- Submission of commissioning reports for Employer’s review under Sub-Clause 5.2 of CoC.
- Delivery of as-built drawings, O&M manuals, test certificates, spare parts, and warranties.

2.8 Operation & Maintenance (O&M)

- Three (03) years of O&M services post-commissioning, including preventive and corrective maintenance, system monitoring, and reporting for Rooftop Solar.
- Training of Employer’s personnel: detailed technical training before completion of O&M, covering PV operations, troubleshooting, preventive maintenance, and reporting.
- Provision of all O&M tools, consumables, and software necessary for smooth operation.

2.9 Compliance and Standards

- All works and equipment shall comply with IEC, IEEE, ISO, NEC, ASTM, and Pakistan Grid Code requirements.

- Implementation Health, and Safety Management Plan during construction and commissioning.
- Health, and safety protection including fire systems.

2.10 Permits and Approvals

- The Contractor shall obtain all necessary approvals, inspections, and permits from authorities, in coordination with the Employer.

3. SPECIFIC SCOPE OF WORKS

The following briefly provides an overview of specific Works involved in the Project. This Scope of Works shall be read together with the Technical Specifications, Drawings, and Schedule of Prices. In case of conflict or omission, the more stringent or technically superior requirement shall apply. No part of the Works shall be excluded on the grounds that it is not expressly mentioned in this Scope if it is included in the Technical Specifications and Drawings or is necessary for safe and reliable operation of the Project.

3.1 Rooftop Solar PV

The details of rooftop installations are provided in **Table 1 – Rooftop Solar PV Installations**, including building names, PV and BESS capacities, and specific requirements, if any.

The Contractor shall be responsible for the design, supply, installation, and commissioning of hybrid rooftop solar PV systems with dedicated Hybrid Inverter and battery backup on selected government and public sector buildings, including but not limited to hospitals, schools, and administrative facilities as defined in technical specifications.

The works shall include structural surveys, supply and installation of PV modules, battery storage, charge controllers, inverters, mounting frames, cabling, protection devices, and energy management systems, all in compliance with IEC and IEE standards. In case Genset is available at Site, the system shall synchronize with the same.

Systems shall be designed for safe, reliable, and autonomous operation, with appropriate protection against overcharge, deep discharge, and islanding, supported by centralized and remote monitoring capabilities. The Contractor shall provide complete as-built documentation, user manuals, training for building staff, and post-commissioning services including defect liability and preventive maintenance to ensure sustainable long-term operation.

Table 1 – Rooftop Solar

RS-01: District Gilgit 78 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.900870, 74.370738	Gilgit	Psychiatry Hospital (Male)	42	51	35	Roof Mounted	10	149	6"	0	-
2	35.900870, 74.370738	Gilgit	Psychiatry Hospital (Female)	42	51	35	Roof Mounted	10	149	6"	0	-
3	35.8934515, 74.36895314	Gilgit	NATCO Head Office	40	48	10	Roof Mounted	10	190	6"	0	-
4	442740.18E; 3972383.9N	Gilgit	Board of Elementary Examination GB	15	18	8	Roof Mounted	10	180	6"	0	-
5	443080.94E; 3972438.8N	Gilgit	Forest Complex Jatial	45	54	23	Parking Shed & Roof Mounted CGI Sheet	5 & 0	178, 264	10' & 4"	0	-
6	44316.48E; 3972913.8 N	Gilgit	General Bus Stand NATCO	8	10	5	Roof Mounted	10	168	6"	0	-
7	442679.439E; 3972998.8 N	Gilgit	Commissioner Office Jatial	40	48	21	Roof Mounted	10	176	6"	0	-
8	442683.38E; 3972957.96N	Gilgit	Excise & taxation Complex	70	84	40	Parking Shed	5	180,89	10'	0	-
9	44.2635.83E; 3972956.43 N	Gilgit	MI office	45	54	20	Roof Mounted	10	174	6"	0	-

¹ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

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				(kW _{DC})	(kVA)	(kWh)						
10	35.9060604, 74.3598528	Gilgit	Gilgit Cardiac Hospital	350	420	350	Roof Mounted	10	131	6"	0	-
11	35.840365, 74.740692	Gilgit	Sassi Civil Hospital	25	30	20	Roof Mounted	10	208	6"	0	-
12	35.894568, 74.435162	Gilgit	30 bed Civil Hospital Mahmoudabad	70	84	40	Ground Mounted	15	180	6"	0	-
13	35.685937, 74.631050	Gilgit	50 bed Hospital Jag lot Sai	70	84	60	Roof Mounted & Roof Elevated	10 & 5	170, 180, 212	6" & 6'	1	18.6
14	35.680754, 74.625328	Gilgit	AC office Jag lot Sai	15	18	8	Roof Mounted	10	172	6"	1	5.1
15	35.916618, 74.342163	Gilgit	ISI HQ Sonikot Gilgit	100	120	55	Roof Mounted CGI Sheet	0	180	4"	0	-
16	35.880597, 74.409431	Gilgit	Boys Degree College Munawar	185	222	50	Roof Mounted & Roof Elevated & Parking Shed	10 & 5 & 5	151, 122	6" & 6' & 10'	1	21.8
17	442682.73 E, 3972912.114 N	Gilgit	LG&RD complex Jatial	88	106	44	Roof Mounted	10	188	6"	0	-
18	442245.8E, 3972495.5N	Gilgit	Director of Teaching staff Diamer	15	18	10	Roof Mounted	10	199	6"	0	-
19	436639.221E, 3976043.261N	Gilgit	XEN W&P Konodas	23	28	23	Roof Mounted	10	100, 280	6"	1	14.7
20	436707.781E, 3976071.319N	Gilgit	XEN PHE Division Gilgit Konodas	8	9	5	Roof Mounted	10	180	6"	0	-

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				(kW _{DC})	(kVA)	(kWh)						
21	436648.64E, 3976040.474N	Gilgit	XEN Building C&W Gilgit	32	39	18	Roof Mounted & Roof Elevated	10 & 5	180	6" & 6'	0	-
22	436745.819E, 3976047.73N	Gilgit	XEN B&R Konodas Gilgit	40	48	23	Roof Mounted	10	184	6"	1	14.4
23	442742.0E, 3975104.06N	Gilgit	Water & Power Complex Secretary Office Gilgit	70	84	50	Roof Mounted & Roof Elevated	10 & 5	205	6" & 6'	1	33.1
24	442795.85E, 3975084.3N	Gilgit	Water & Power Complex Chief Engr Office Gilgit	70	84	40	Roof Elevated	5	205	6'	1	26.3
25	437287.1E, 3975508.7N	Gilgit	Sub Station Khazana Road & Billing Gilgit	23	28	15	Roof Mounted	10	203	6"	1	10.2
26	35.9242959, 74.3634718	Gilgit	Special Education Office	100	120	60	Roof Mounted & Roof Elevated	10 & 5	170	6" & 6'	0	-
27	437517.5E, 3975715.1N	Gilgit	Markazi Jamia Masjid Ahlesunnat Gilgit	80	96	50	Roof Elevated	5	177	6'	0	-
28	437210.03E, 3975648.3	Gilgit	Markazi Imamia Jamia Masjid Shaheed Syed Zia ud Deen Rizvi Punial Road Gilgit	80	96	50	Roof Elevated	5	160	6'	0	-
29	437705.8E, 3975530N	Gilgit	Ismaili Central Jamat Khana Gilgit	80	96	50	Roof Elevated	5	220,130	6'	0	-
30	437274.65E, 3975366.6N	Gilgit	C&W Complex Secretariat Office Khazana Road Gilgit	35	42	20	Roof Elevated	5	180	6'	0	-
31	437208.5E, 3975602.1N	Gilgit	District Council Office Punial Road Gilgit	10	12	6	Roof Mounted	10	210	6"	0	-

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				(kW _{DC})	(kVA)	(kWh)						
32	43284.548E, 3975671.93N	Gilgit	Baldia Office Central Gilgit Near Shahi Polo Ground	10	12	6	Roof Mounted	10	172	6"	0	-
33	437544.08E, 3976092.21N	Gilgit	Konodas Shaheed Mustaqeem 11kV Substation	10	12	10	Roof Mounted	10	180	6"	0	-
34	436544.012E, 3976111.864N	Gilgit	Jamia Masjid Sofia Noor Bakhshia Konodas Gilgit	17	21	15	Roof Mounted	10	180	6"	0	-
35	436637.865E, 3976142.869N	Gilgit	Deputy Director Education Konodas Gilgit	25	30	14	Roof Mounted	10	185	6"	0	-
36	35.9262358, 74.3097800	Gilgit	Police Line Safe City Konodas	70	84	65	Roof Mounted	10	185	6"	0	-
37	35.922565, 74.309723	Gilgit	Revenue Office Complex Gilgit	28	34	7	Roof Mounted	10	192	6"	1	1.5
38	35.9229229, 74.3093636	Gilgit	Rescue 1122 Office Gari bagh	14	17	10	Roof Mounted	10	194	6"	1	6.4
39	35.922680, 74.310204	Gilgit	Regional Directorate Education Gilgit	40	48	15	Roof Mounted	10	193	6"	0	-
40	35.90937291, 74.35323916	Gilgit	Radio Pakistan Gilgit	70	84	39	Roof Mounted & Parking Shed	10 & 5	198	6" & 10'	0	-
41	3591931828, 74.37909465	Gilgit	Radio Pakistan Denyor	40	49	20	Roof Mounted	10	169	6"	0	-
42	35.9582560, 74.3538852	Gilgit	RUTH PUAF Govt. College	23	28	9	Roof Mounted	10	133	6"	0	-
43	35.90324991, 74.35566656	Gilgit	PTV RBS Gilgit	34	41	30	Parking Shed & Roof Mounted	5 & 0	205	10' & 4"	0	-

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				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
44	35.9203158, 74.3320675	Gilgit	Police Station and Investigation Wing Kash rote	40	48	30	Roof Elevated & Parking Shed	5 & 5	200	6' & 10'	1	19.7
45	35.9252079, 74.3634728	Gilgit	NAB Building	100	120	30	Ground Mounted	15	150, 136	6"	0	-
46	443411.92E, 3972882.70N	Gilgit	NAB Courts Gilgit	35	42	18	Roof Mounted	10	170	6"	1	12.3
47	35.9225957, 74.3618497	Gilgit	KIU Police Station	6	8	12	Roof Mounted	10	180	6"	0	-
48	35.918050, 74.301055	Gilgit	KIU (Karakoram International University)	650	780	300	Roof Mounted	10	180	6"	0	-
49	442049.35E, 3973913N	Gilgit	Jatial Substation	6	8	5	Roof Mounted	10	218	6"	1	3.3
50	35.9264315, 74.3130751	Gilgit	Judicial Court Complex	127	153	80	Roof Mounted & Roof Elevated	10 & 5	172	6" & 6'	1	33.2
51	35.9338949, 74.2314518	Gilgit	Govt. Inter College Basin	30	36	10	Roof Mounted	10	212	6"	0	-
52	35.91340, 74.32270	Gilgit	Imam Bargah Kalan Nagral	20	24	10	Roof Mounted	10	191	6"	0	-
53	35.923481, 74.310707	Gilgit	IB Office Gari bagh	20	24	10	Roof Mounted	10	191	6"	1	6.5

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				(kW _{DC})	(kVA)	(kWh)						
54	44258.66E, 3973034.35N	Gilgit	GB Secretariat Jatial Gilgit	400	480	150	Roof Mounted & Roof Elevated	10 & 5	147, 241	6" & 6'	0	-
55	442706.655E, 3973298.33N	Gilgit	GB Assembly Gilgit	250	300	100	Roof Elevated & Parking Shed	5 & 5	136, 175, 218	6' & 10'	0	-
56	442016.33E, 3973900N	Gilgit	Food Directorate Gilgit	80	96	25	Roof Mounted	10	218	6"	0	-
57	44830.118E, 3973287.69N	Gilgit	Election Commission Gilgit	100	120	40	Roof Mounted & Roof Elevated	10 & 5	151	6" & 6'	1	22.2
58	442641E, 3972730N	Gilgit	Drug Directorate Gilgit	30	36	10	Roof Mounted	10	180	6"	1	6.4
59	35.9262711, 74.3102152	Gilgit	DPO Police Office Kanodas	30	36	10	Roof Mounted CGI Sheet	0	180	4"	0	-
60	439787.58E, 3974339.17N	Gilgit	DC Office Gilgit	70	84	40	Roof Mounted	10	204	6"	0	-
61	442198.98E, 3973823.31N	Gilgit	College of Education Male Gilgit	35	42	8	Roof Mounted	10	180	6"	0	-
62	442154.75E, 3973839.71N	Gilgit	College of Education Female Gilgit	30	36	7	Roof Mounted	10	180	6"	0	-
63	35.9287240, 74.3784070	Gilgit	Civil Court Danyor	30	36	7	Roof Mounted	10	180	6"	1	5.0
64	35.9231711, 74.3077093	Gilgit	City Police Station	15	18	15	Roof Mounted & Roof Mounted	10 & 0	180	6" & 4"	1	8.7

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				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
65	442912.74E, 3975004.3N	Gilgit	Central Grid Station 66-33 Gilgit	60	72	40	Roof Mounted & Roof Elevated	10 & 5	205	6" & 6'	1	28.6
66	35.89397804, 74.4372855	Gilgit	Boys Degree College Mahmood Abad	60	72	25	Roof Mounted	10	197	6"	0	-
67	35.9262749, 74.3120679	Gilgit	ATA House	30	36	20	Roof Elevated	5	180	6'	0	-
68	35.9258622, 74.3628884	Gilgit	Agriculture Livestock Complex Konodas	190	228	45	Roof Mounted & Roof Elevated & Roof Mounted CGI Sheet	10 & 5 & 0	197	6" & 6' & 4"	1	28.7
69	35.9287240, 74.3784070	Gilgit	AC Office DanYore	35	42	8	Roof Mounted	10	200	6"	1	5.1
70	35.9181162, 74.3008642	Gilgit	Secretary Education	20	24	11	Ground Mounted & Roof Mounted CGI Sheet	15 & 0	227	6" & 4"	1	7.3
71	35.91836222, 74.3013492	Gilgit	P&D (Planning)	25	30	15	Roof Mounted CGI Sheet	0	211	4"	0	-

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				(kW _{DC})	(kVA)	(kWh)						
72	35.91767830, 74.3010724	Gilgit	Education Building 2	17	21	10	Roof Mounted	10	180	6"	0	-
73	35.9172259, 74.3011835	Gilgit	CMIT	35	42	20	Roof Mounted & Ground Mounted	10 & 15	180	6" & 6"	1	13.1
74	35.916421, 74.3015164	Gilgit	DHO Office	19	23	10	Roof Mounted	10	218	6"	0	-
75	35.91800910, 74.3006478	Gilgit	CS Office	32	39	10	Roof Mounted CGI Sheet	0	180	4"	1	6.1
76	35.947713323 74.3535104	Gilgit	Technical Education Complex	150	180	50	Ground Mounted	15	144	6"	1	11.4
77	35.92451458, 74.3191547	Gilgit	Govt. Degree College for Girls gilgit	90	108	70	Roof Mounted & Roof Elevated	10 & 5	193	6" & 6'	0	-
78	35.8980034, 74.3650298	Gilgit	Regional Blood Center, Jatial	65	78	20	Roof Mounted	10	191	6"	0	-

RS-02: District Hunza 61 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	36.6177553, 74.8640622	Hunza	BPS Jamala bad Sost Hunza	4	6	4	Roof Mounted	10	156	6"	1	2.74
2	36.4953540, 74.8819210	Hunza	BPS Jana bad Passu Hunza	4	6	9	Roof Mounted CGI Sheet	0	198	4"	1	6.43
3	36.6920171, 74.8209336	Hunza	Pakistan Custom, Sost, Hunza	20	27	10	Roof Mounted CGI Sheet	0	152	4"	0	-
4	36.700064, 74.819743	Hunza	Excise and Taxation Office, Sost, Hunza	16	22	13	Ground Mounted	15	186	4"	1	9.29
5	36.376709, 74.8627197	Hunza	FG High School, Ghulmat	25	34	6	Roof Mounted	10	219	6"	0	-
6	36.3887349, 74.8636018	Hunza	Govt Girls Hostel, Ghulmat, Hunza	68	92	46	Roof Mounted CGI Sheet	0	154	6"	1	30.80
7	36.6789830, 74.8225315	Hunza	GPS Khudabad, Hunza	9	13	8	Roof Mounted	10	193	4"	1	4.69
8	36.6920171, 74.8209336	Hunza	Pakistan Immigration Office, Sost, Hunza	50	68	27	Ground Mounted	15	155	6"	0	-
9	36.6828498, 74.8184650	Hunza	Dispensary, Khudabad	6	9	9	Ground Mounted	15	144	6"	0	-
10	36.6876069, 74.8178709	Hunza	MI Office, Sost, Hunza	16	22	8	Ground Mounted	15	163	6"	0	-
11	36.658987, 74.8425435	Hunza	NADRA Registration Office, Gircha, Hunza	20	27	5	Parking Shed	5	192	6"	0	-

² PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

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				(kW _{DC})	(kVA)	(kWh)						
12	36.666806, 74.8383136	Hunza	Police Station, Sost, Hunza	40	54	34	Roof Mounted	10	174	10'	0	-
13	36.6771263, 74.8316879	Hunza	RHC, Sost, Hunza	38	52	12	Roof Elevated	5	207	6"	0	-
14	36.3741329, 74.8575183	Hunza	SDPO Office, Ghulmat, Hunza	7	10	2	Roof Mounted	10	204	6'	1	1.14
15	36.6882285, 74.8204703	Hunza	Sost 33kv Grid, Hunza	15	21	14	Roof Elevated	5	148	6"	0	-
16	36.6845829, 74.8236906	Hunza	Naib Tehsil Dar Office, Sost, Hunza	11	15	6	Ground Mounted	15	153	6'	1	4.29
17	36.6882666, 74.8214352	Hunza	Waste management Office, Sost, Hunza	6	9	3	Ground Mounted	15	151	6"	1	2.14
18	36.317755, 74.640695	Hunza	BHU Hyderabad	19	27	14	Roof Elevated	5	177	6"	1	9.09
19	36.246389, 74.396944	Hunza	BMS Hussain Abad	28	39	8	Roof Mounted	10	192	6'	1	4.74
20	36.304368, 74.609242	Hunza	AGPRO Office	22	30	12	Roof Mounted & Ground Mounted	10 & 15	175	6" & 6"	0	-
21	36.309976, 74.616772	Hunza	BISP office	6	9	12	Roof Mounted	10	180	6"	0	-
22	36.312530, 74.619265	Hunza	DC Office	30	41	15	Roof Elevated	5	161	6"	0	-
23	36.309628, 74.620212	Hunza	DD Fisheries Office	8	11	3	Roof Elevated	5	163	6'	0	-
24	36.301618, 74.611362	Hunza	Deputy director LG&RD Office	32	44	7	Roof Elevated	5	226	6'	0	-
25	36.308865, 74.620926	Hunza	Distt Treasury office	28	38	10	Roof Elevated	5	146	6'	1	6.46
26	36.303956, 74.609318	Hunza	Distt Council Office	4	6	8	Roof Mounted	10	164	6'	0	-

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				(kW _{DC})	(kVA)	(kWh)						
27	36.311252, 74.612928	Hunza	Forest Department	11	15	4	Roof Elevated	5	180	6"	0	-
28	36.310870, 74.667878	Hunza	Grid Station Ganish	15	21	14	Roof Elevated	5	154	6'	0	-
29	36.313715, 74.617753	Hunza	IB Office	25	34	30	Roof Elevated	5	162	6'	0	-
30	36.312863, 74.627372	Hunza	Rescue 1122	29	40	16	Parking Shed	5	230	6'	0	-
31	36.311865, 74.616890	Hunza	Session judge office	25	34	10	Roof Mounted	10	169	10'	1	7.14
32	36.299944, 74.606095	Hunza	Special Education School	8	11	3	Roof Elevated	5	154	6"	1	1.86
33	36.300518, 74.608684	Hunza	Tehsil Office	30	41	16	Roof Elevated	5	142	6'	1	10.91
34	36.309765, 74.623007	Hunza	waste management office	16	22	8	Roof Elevated	5	131	6'	0	-
35	36.315000, 74.636944	Hunza	BPS Hyderabad, Chumar Khan	7	10	3	Roof Mounted	10	180	6'	1	1.57
36	36.264500, 74.540289	Hunza	Civil Dispensary	10	14	3	Roof Mounted CGI Sheet	0	175	6"	1	3.40
37	36.283506, 74.611922	Hunza	DD Food Murtzabad	20	27	5	Roof Elevated	5	195	4"	1	3.34
38	36.293546, 74.597194	Hunza	Divisional Office W&P	75	102	60	Roof Elevated	5	136	6'	0	-
39	36.263203, 74.524578	Hunza	Govt Girls High School Naseer Abad	6	9	2	Roof Mounted	10	165	6'	1	0.57
40	36.313249, 74.666191	Hunza	Govt High School, Ganish	55	75	15	Roof Elevated	5	205	6"	1	8.89
41	36.331361, 74.656476	Hunza	GPS Kareem Abad Ganish	6	9	4	Roof Mounted	10	217	6'	1	2.46

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				(kW _{DC})	(kVA)	(kWh)						
42	36.324110, 74.652364	Hunza	KIU Campus	100	135	70	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	159, 204	6" & 4"	0	-
43	36.311958, 74.628746	Hunza	Municipal Community Office	7	10	11	Ground Mounted	15	142	6"	0	-
44	36.310142, 74.624578	Hunza	NADRA Office Aliabad	30	41	12	Roof Elevated	5	136	6'	0	-
45	36.318280, 74.659709	Hunza	Passport Office Ganish	18	25	5	Roof Elevated	5	180	6'	0	-
46	36.311865, 74.616890	Hunza	Civil Judge Office	21	29	7	Roof Mounted	10	169	6"	0	-
47	36.315297, 74.650765	Hunza	SE Office C&W	29	40	7	Roof Elevated	5	165	6'	0	-
48	36.261444, 74.545094	Hunza	Tehsil Office Nazeera bad	8	12	3	Roof Mounted	10	158	6"	1	1.97
49	36.284697, 74.612150	Hunza	Tourism Office	19	26	5	Roof Elevated	5	180	6'	0	-
50	36.28927989, 74.6044334	Hunza	PTV Tower, Murtaza bad	16	22	6	Ground Mounted	15	143	6"	0	-
51	36.31311489, 74.62150164	Hunza	Union council Aliabad	9	12	4	Roof Mounted	10	134	6"	1	2.74
52	36.30472669, 74.61091831	Hunza	police station, Aliabad	34	46	37	Roof Elevated	5	150	6'	0	-
53	36.31127992, 74.6116033	Hunza	livestock office Aliabad	22	30	12	Roof Elevated	5	132	6'	0	-
54	36.3089567, 74.62217119	Hunza	Distt Monitoring Office Aliabad	25	34	12	Roof Elevated	5	156	6'	1	8.57
55	36.30459672, 74.61580832	Hunza	Masjid Quba Aliabad	15	21	4	Roof Elevated	5	168	6'	1	2.29

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
56	36.30690494, 74.6130899	Hunza	Jamia Masjid, Aliabad	45	61	22	Roof Elevated	5	163	6'	1	14.80
57	36.30505335, 74.61970992	Hunza	central jamaat khan Aliabad	55	75	18	Ground Mounted	15	166	6"	0	-
58	36.3876399, 74.8679521	Hunza	AC Office Ghulmat	32	44	8	Roof Elevated	5	164	6'	1	4.91
59	36.308930, 74.615683	Hunza	DHQ Aliabad, Hunza	151	204	85	Roof Elevated	5	179	6'	0	-
60	1- 36.254044,74.509145 2-36.253840, 74.508889	Hunza	Police Check Post Naseera bad	15	21	15	Roof Elevated & Parking Shed	5 & 5	214	6' & 10'	1	10.49
61	36.5753806, 74.7990736	Hunza	BMS Khyber Sost Hunza	12	17	3	Roof Mounted	10	221	6"	1	2.14

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Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	36.244444N, 74.362500E	Nagar	Police station Sikander Abad	15	19	8	Roof Elevated	5	140	6'	1	5.14
2	36.243056N, 74.362500E	Nagar	AC Office Sikander Abad	10	13	5	Roof Elevated	5	136	6'	0	-
3	36.240833N, 74.368889E	Nagar	Govt High School Sikander Abad	24	30	13	Roof Elevated	5	181	6'	1	7.74
4	36.243056N, 74.362778E	Nagar	Magistrate office	5	7	3	Roof Elevated	5	136	6'	1	1.86
5	36.244167N, 74.363056E	Nagar	Naib tehsildar	2	3	1	Roof Mounted	10	135	6"	1	0.43
6	36.243333N, 74.362500E	Nagar	Treasury office	8	10	4	Roof Mounted	10	170	6"	0	-
7	36.241944N, 74.362778E	Nagar	Medicine warehouse - DHO	20	25	11	Roof Elevated	5	227	6'	0	-
8	36.243056N, 74.362500E	Nagar	Veterinary office	5	7	3	Roof Mounted	10	149	6"	0	-
9	36.240833N, 74.393611E	Nagar	AGPR Jaffer Abad	2	3	1	Parking Shed	5	198	10'	0	-
10	36.243056N, 74.362500E	Nagar	Waste management office	6	8	3	Roof Mounted	10	128	6"	1	1.97
11	36.236944N, 74.401111E	Nagar	Govt Girls Jaffer Abad	11	14	6	Roof Mounted CGI Sheet	0	159	4"	1	3.60
12	36.242778N, 74.362222E	Nagar	NADRA office Sikander Abad	11	14	6	Roof Elevated	5	149	6'	0	-
13	36.243056N, 74.363333E	Nagar	Civil court session court	22	28	12	Roof Mounted	10	209	6"	0	-

³ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
14	36.235278N, 74.399722E	Nagar	District Council Jaffer Abad	11	14	6	Roof Elevated	5	140	6'	1	3.94
15	36.234944N, 74.404167E	Nagar	Boys high school Nilt	20	25	11	Roof Mounted	10	200	6"	1	6.43
16	36.244444N, 74.363611E	Nagar	Fisheries office Sikander Abad	6	8	3	Roof Mounted	10	208	6"	0	-
17	36.300828N, 74.641752E	Nagar	Bed hospital Askordas	35	44	30	Roof Elevated	5	158	6'	0	-
18	36.245000N, 74.372222E	Nagar	Govt Girls School	30	38	17	Roof Elevated	5	176	6'	1	9.51
19	36.243333N, 74.362778E	Nagar	DD Education	14	18	7	Roof Elevated	5	130	6'	0	-
20	36.251002N, 74.320806E	Nagar	BISP Nagar	5	6	2	Roof Mounted CGI Sheet	0	171	4"	1	1.26
21	36.233611N, 74.402222E	Nagar	DD WM Jafar Abad Nagar 2	7	10	4	Roof Mounted CGI Sheet	0	161	4"	1	2.40
22	36.254168N, 74.327064E	Nagar	DHQ Chilter Nagar	52	65	26	Roof Mounted CGI Sheet	0	135	4"	1	16.57
23	36.253077N, 74.342196E	Nagar	FPA Sonikot	1	2	1	Ground Mounted	15	180	6"	1	0.60
24	36.247974N, 74.315777E	Nagar	Girls Middle Chalt	10	13	5	Roof Mounted	10	134	6"	1	1.57
25	36.253117N, 74.329154E	Nagar	Girls School Chalt	15	19	8	Roof Mounted	10	142	6"	0	-
26	36.295000N, 74.622222E	Nagar	GMS Shayar Nagar	8	10	4	Roof Mounted	10	188	6"	1	2.46
27	36.306111N, 74.654444E	Nagar	Govt BHS Samayar	30	38	17	Roof Elevated	5	195	6'	0	-

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
28	36.252053N, 74.320204E	Nagar	Govt Boys High School	20	25	11	Roof Mounted	10	160	6"	1	3.63
29	36.307500N, 74.661111E	Nagar	HPP Nagar 1	19	24	13	Roof Mounted CGI Sheet	0	178	4"	0	-
30	36.251386N, 74.320167E	Nagar	Jamia Masjid Chalt	12	15	6	Roof Mounted	10	156	6"	0	-
31	36.245785N, 74.315595E	Nagar	Livestock Office	1	1	0.5	Roof Mounted	10	120	6"	0	-
32	36.235000N, 74.400000E	Nagar	Municipal Corporation Jaffer Abad	2	3	1	Roof Mounted CGI Sheet	0	231	4"	1	0.37
33	36.239779N, 74.304884E	Nagar	Police Station Chalt	5	7	3	Roof Mounted	10	197	6"	1	1.00
34	36.247626N, 74.323178E	Nagar	Tehsil Office Chalt	2	3	1	Roof Mounted	10	168	6"	1	0.49
35	36.246161N, 74.346575E	Nagar	WP Office Nagar	44	55	14	Roof Elevated	5	146	6'	1	8.29
36	36.251812, 74.762804	Nagar	1.5mw nugur complex	10	13	5	Roof Mounted CGI Sheet	0	175	4"	1	3.29
37	36.266477, 74.743494	Nagar	30 bedded hospital, Nagar Khas	50	63	40	Roof Elevated	5	219	6'	1	15.51
38	36.245888, 74.346065	Nagar	B&R office Nagar	44	55	23	Parking Shed & Roof Mounted CGI Sheet	5 & 0	143	10' & 4"	0	-
39	36.224212, 74.760876	Nagar	BHU Hooper	3	4	1	Roof Mounted	0	148	4"	1	0.71

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
40	36.240313, 74.483356	Nagar	Civil Hospital 10 bedded, ghulmat, Nagar	25	32	20	Roof Mounted	10	174	6"	0	-
41	36.243795, 74.342339	Nagar	Civil supply Nagar	7	9	2	Roof Mounted	10	140	6"	1	1.20
42	36.245276, 74.344693	Nagar	DC Office Nagar	47	59	12	Parking Shed	5	152	10'	0	-
43	36.251045, 74.531157	Nagar	Dispensary mina pin nupur	2	3	1	Roof Mounted CGI Sheet	0	177	4"	1	0.49
44	36.243591, 74.342421	Nagar	Excise and taxation Nagar 2	20	25	11	Roof Elevated	5	144	6'	1	7.40
45	36.246095, 74.345863	Nagar	Forest office Nagar	5	6	2	Roof Mounted	10	144	6"	0	-
46	36.254253, 74.529527	Nagar	Govt boys' high school, Mina pin, Nagar	10	13	5	Roof Mounted	10	158	6"	1	2.43
47	36.239608, 74.483662	Nagar	Govt boys' model high school, ghulmat, Nagar	5	7	2	Roof Mounted	10	138	6"	0	-
48	36.242324, 74.481012	Nagar	Govt Girls high school, ghulmat, Nagar	30	38	16	Roof Mounted	10	185	6"	1	8.00
49	36.273694, 74.716337	Nagar	Govt Girls high school, Nagar proper	23	29	11	Roof Mounted CGI Sheet	0	155	4"	0	-
50	36.251474, 74.536567	Nagar	Govt girls' middle school, Mina pin, Nagar	12	15	6	Roof Mounted	10	265	6"	1	3.89
51	36.244443, 74.343274	Nagar	Inter college for boys Nagar	62	78	33	Roof Elevated	5	144	6'	0	-
52	36.257160, 74.361732	Nagar	LG & RD office Nagar	23	29	13	Roof Elevated	5	217	6'	1	8.66

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
53	36.245444, 74.345081	Nagar	Rescue 1122 Nagar	13	17	7	Roof Mounted CGI Sheet	0	144	4"	1	4.58
54	36.215678, 74.767867	Nagar	Rest House, Hooper	35	44	17	Roof Elevated	5	139	6'	1	11.23
55	36.248315, 74.350243	Nagar	Tourism office Nagar	18	23	9	Roof Elevated	5	137	6'	1	6.03
56	36.242500N, 74.363056E	Nagar	DHQ Hospital Sikander Abad	32	40	30	Roof Elevated	5	220	6'	0	-

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Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	36.090722°, 74.034889°	Ghizer	BHS Sherqillah	5	6	3	Roof Mounted CGI Sheet	0	189	4"	0	-
2	36.109556°, 73.902694°	Ghizer	Police Station Singul	10	12	6	Roof Mounted CGI Sheet	0	170	4"	1	3.54
3	36.181000, 73.767917	Ghizer	District Session Judge	25	30	14	Roof Mounted	10	170	6"	1	9.43
4	36°10'32.6"N, 73°46'15"E	Ghizer	District Council	7	9	5	Roof Mounted CGI Sheet	0	154	4"	1	2.54
5	36.205556, 73.730000	Ghizer	GB Scout Damas Camp	30	36	15	Parking Shed	5	132&110	10'	1	8.83
6	36.163611, 72.909167	Ghizer	Girls Middle School Phunder	32	39	21	Ground Mounted	15	186	6"	1	13.00
7	36.163889,73.109167	Ghizer	Boys Middle School Pingal	5	6	4	Roof Mounted	10	198	6"	1	2.46
8	36.2301523, 73.44958468	Ghizer	NADRA office Gupis	5	6	2	Roof Mounted	10	189	6"	0	-
9	36.176185, 73.772301	Ghizer	Tehsil Office Ghakuch	4	5	2	Roof Mounted	10	141	6"	1	0.86
10	36.176944, 73.768056	Ghizer	Executive Engineer B&R GB PWD	10	12	6	Roof Mounted	10	177	6"	0	-
11	36.171944, 73.771667	Ghizer	AGPR Office Ghakuch	10	12	3	Ground Mounted	15	180	6"	1	1.57
12	36.17668263, 73.76887027	Ghizer	VIP Guest House C&W	70	84	38	Ground Mounted	15 & 0	162		1	26.00

⁴ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							& Roof Mounted CGI Sheet					
13	36.174167, 73.770278	Ghizer	Police Station Ghakuch	10	12	6	Roof Mounted	10	191	6"	0	-
14	36.17494481, 73.77032499	Ghizer	AC Office Gha Kuch	6	8	3	Roof Mounted	10	214	6"	0	-
15	36.17543432, 73.77410691	Ghizer	Treasury Office	10	12	6	Roof Mounted	10	180	6"	0	-
16	36.177222, 73.766667	Ghizer	Govt. High School Ghakuch	15	18	8	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	154	6" & 4"	1	3.20
17	36.187500, 73.761944	Ghizer	Ghizer Public School Ghakuch	28	34	14	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	136	6" & 4"	1	6.91
18	36.226944, 73.458333	Ghizer	Govt. Boys High School Gupis	10	12	6	Roof Mounted	10	190	6"	1	2.57
19	36.175833, 73.768611	Ghizer	Executive Engineer W&P Ghizer	20	24	11	Roof Mounted CGI Sheet	0	210	4"	1	6.03
20	36.176111, 73.769167	Ghizer	SP Office Ghizer	10	12	6	Roof Mounted CGI Sheet	0	199	4"	0	-
21	36°11'02"N, 73°45'58"E	Ghizer	DHQ Gha Kuck	212	255	121	Roof Mounted & Parking Shed	10 & 5	210	6" & 10'	0	-

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
22	36°13'36"N, 73°27'43"E	Ghizer	Civil Hospital Gupis	177	213	103	Roof Mounted	10	199	6"	1	67.34
23	36°09'46"N, 72°53'38"E	Ghizer	Govt. Hospital Phander	90	108	60	Parking Shed	5	205	10'	0	-
24	36°05'15"N, 74°03'06"E	Ghizer	Civil Hospital Sherqillah	147	177	98	Roof Mounted	10	223	6"	1	57.82
25	36°06'44"N, 73°53'53.9"E	Ghizer	10 Bed Civil Hospital Singul	58	70	50	Parking Shed & Roof Mounted CGI Sheet	5 & 0	205	10' & 4"	1	31.34
26	36°24'36"N, 73°21'09"E	Ghizer	Civil Hospital Yasin	92	111	55	Roof Mounted	10	186	6"	0	-
27	36.427667, 73.381889	Ghizer	Govt. Girls Middle School Sandi	7	9	4	Roof Mounted	10	204	6"	1	2.17
28	36.17635214668913, 73.76831488759167	Ghizer	DC Office	10	12	3	Roof Mounted	10	180	6"	0	-
29	36.17621929108487, 73.76310349972263	Ghizer	DHO Office	15	18	8	Roof Elevated	5	248	6'	0	-
30	36.17434153, 73.7682743	Ghizer	NADRA Office Ghakuch	8	10	5	Ground Mounted	15	207	6"	0	-
31	36.086958, 74.045218	Ghizer	Police Check Post Chimardass	25	30	14	Roof Mounted	10	216	6"	1	9.09
32	36.113649, 73.890699	Ghizer	Rescue 1122 Singul	16	20	9	Parking Shed & Roof Mounted CGI Sheet	5 & 0	230	10' & 4"	0	-

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
33	36.174442, 73.768002	Ghizer	Excise & Taxation HQ	10	12	6	Roof Mounted	10	204	6"	0	-
34	36.224500, 73.717500	Ghizer	KIU Hatun Ghizer	90	108	51	Roof Mounted	10	221	6"	0	-
35	36.174915168, 73.7623092	Ghizer	Girls Degree College Ghizer	30	36	15	Roof Mounted	10	120	6"	0	-
36	36.184118, 73.753004	Ghizer	APS Ghakuch	20	24	11	Roof Mounted	10	200	6"	1	4.71
37	36.381323, 73.849046	Ghizer	BHS Phokra	16	20	9	Roof Mounted	10	177	6"	0	-
38	36.214656, 73.751543	Ghizer	Govt. Boys Middle School Golodass Ghizer	10	12	5	Roof Mounted	10	149	6"	1	1.69
39	36.344118, 73.842993	Ghizer	Govt. Boys Middle School Chatorkhand Ghizer	15	18	9	Roof Mounted CGI Sheet	0	217	4"	1	4.31
40	36.411556, 73.834694	Ghizer	BMH Asumber	3	4	2	Roof Mounted	10	238	6"	1	1.43
41	36.175436, 73.772473	Ghizer	MC Office	6	8	3	Roof Mounted	10	220	6"	1	1.51

SECTION – II: GENERAL PROJECT REQUIREMENTS

1. INTRODUCTION

This Part of the Employer’s Requirements sets out the general obligations of the Contractor in relation to the execution of the Works. It shall be read in conjunction with the Contract, Technical Specifications, Drawings, and other parts of the Employer’s Requirements.

The Contractor shall be responsible for the complete design, engineering, procurement, construction, installation, testing, commissioning, training, operation and maintenance (O&M), and handover of the Works. The requirements in this Part establish the minimum standards to be achieved. In the event of any conflict, the more stringent or technically superior requirement shall prevail.

2. SITE CONDITIONS

The Project sites are located in various districts of Gilgit-Baltistan, characterized by mountainous terrain, high seismicity, and diverse climatic conditions. The Contractor shall take full account of these conditions in planning, design, procurement, construction, testing, commissioning, and maintenance of the Works.

Key site considerations include:

- **Topography and Access:** Sites are generally in hilly and mountainous areas with limited access roads, steep gradients, and restricted working space. The Contractor shall arrange safe and efficient transport and erection of equipment under these conditions.
- **Seismic Conditions:** Gilgit-Baltistan is classified as a high seismic risk zone. All structures and foundations shall be designed to relevant international codes (e.g., IBC/Eurocode/UBC) and Pakistani standards for seismic resilience.
- **Temperature:** The region experiences wide variations, with summer highs up to +45 °C and winter lows down to –30 °C, depending on site altitude and location. Equipment shall be designed for continuous operation within these extremes.
- **Wind Conditions:** Maximum wind speeds can reach 100 mph. PV structures shall be designed to withstand these loads, including gusts.
- **Rainfall and Snowfall:** Annual precipitation is moderate but may include heavy rain and snow, particularly in winter. Roof loading shall be designed accordingly.
- **Altitude:** Several sites exceed 2,800 m above sea level. Equipment shall be rated and de-rated as necessary for reliable high-altitude performance.
- **Corrosion:** Site specific conditions shall be taken into account.

The Contractor shall confirm and supplement this information by carrying out detailed site-specific investigations at its own cost. No claim for additional payment or extension of time shall be made due to difficulties arising from these conditions.

3. DRAWINGS AND DESIGN RESPONSIBILITIES

3.1 Bid Drawings

- The drawings provided in Volume II, Annexure 1 are issued as Bid Drawings for reference only. These reflect only the Employer’s preliminary design concept based on available information.
- The Contractor shall conduct all required site surveys, and meteorological assessments (including rain & hailstorm risks) and shall develop detailed designs accordingly to achieve the required capacity.
- Bid Drawings shall not be used for construction. The Contractor bears full responsibility for preparing and submitting construction drawings based on proposed equipment and verified site conditions.
- Final as-built drawings shall be submitted at completion as part of the Project Handover documentation.

3.2 Contractor’s Design

- The Contractor shall prepare in accordance with Sub-Clause 5.2 of CoC and submit detailed design reports, drawings, calculations, and method statements in accordance with the Contract.
- Submissions shall include, at minimum: design assumptions, methodologies, calculations, test reports, geotechnical data, construction method statements, quality assurance plans, and equipment manufacturer drawings.
- Permanent Works shall not commence until relevant design submissions have been reviewed by the Employer’s Representative or his Delegated Assistant under the provisions of the Contract.
- All drawings, reports, and data prepared by the Contractor shall become the property of the Employer.

Wherever applicable, the solution shall incorporate mechanical structure design considerations, taking into account factors such as wind, snow, thermal expansion, flooding, seismic activity, and corrosion.

4. QUALITY MANAGEMENT SYSTEM

The Contractor shall implement a Quality Management System in accordance with Sub-Clause 4.9 of the Conditions of Contract.

4.1 Quality Assurance and Control

- The Contractor shall prepare a comprehensive Quality Assurance and Quality Control (QA/QC) Plan based on ISO 9001 principles.
- The Plan shall include: quality policy, organization, responsibilities, inspection and testing procedures, NCR/DR management, internal audits, and document control.

- The outline QA/QC Plan shall be submitted within 15 days of the Commencement Date. The detailed Plan shall follow within another 15 days and shall be updated throughout the Project.
- A dedicated QA Manager shall be appointed on Site with authority and responsibility for implementing the Plan.

5. USE OF SITE

5.1 Boundary of the Site

The Project sites are indicated in Section I (Table-01) of the Employer’s Requirements, including coordinates. The Contractor shall arrange, at his own cost, any additional land required for temporary facilities such as camps, workshops, offices, and storage areas. Quarries, borrow pits, disposal areas, and any other external areas used by the Contractor shall not be considered part of the Site.

5.2 Setting Out of Site Installations

All setting out shall be carried out strictly in accordance with approved drawings. Any discrepancy between drawings and actual site conditions (topography, geology, etc.) shall be reported immediately to the Employer’s Representative or his Delegated Assistant, and alternative proposals submitted for approval.

5.3 Storage Areas

The Contractor shall establish and maintain temporary storage areas at the Site and any off-site location. These shall include drainage, sumps, oil traps, separators, and containment for chemicals and oils. Secure, ventilated warehouses for PV modules, inverters, and auxiliaries shall be constructed or rented by the Contractor, in consultation with the Employer’s Representative or his Delegated Assistant.

6. TEMPORARY WORKS AND FACILITIES

The Contractor shall arrange temporary land and design, construct, operate, and maintain all temporary works and facilities necessary for execution of the Works at its own cost.

6.1 Camps and Offices

- The Contractor shall establish its own camps, offices, workshops, and storage facilities to support Project execution.
- Temporary camps shall include adequate boundary walls, fencing, lighting, access control, and utilities.
- Accommodation, catering, and welfare facilities for Contractor’s staff shall comply with health and safety standards.

6.2 Removal and Restoration

- Upon completion, all temporary facilities not handed over to the Employer shall be dismantled and removed by the Contractor.
- The Contractor shall restore the affected areas to an acceptable condition to the Employer’s satisfaction.

7. CONTRACTOR’S RESPONSIBILITIES

7.1 General

- The Contractor may propose changes to layout, methodology, or design, subject to Employer’s approval, provided that the Contract requirements, Time for Completion, and Contract Price remain unaffected.
- All designs shall consider site-specific risks such as seismicity and hailstorms.

7.2 Procurement

- The Contractor shall procure all labor, materials, equipment, and services in his own name, warranting that all supplied items are new, reliable, and consistent with best international practice.

7.3 Standardization of Equipment

- SI units shall be used for all documentation and instrumentation.
- Parts and components shall be standardized across the buildings to maximize interchangeability.
- All indicators and labels shall be in English and SI units.

7.4 Testing and Material Delivery Verification Program

- The Contractor shall provide competent staff and facilities for material and PV testing.
- Factory acceptance tests (FAT), material delivery verifications, and other standard tests shall be performed in accordance with specifications, with certificates submitted to the Employer’s Representative or his Delegated Assistant.
- Employer’s participation in tests shall not relieve Contractor of responsibility.

7.5 Health, Safety, and Security

- The Contractor shall comply with national HSE laws, prepare a full HSE plan, and conduct regular training under Sub-Clause 4.8 of the Conditions of the Contract.
- PPE (helmets, safety shoes, insulated gloves etc.) shall be supplied for all Contractor staff.
- First Aid: Fully equipped first-aid Kits shall be provided at each under construction site.
- Emergency: Proof of arrangements with local hospitals for evacuation and treatment shall be provided.

7.6 Noise

- Noise measurement and limits shall comply with ISO and IEC standards applicable to PV Solar Systems.

7.7 Utilities and Site Services

- The Contractor shall protect all existing utilities and, if damaged, shall restore them at his own cost.

- Relocation of utilities shall be coordinated with the concerned authorities, without interruption of service.

8. GENERAL CONSTRUCTION REQUIREMENTS

8.1 General

- The Contractor shall be fully responsible for the specification, quality, and performance of all materials incorporated in the Works.
- Local materials may be used where they meet the Employer’s Requirements and approved standards.

8.2 Standards and Service Life

- All materials and workmanship shall comply with relevant International (IEC, ISO, IEEE, ASTM) or National Standards. Where alternatives are proposed, the Contractor shall demonstrate equivalence to the satisfaction of the Employer’s Representative or his Delegated Assistant.
- Minimum service life requirements:
 - 25 years: PV modules; 10 years: Inverters; 10 years: BESS (excluding replaceable components).

8.3 Commissioning Plan Development

The development of a comprehensive commissioning plan is fundamental to the successful execution of all testing and acceptance activities. This plan serves as the roadmap for all commissioning activities and must be developed with meticulous attention to detail, incorporating lessons learned from similar projects and site-specific considerations that may impact testing procedures or safety requirements.

The commissioning plan must demonstrate a thorough understanding of the system design, potential risks, and mitigation strategies. It should provide clear guidance for all testing personnel and establish protocols for handling unexpected situations or test failures. The plan must be submitted well in advance to allow for thorough review and any necessary modifications before commencement of testing activities.

Commissioning Plan Requirements:

- Submit detailed plan minimum 15 days before commissioning commencement
- Include comprehensive methodology and detailed sequence of all tests
- Provide thorough risk analysis with identified mitigation strategies
- Develop contingency plans for equipment failures or adverse conditions
- Specify all instrumentation requirements with valid calibration certificates
- Define clear acceptance criteria for each individual test
- Include weather contingency plans for outdoor testing activities

8.4 Tolerances

- Construction tolerances shall conform to international practice for solar PV and associated works, subject to Employer’s Representative’s or his Delegated Assistant’s approval.

8.5 Protection of Works

- All completed Works shall be protected against damage from construction activities and weather.
- Safety signage, fire protection, and hazard prevention measures shall be implemented throughout.

9. HEALTH, SAFETY, AND ENVIRONMENT

9.1 Occupational Health and Safety

- Contractor shall maintain a certified OHS management system aligned with national laws and ISO 45001.
- Work permits shall be issued for all hazardous activities.
- Monthly safety meetings shall be conducted, and incident investigations reported.

9.2 Emergency and Medical Services

- Fully equipped first aid stations shall be provided at each site.
- Contractor shall maintain agreements with approved hospitals for emergency treatment.

9.3 PPE

- PPE (helmets, harnesses, safety shoes, raincoats, jackets, etc.) shall be supplied to all workers, Consultants, and Employer staff, and replaced at least every four (4) months.

9.4 Regulatory Requirements and Applicable Standards

- The GB Environmental Protection Act, 2014 should be followed which was enacted in 2014 by repealing the Pakistan Environmental Protection Act.
- Other project related national environmental laws, regulations, policies and guidelines are as follows:
 - National Conservation Strategy (NCS), 1992.
 - National Environment Policy, 2005.
 - Pakistan Labor Policy, 2010.
 - Pak-EPA (Review of IEE and EIA Regulations, 2000).
 - Pakistan EIA Procedures.
 - National Environmental Quality Standards (NEQS).
 - Land Acquisition Act (LAA), 1894.
 - Cutting of Trees (Prohibition) Act, 1975.
 - Antiquities Act, 1975.
 - The Forest Act 1927, and the Forest (Amended Act) 2010.
 - The Explosion Act 1884.
 - GB Wildlife Preservation Act 1975.

- GB Fisheries Act 1975.
- Pakistan Penal Code, 1860.
- Pakistan Clean Air Program (PCAP); and
- Guidelines for Public Consultation.

10. CONTRACTOR’S DOCUMENTS

10.1 General

- Notwithstanding the time periods listed in the construction schedule by the Contractor shall submit all documents as early as reasonably practical to mitigate any possibility of delays arising from review by the Employer’s Representative or his Delegated Assistant or by third parties.
- It is intended that Employer’s Representative or his Delegated Assistant shall have a review and comment opportunity for each construction document, for each submittal or re-submittal.
- Prior to the Commencement Date, the Contractor shall prepare and submit a “Design Management Plan” outlining the procedures to be used for control of design activities, schedule for design, coordination of the main Project design with the activities of subcontractors, design quality control procedures, authorizations for review and approval of design, description of design documents such as design criteria, and design reports, and other information necessary to demonstrate that the Contractor can effectively manage the design of the Works.
- All specifications, drawings, reports, design calculations and other essential data are subject to the Employer’s Representative’s or his Delegated Assistant’s review. Comments shall be given in writing by the Employer’s Representative or his Delegated Assistant within twenty-one (21) days after receiving such documents, unless otherwise stipulated. Any work carried out prior to such approval shall be at the Contractor’s own risk and expense. The number of drawings and documents to be submitted for information or approval shall be limited to the required minimum for the purposes of the Employer’s Representative or his Delegated Assistant. The exact number and mode of distribution for drawings and documents will be agreed upon between the Contractor and Employer’s Representative or his Delegated Assistant at the work Commencement Date.
- The Contractor shall submit a drawing schedule, which will be subject for the review by the Employer’s Representative or his Delegated Assistant. The drawing schedule shall be consistent with the Contractor’s integrated project schedule. The drawing schedule shall show design phase, structure, drawing number, titles, status, schedule dates and other relevant information. At four (04) week intervals, the Contractor shall submit copies of the revised drawing schedule showing the actual status of the drawings, i.e. preliminary, reviewed by Employer’s Representative or his Delegated Assistant, approved for construction by Contractor, for information only, or as-built, and the date for completion of each phase of the drawings.
- The Contractor shall submit a document control schedule, which will be subject to the review by the Employer’s Representative or his Delegated Assistant. The document control schedule shall be consistent with the Contractor’s integrated project schedule. The document control schedule shall show the number, titles, status, schedule dates and other relevant information. At four-week intervals, the Contractor shall submit copies of the revised document control schedule showing the actual status of the documents, i.e.

preliminary, reviewed by Employer’s Representative or his Delegated Assistant, approved for construction by Contractor, for information only, or as-built, and the date for completion of each phase of documentation.

- The sequence in which documents are submitted shall follow a logical progression such that all information is available to the Employer’s Representative or his Delegated Assistant to facilitate review of each submittal when it is received. The program for detailed design shall allow the required time for review by the Employer’s Representative or his Delegated Assistant.

10.2 Contractor’s Design Documents

- Design Documents means documents of a technical nature provided by the Contractor under the Contract. Design Documents shall include but not be limited to:
 - a. Calculations, analyses and designs.
 - b. Site investigation plans, reports, memoranda
 - c. Construction and manufacturing drawings.
 - d. Type Test Reports
 - e. Any other analysis report and calculations if considered to be necessary by Employer’s Representative or his Delegated Assistant
 - f. Design briefs and design reports.
 - g. Technical specifications and performance curves
 - h. Parts and components list.
- The Contractor shall provide all necessary Design Documents and any other document or information (unless restricted by confidentiality requirements) as may be relevant to the performance, operation and maintenance of the Project and Employer’s operating and maintenance activities and transfer obligations and to satisfy Employer’s requirements.

10.3 Required Documentation

- As-built drawings reflecting actual installation configurations and any field modifications
- Complete component serial number records and warranty certificate compilation
- Operation and maintenance manuals for all major system components
- Safety data sheets (SDS) for all hazardous materials used in the installation
- Commissioning test certificates and calibration records for all testing equipment

10.4 Documents’ Submission and Approval Procedure

- All drawings and documents shall be submitted through the Documents Management System (DMS) for review by the Employer’s representative or his delegated Assistant under Sub-Clause 5.2 of CoC.
- In parallel, the Contractor shall provide four (4) hard copies of each drawing/document to the Employer’s Representative or his Delegated Assistant
- The date of receipt of hard copies by the Employer’s Representative or his Delegated Assistant shall be considered the official date of submission for review.
- The Employer’s Representative shall return comments and approvals through the DMS in accordance with the review period specified under Sub-Clause 5.2 of the CoC.

- In general, electronic copies of design submittals shall be in: -
 - i. MS Word format for all text and reports
 - ii. PDF as well as CAD formats for drawings
 - iii. MS Excel for all calculations
- The Employer’s Representative or his Delegated Assistant will review submittals only for conformance with the design concept of the Project and for compliance with the contract. The contractor shall make any and all corrections required.
- After Employer’s Representative or his Delegated Assistant has performed his review of submittals, he will return one print to the Contractor with one of the following notations:
 - i. Rejected. (R)
 - ii. Revise and resubmit. (RC)
 - iii. Approved Except as Noted.
 - iv. Approved. (A)
- When submittals are returned marked with either (i) or (ii), the Contractor shall make such revisions and/or corrections and resubmit the drawings or other material in the same manner as specified.
- When drawings and submittals are returned with authorization to proceed with the work, Contractor shall provide the number of prints or copies of drawings as is required for field distribution.

10.5 Document Management System (DMS)

- The Contractor shall establish, operate, and maintain a secure, computer-based Document Management System (DMS) for the entire duration of the Contract, including the Defects Notification Period.
- The DMS shall:
 - Track identification, revision, status, and location of all Project Documents at all stages.
 - Provide online access via standard internet browsers without requiring special client software.
 - Allow up to thirty (30) concurrent users worldwide, with password-protected access rights tailored to roles (creation, review, comment, approval, etc.).
 - Support structured workflows for design review, approvals, quality records, correspondence, planning, progress measurement, testing, commissioning, and reporting.
- The DMS shall include all Contractor, Subcontractor, and Vendor documents and correspondence (except financial correspondence, which will be exchanged directly).
- All costs for establishing, licensing, maintaining, and operating the DMS, including user accounts and storage, shall be borne by the Contractor.

10.6 Final Documentation

- At the end of the Contract, including the Defects Notification Period, the Contractor shall provide:

- Electronic sets shall be provided on hard drives or equivalent media, in open and editable formats (MS Word, Excel, AutoCAD, etc.) along with PDF versions for record.
- All as-built drawings, O&M manuals, test reports, and certificates in both hard and soft copy.

11. INSPECTION AND TESTING

11.1 General

This section contains the general requirements for inspection and testing (I&T) of material, parts, equipment and workmanship of the Plant during manufacture, assembling, installation, commissioning and upon completion to demonstrate compliance with the specification, codes and standards to ensure overall reliability of the Plant operation and performance.

The whole of the Works supplied under this Contract shall be subject to visual, dimensional, material, non-destructive, functional, and performance inspection and tests by the Employer’s Representative or his Delegated Assistant during manufacture, construction, installation and commissioning, at the manufacturers’ works and/or on site.

The Contractor shall prove that its material and/or equipment complies with the requirements of the Contract.

Employer’s participation in factory acceptance tests (FATs) or material delivery verification shall not relieve the Contractor of its responsibility to demonstrate compliance

11.2 Calibration and Equipment Standards

The accuracy and reliability of all test results depend fundamentally on the proper calibration and maintenance of testing equipment. All instrumentation used in commissioning activities must meet stringent accuracy requirements and maintain valid calibration certificates traceable to national or international standards. This ensures the integrity of all test data and provides confidence in the commissioning results.

Equipment calibration records must be maintained throughout the commissioning process and made available for review by all stakeholders. Any equipment found to be out of calibration must be immediately removed from service and either re-calibrated or replaced before testing can continue.

Equipment and Calibration Requirements

- All test instruments must have valid calibration certificates within 12 months of use
- Calibration records must be traceable to recognized national or international standards
- Backup equipment must be available for critical measures to prevent delays
- Daily functional checks of equipment before commencement of testing activities
- Secure storage and handling procedures to prevent equipment damage or degradation

11.3 Expenses

All shop and field-testing certifications, reporting, and assuring of engineering quality verification and documentation of the Works in accordance with the technical specifications and the Contractor’s testing programme shall be performed by the Contractor at its expense. If tests

indicate non-compliance with the terms of the Contract, the Contractor shall, at its own expense, make all necessary repairs and perform additional test(s) required to indicate compliance with the terms of the Contract.

11.4 Inspection and Test Program (ITP)

The Contractor shall establish, document and implement a Quality Control Program in accordance with the requirements of the ISO standards.

Implementation of this program shall cover all fabrication, installation, and commissioning activities on and off the Project site.

Inspection and test plans shall be prepared for all major items of equipment, plant and systems defining the Quality Control and inspection activities to be performed to ensure that the design, manufacture, construction, installation, commissioning and completion of the Plant complies with the contract. ITPs shall be submitted defining relevant inspection and test points for all stages of manufacturing, construction, installation, commissioning and completion.

Inspection and Test Plans shall be submitted for the Employer’s Representative or his Delegated Assistant for review in accordance with Sub-Clause 5.2 of CoC. If any operation in ITP requires change, the Contractor shall revise the plan and resubmit for approval as above.

11.5 Factory Acceptance Tests

The Employer’s Personnel (including the Employer’s Representative, Delegated Assistant to the Employer’s Representative or other independent experts), at their discretion, will participate in all or in a selected number of Factory Acceptance Tests (FATs) at manufacturers’ premises. All cost in connection with witnessing the FATs by the Employer’s Personnel shall be borne by the Contractor as per provision of the Contract.

If the Employer’s Personnel do not attend, then the Contractor shall perform the test and submit a certified copy of the results to the Employer’s Representative or his Delegated Assistant.

The Contractor or sub-contractors, as applicable, shall provide labor, materials, water, air, electric power, fuel, shop, apparatus and all necessary equipment for the performance of the said acceptance tests. If the equipment passes the tests, the Employer’s Personnel shall give the Contractor a certificate testifying to this.

All these test documents have to be submitted to the Employer’s Representative or his Delegated Assistant in due time before the tests are performed. Test procedures for FATs shall be submitted not later than 30 days prior to the scheduled tests. The Contractor should notify the Employer’s Representative or his Delegated Assistant well before the FAT dates, giving due consideration to time required by the Employer’s Personnel for their internal approvals as well as the time required by relevant embassies in processing the visa applications.

Factory acceptance tests shall be witnessed by the Employer’s Personnel (including the Employer’s Representative, Assistant to the Employer’s Representative or other independent experts). All costs in connection with witnessing of the factory acceptance tests by the Employer’s Personnel shall be borne by the Contractor. These shall include the costs of air travel from Pakistan to place of inspection/testing and back, visa processing, hotel accommodation/boarding/lodging (as per actual), inland transportation and daily allowance @ US Dollars 200 per day per person for inspection/testing to be conducted outside Pakistan including

two days of travel time and Rs. 10,000 per day per person [besides other costs of travelling and lodging etc. (as above) for inspection/testing to be conducted inside Pakistan for each visit of every person to witness these tests. A minimum of 06 trips and 50-man days are expected for FAT outside Pakistan.

The Factory Acceptance Tests (FATs), of equipment not limited to, shall cover PV modules, inverters, Battery Energy Storage Systems (BESS), AC and DC cables, LV panels, distribution boxes, earthing and lightning protection equipment and module mounting structures.

Sampling for FATs shall be performed in line with ISO 2859 series.

As a minimum the following tests shall be made part of FATs:

1. PV Modules

- Visual Inspection
- Performance at STC
- Performance at low Irradiance
- Thermal Cycling Test
- Humidity Freeze Test
- Static Mechanical Load Test
- Hail test

2. Hybrid Inverters

- Visual Inspection
- Maximum Charge Power
- Maximum Discharge Power
- Voltage test (Dielectric Strength Test)
- Back-feed Test under Normal Conditions
- Back-feed Test under Single Fault Condition

3. Battery Energy Storage System & Battery Management System

- Visual Inspection
- Drop Test
- Control of Voltage
- Control of Current
- Temperature Control

4. PV Module Mounting Structure

- Sections and Plates
 - Visual examination
 - Verification of dimensions and weights
 - Tensile tests
 - Bend tests
 - Galvanizing tests
- Nuts and Bolts
 - Verification of dimensions
 - Visual inspection
 - Proof load tests
 - Ultimate tensile strength tests
 - Galvanizing tests

5. Cables

- Thickness of Insulation

- DC Resistance Test
- Insulation Resistance
- High Voltage Test A.C
- Diameter of Cables
- Standard Formation

6. LV Panels

- Visual Inspections
- Functional Test
- Earthing and Grounding Continuity Test
- Insulation Resistance Test
- Polarity Test

Inspection sheets with subject, attendance, result and comments shall be signed by all parties and distributed immediately after the tests.

11.6 Material Delivery Verification

The equipment to be supplied under the Contract shall be verified at site prior to initiation of construction / installation activities.

Material delivery verification procedures for each site shall be submitted not later than one week prior to the scheduled verification, including all necessary drawings and documents, excerpts of applicable standards, etc. for Employer’s Representative’s or his Delegated Assistant’s approval.

11.7 Tests on Completion

All Tests on Completion required to be carried out under Clause 9 shall conform to international standards, OEM guidelines, and local grid requirements, with full documentation to support QA/QC, warranty claims, and future maintenance.

Commissioning Tests

Commissioning tests shall include visual inspection for mechanical integrity, installation quality, labeling, and cable terminations; insulation resistance testing of all AC and DC cables; and verification of earthing and bonding systems. Functional checks shall cover inverters, energy storage systems, monitoring systems, protection devices, communication networks, and alarms.

Commissioning tests shall validate PV array IV curves, inverter performance, anti-islanding protection, and grid compliance. The storage system shall be tested through charge/discharge cycles to verify SOC and SOH, while genset synchronization shall be evaluated under load for stable integration. Functional tests of lighting, emergency systems, and auxiliary circuits shall ensure full operational readiness.

Commissioning Tests (IEC Standards Compliant) shall include:

- Polarity Test
- String open circuit voltage test
- String circuit current test (short circuit or operational)
- Functional tests
- Insulation resistance of the DC circuits
- String I-V Curve Test
- IR Inspection

- Continuity of earthing and/or equipotential bonding conductors, where fitted

Commissioning Tests (IEC Standards Compliant) for BESS shall include:

1. Cold checks (before operation): insulation, voltage, earthing, safety protection against touch; general functionality, display and interface
2. Operational checks (under operation):
 - Check monitoring parameters: SOC, SOH, cell voltages, cell imbalances, current, and temperature, as well as general functionality and plausibility of monitoring system
 - Check remote monitoring and control as well as integration with SCADA or EMS (whichever the case).
 - Verification of currents and voltages Behavior under operational conditions
 - No overheating of components under operation
 - Functionality of cooling system (if applicable)

Three days (03) days remote monitoring data under operation shall be analyzed by Employer’s Representative or his Delegated Assistant in order to determine the health of the Battery Energy Storage System, and the system shall be accepted if the data conforms with the manufacturer's data sheet and approved system design. In case of any documented deviation from the given specifications (after considering measurement uncertainty), further tests such as Round-Trip Efficiency (RTE), Charge / Discharge and Capacity test shall be carried out at the cost of the Contractor prior to site Taking Over.

11.8 Tests After Completion of O&M Period

Upon completion of O&M period, the Contractor shall perform the tests listed under commissioning tests. In case the PV system corrected output is found to be lower or degraded by more than 3% beyond the commissioning tests results, the Contractor shall, at its own cost, make up for the shortfall in capacity

For the BESS, degradation shall not exceed the limits specified in the manufacturer’s data sheet and the approved system design.

These tests represent the ultimate validation of system performance and reliability after an extended operational period and granted only after the system has demonstrated sustained performance meeting all specifications throughout the three years of operational period

12. ADDITIONAL DOCUMENTATION AND REPORTING REQUIREMENTS

12.1 Erection and Testing Manuals

Detailed erection and testing procedures (method statements), including instructions on handling, installation, and storage of all equipment, shall be submitted at least 28 days before the start of erection.

12.2 Operation and Maintenance Manuals

At least 28 days prior to scheduled commissioning, the Contractor shall provide detailed O&M manuals with drawings and schematics covering all civil, mechanical, and electrical works and equipment. Manuals shall include specifications, data sheets, vendor data, and shop drawings.

12.3 As-Built Drawings

The Contractor shall provide six (6) sets of detailed as-built drawings for the entire Project, covering PV, civil, mechanical, and electrical general arrangements. Drawings shall be based on approved shop drawings and verified field information. Drawings shall be delivered in hard copy and electronic formats, including AutoCAD.

12.4 Commissioning and Testing Reports

Within 28 days after the expiry of the Time for Completion, the Contractor shall issue a Commissioning Report to the Employer’s Representative or his Delegated Assistant, including copies of all test records.

12.5 Insurance and Construction Consents

At least 15 days prior to commencement of construction, the Contractor shall submit evidence that all required insurances under Clause 18 of CoC, permits, and consents have been obtained.

12.6 Photographic Records

The Contractor shall take digital and drone-based photographs of ongoing works. These records shall be included in MPRs and provided on a USB or other approved digital medium approved by the Employer’s Representative or his delegated Assistant.

12.7 Drawings for Construction

The Contractor shall provide six (6) printed copies and one (1) electronic copy of all “Issued for Construction” drawings. All such documents shall also be uploaded to the DMS in accordance with Sub-Clause 10.4.

12.8 Programme of the Works

Prior to the Commencement Date, the Contractor shall submit a Programme of the Works under Sub-Clause 8.3 covering all the activities of the Works but shall not be limited to engineering, procurement, transport, construction, testing and commissioning activities, etc.,. The schedule shall be prepared using Primavera (or another software acceptable to the Employer’s Representative or his Delegated Assistant) based on Critical Path Method (CPM). Monthly Progress Reports shall include such Programme or revised Programme depicting the actual progress of the Works against the Initial accepted Programme of the Works. The Contractor shall not make any amendment/deviation in the Initial Programme of the Works accepted under Sub-Clause 8.3 without the consent of the Employer’s Representative or his Delegated Assistant. The Employer’s Representative or his Delegated Assistant may require the Contractor to revise the initial programme, if found impractical or non-compliant.

13. PROJECT MEETINGS

Monthly project management meetings shall be held at site to review the MPRs. The Contractor shall present his report at each meeting. Weekly site management meetings shall also be held with the Employer’s Representative or his Delegated Assistant to review day-to-day progress and site procedures.

13.1 Monthly Progress Reports (MPRs)

The Contractor shall submit Monthly Progress Reports in a format acceptable to the Employer’s Representative or his Delegated Assistant, including financial status, updated drawings, and photographic evidence. Reports shall include progress photographs, drone aerial images, and stage-sequence progress videos.

13.2 Fortnightly Progress Meetings

Fortnightly meetings shall be held with the Employer’s Representative or his Delegated Assistant to review progress and resolve bottlenecks. The Contractor shall submit the next fortnightly work plan for review under Sub-Clause 5.2 of CoC, alongside reporting on the previous fortnight’s progress

SECTION – III: DC SYSTEMS

Technical Specifications under this section focus on Solar PV Modules to Inverters, DC cables and BESS. However, wherever applicable the same shall be applied for other parts of the Solar systems as well.

1. SOLAR PV MODULES

The PV modules shall be mono crystalline N type, half-cut, Topcon / HPBC or Mono PERC with a rated power of 600 Wp or higher and positive tolerance of 0 to +3%. They must maintain $\geq 95\%$ efficiency at 200 W/m^2 and have a module efficiency of at least 22%. Every PV Module shall be Hail resistant to at least of 50mm Dia or higher for the given tilt with power output equivalent or greater than its nominal power at STC conditions. The module Temperature Coefficient at Pmax shall be $-0.37\% / ^\circ\text{C}$ or lesser.

Modules will withstand impact from hail of $\geq 50 \text{ mm}$ Dia for the given tilt, mechanical loading of $\geq 5400 \text{ Pa}$ front / $\geq 2400 \text{ Pa}$ rear and $\geq 4 \text{ mm}^2$ UV-resistant cables.

1.1 Manufacturer and Material Requirements

Tier 1 PV module manufacturers, as defined by Bloomberg New Energy Finance (BNEF) for Q2 or Q3 of year 2025, shall be acceptable. Each module shall have IP 68 rated Junction Boxes which shall be dust and vermin proof having copper bus bar terminals, EPDM rubber gasket, EVA encapsulant, three reverse blocking diodes and IEC 62790 compliant.

1.2 Certifications:

The PV Module must be Type Tested based on IEC standard 61215 (Terrestrial PV Modules- Design qualification and type approval) and IEC 61730 (Photovoltaic module safety qualification) based insulation of Safety Class II. Modules must be resistant to Potential Induced Degradation (PID). The module shall be S.R.O 604 compliant issued by Government of Pakistan.

1.3 Minimum Specifications Table

No.	Parameter	Specification
1	Rated Power	$\geq 600 \text{ Wp}$
2	Tolerance	$0 \sim +3\%$
3	Module Efficiency	$\geq 22\%$
4	Operating Temperature	-40°C to $+85^\circ\text{C}$
5	System Voltage	1500 V DC
6	Fire Rating	IEC Class C, UL Type 29
7	Warranty	12-year product, 25 years performance
8	Certifications	IEC 61215, IEC 61730, IEC 62941
9	Protection Class	Class II
10	Encapsulant	Ethylene Vinyl Acetate (EVA) or better

1.4 Warranty and Performance

The PV modules shall include a 25-year performance warranty, guaranteeing at least 85% of initial power output for year 25, with a maximum 0.5% annual degradation after the first year. A

minimum 12-year product warranty covering materials and workmanship is also required. Light induced degradation (LID) should not be more than 2%.

2. HYBRID INVERTERS

Hybrid inverters for RTS applications shall be designed for single-phase or three-phase operation, supporting both grid-tied and off-grid modes with seamless transition. These inverters must be compatible with lithium-ion and lead-acid battery technologies, enabling efficient energy storage and backup power functionality. The hybrid inverter must support a wide DC input voltage range to accommodate different PV array configurations and should include a built-in MPPT charger for optimal solar energy utilization.

The inverter must provide intelligent energy management, allowing users to prioritize solar, battery, or grid power according to programmable settings. Remote monitoring and control via Wi-Fi or Ethernet shall be standard, with mobile app support for real-time performance tracking. The inverter must include comprehensive protection features such as anti-islanding, overvoltage, overcurrent, short-circuit, and ground fault protection, as well as battery management functions including overcharge and deep discharge protection.

All hybrid inverters must be compatible with energy management systems and support remote monitoring. Full compliance documentation, test reports, and pre-shipment inspection certificates shall be provided at delivery.

2.1 Manufacturer and Material Requirements

Hybrid inverters must be supplied by reputable manufacturers with proven deployment in residential and commercial installations, certified and compliant with international standards.

2.2 Certifications:

The hybrid inverter must be certified to the following standards:

- IEC 62109-1/2: Safety of power converters
- IEC 61683: Efficiency of power converters
- IEC 61000-6-2/4: EMC immunity and emission
- UL 1741: Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources or equivalent

2.3 Minimum Specifications Table

Parameter	Requirement
Rated Power Output (Min.)	As Specified for each Site
Maximum DC Input Voltage	Compliant with PV Array
Output Voltage & Frequency	Compatible with Point of Interconnection
Power Export Limit Function	Inverter Should have Power Export Limiting Feature
MPPT Voltage Range	Compliant with PV Array
Number of MPPTs	Multiple except for 6 kW or less Inverter
Battery Voltage	24 V or higher (model dependent)
Battery Compatibility	Lithium-ion (LPF), Lead-acid

Parameter	Requirement
Maximum Efficiency	≥96.5%
European Weighted Efficiency	≥96%
Grid Modes	Grid-tied, Off-grid, Backup, Parallel
Communication Mode	Wi-Fi / 4G, Ethernet, RS485
Communication Protocols	Modbus-RTU, Modbus-TCP
Protection Features	SPD, AFCI, GFDI, Anti-islanding, BMS
Ingress Protection	IP65
Operating Temperature Range	-30°C to +60°C
Warranty	10 years

2.4 Warranty and Performance

Hybrid inverters shall include a minimum 10-year standard product warranty. Installation, commissioning, and O&M manuals must be provided in English.

3. BATTERY ENERGY STORAGE SYSTEM (BESS)

BESS shall be designed for ease of installation, user-friendly operation, and integration with PV arrays and inverter. The system features a modular design, enabling capacity expansion if required.

In order to ensure that the hybrid inverter remains operational for extended time during solar hours in the event of load shedding, the Contractor, in consultation with the Client, shall define the load that can be supported by the battery during islanded operation, ensuring the continued operation of the inverter. A joint proforma, duly signed by both the Contractor and the Employer, shall document the load details for the building owner’s awareness to ensure proper operational practices during load shedding.

3.1 Manufacturer and Material Requirements

LiFePO4 batteries of requisite capacity shall be used for the project, which shall be compliant with relevant IEC, IEEE, BS, EU and other international standards.

The Battery energy system and all its components shall meet the following international standards:

- IEC 62619 for lithium battery pack safety
- UL 9540/UL 9540A for fire safety and thermal runaway resistance
- IEC 61000-6-1/2/3/4 for EMC immunity and emissions
- UN38.3 for transport safety certification of lithium battery or equivalent

3.2 Minimum Specifications Table

Parameter	Requirement
Rated Energy Capacity	As Specified for each Site
Cell Chemistry	Lithium Iron Phosphate (LFP)
Depth of Discharge (DoD)	≥ 90%

Parameter	Requirement
Round-trip Efficiency	≥ 90%
Cycle Life	≥ 6,000 cycles @ 80% DoD
Operating Voltage Range	24V and above (model and design dependent)
Maximum Charge/Discharge Rate	≥1 C
Ambient Operating Temperature Range	-30°C to +50°C
Ambient Charging Temperature	-30°C to +50°C (self-heating for sub-zero charging)
Relative Humidity	0–95% RH (non-condensing)
Ingress Protection (Self or Enclosure)	≥ IP65
Noise Emission	≤ 65 dB(A)
Monitoring	BMS, mobile app, cloud-enabled
Safety Integrity Level	SIL-2 or Higher

3.1 Warranty & Performance

The system shall include a minimum 10 – year product warranty and a performance warranty ensuring at least 70% of initial capacity after 10 years or 6000 cycles @ 80% DoD.

3.2 Protection and Safety Requirements

LiFePO4 batteries shall be compliant with relevant IEC, IEEE, BS, EU and other international standards. The Battery backup should be equipped with comprehensive protection features, including Type II DC/AC surge protection, insulation resistance monitoring, and residual current detection. It should also provide cell-level temperature monitoring, emergency stop functionality, and integrated fire suppression for BESS systems. All safety measures shall comply with international standards and industry’s best practices.

3.3 Monitoring & Control

The battery system shall feature an advanced monitoring interface for real-time tracking of SOC, SOH, cell voltages, cell imbalances, current, and temperature. It should support remote monitoring and control via standard communication protocols and integrate with the site SCADA or EMS. The system shall enable charge/discharge scheduling ensuring safe and efficient operation across varying grid and load conditions.

3.4 Documentation & Services

The supplier shall provide complete documentation, including installation, operation, and maintenance manuals in English, along with factory test and type-test certificates. SCADA integration guides, remote monitoring manuals, on-site training, and commissioning support shall be included to ensure smooth deployment. The system must be compatible with energy management platforms and support future expansion and upgrades as required.

4. DC CABLE, EQUIPOTENTIAL BONDING AND DC EARTHING

Copper cables with purity of 99.9% or more with XLPO insulation and rated at 1500 V shall be used for string formation, equipotential bonding and earthing. Cables shall be low smoke Halogen free along with compliance with IEC and British standards. Minimum size for DC cables will be 4 mm². For DC cables, voltage drop shall be less than 1% at STC. Separate DC and AC

earthing each with 5 ohm or lesser resistance shall be achieved using the earthing arrangement.

6 mm² earth wires for equipotential bonding shall be used. In case same earthing is used for PV module equipotential bonding and lightning protection, the minimum cable size shall be 16mm². Relevant building codes and electricity acts shall be complied with.

4.1 Minimum Specifications Table

Parameter	Requirement
Cable Type	XLPO insulated, Halogen Free
Voltage Rating	1500 V DC
Conductor	Copper, ≥99.9% purity
Earthing Type	Rod / Bore type

5. LIGHTNING PROTECTION SYSTEM

Lightning protection system capable to withstand lightning currents of 100 kA with earthing resistance of 10 ohms or less shall be provided.

Lightning protection system include 5 spike on copper ball, copper tape, copper nail, copper staple, sand mortar, copper plate (600 x 600 x 3mm) and Bare conductor with complete erection of accessories as per project specified requirements.

6. CENTRALIZED AND REMOTE MONITORING SYSTEMS

The system shall integrate seamlessly with all plant devices via industry-standard communication protocols, incorporating robust cybersecurity for secure remote access and data integrity. Intuitive HMI dashboards shall provide clear visualization for operators for all roof top systems. The SCADA platform shall be designed in accordance with approved design requirements, supporting real-time data acquisition, command execution, and system optimization including fault detection, alarms and rectification time.

Online and real-time monitoring shall be provided with the following parameters along with the remote power on / off control.

- Energy generation (kWh)
- Power production (kW)
- String-level monitoring of Voltage and Current
- Storage and monitoring data for at least 5 years
- 4 x 55” TV Screens (For Centralized Monitoring)
- Server and accessories

6.1 Minimum Specifications Table

Parameter	Requirement
Communication Protocols	Modbus TCP/IP, IEC 104, IEC 61850
Connectivity	Ethernet, fiber optics, 4G/LTE (optional)
Data Logging	Historical trending, KPI reporting, alarms

Parameter	Requirement
Visualization	Web-based HMI, intuitive dashboards
Control Capability	Remote start/stop, parameter adjustments
Access Management	Multi-user with secure authentication
Cybersecurity	Encryption, firewall protection, role-based access
Integration	Inverters, BESS, Meters
Expandability	Modular for future device integrations
Operating Temperature	-30°C to +60°C
Warranty	≥ 5 years

SECTION – IV: AC SYSTEMS

Technical Specifications under this section focus on the AC network from Inverter to LV panels, however, wherever applicable the same shall be applied for DC Cables, Earthing, Breakers, Distribution Boxes as well.

1. LOW VOLTAGE (LV) DISTRIBUTION BOARDS

1.1.General

The Low Voltage Distribution Boards shall be sheet steel fabricated. These shall be suitable for surface mounting, semi-recessed or recessed in wall mounting. The Low Voltage Distribution Boards shall be totally enclosed, dust and damp proof. The Low Voltage Distribution Boards shall be complete in all respects with material and accessories, factory assembled, tested and finished according to the Specifications and to the normal requirements.

1.2.Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

BS 4752-1	-	Triple Molded Case Circuit Breaker
IEC 947	-	Single and Triple Miniature Circuit Breaker
IEC 947	-	Low Voltage Switch gear and Control gear
IEC 439	-	Factory Built Assemblies of LV Switch gear
IEC 4752		Switch gear and control gear for Voltages
BS 88	-	HRC Fuses
IEC 73	-	Colors for indicator lights and push buttons
IEC 446	-	Identification of insulated/bare conductors

1.3.Components

The Low-Tension Distribution Board shall be provided with components for the satisfactory operation of the electrical system.

Typical component specifications are given below:

1.3.1. Bus Bars

The bus bars shall be made of high conductivity electrolytic copper and shall be completely isolated and mechanically braced for the specified fault level. The phase identification of bus bars shall be by colors applied on bus bars and these shall be red, yellow and blue for phase and white for neutral. The earth bus bar shall be green.

1.3.2. Molded Case Circuit Breaker (MCCB)

The MCCB shall be of molded case type, provided with fixed magnetic short-circuit and fixed thermal overload protections.

1.3.3. Miniature Circuit Breaker (MCB)

The MCBs shall be appropriate current ratings as required. They shall be provided with fixed magnetic short-circuit and fixed thermal overload protections.

1.3.4. Push Buttons

Push buttons shall be momentary make break contact type (normally open/normally close).

1.3.5. AC voltmeters

The AC voltmeters shall be of digital type, suitable for flush mounting on switchboards, and shall provide a clear display for accurate measurement of voltage.

1.3.6. Ammeters

The AC voltmeters shall be of digital type, suitable for flush mounting on switchboards, and shall provide a clear display for accurate measurement of current.

1.3.7. Voltmeter Selector Switch

The voltmeter selector switch shall be complete with front plate, grip handle, and RY-YB-BR-OFF-RN positions.

1.3.8. Current Transformers

The current transformers shall be of air-cooled, ring-type construction and shall be suitable for the intended application. They shall be provided with adequate burden and accuracy class to ensure reliable measurement and protection functions.

1.3.9. Air Break Magnetic Contactors

The contactors shall be air break, suitable for the type of duty to be performed. Contactor shall be provided operating coil and auxiliary contacts wired up to terminals. The number of working auxiliary contacts shall be provided according to the system requirements.

1.3.10. Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, auxiliary transformer and shall have rosettes of suitable color.

1.3.11. Line up Terminals

Line up terminals wherever provided for control of lighting, power and control circuits shall be suitable for voltage and size of conductors. The line-up terminals shall be suitable for channel mounting. All necessary accessories shall be provided.

1.4. Installation

The actual location shall be determined at site, keeping in view the site conditions and in coordination with other equipment.

Low Voltage distribution board for recessed mounting in wall shall be installed such that the door shall finish flush with the surface of wall. The recess mounted distribution board shall be installed before the plastering of walls. The DB shall be protected to avoid any damage due to the civil work.

All loose parts dispatched separately with the DB shall be installed as per manufacturer instructions and all adjustments or setting shall be made, as required. All screws, nuts and bolts used for fixing the distribution board shall be galvanized. The distribution boards installation shall include connecting all incoming and outgoing cables. The cable entry in the boards shall be provided from top or bottom as required.

The distribution board body shall be connected to earth as per instructions described in section "Earthing" of these Specifications. The switchboard shall be tested and commissioned in the presence of the Employer’s Delegated Assistant.

2. LOW VOLTAGE CABLE

2.1.General

The work under this section consists of supplying, installing, testing and commissioning of all material and services of Low Voltage cables and the accessories.

The Contractor shall discuss the electrical layout with the Employer’s Delegated Assistant and coordinate at site with other services for exact route, location and position of the electrical lines.

The cable shall be suitable for nominal service voltage, have an insulated Conductor, shielded and sheathed. It shall be suitable for indoor and outdoor use in the transmission and distribution of electrical energy.

2.2.Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials within the scope of this section:

BS 6360	-	Conductors for insulated cables
IEC 228	-	Conductors for insulated cables
BS 6500	-	Insulated flexible cords
BS 5467	-	XLPE insulated cables

2.3.Material

2.3.1. Phase Identification

All cables shall have phase identification colors on insulation of each core. The color code for three phase circuits shall be;

- Red, Yellow and Blue for phase conductors.
- Black for neutral conductor.
- Green for earth conductor. Where XLPE insulated cable is installed.

Single phase circuits shall have insulation of;

- Red color for phase/line
 - Black color for neutral
 - Green color for earth conductor.
- All DC circuits shall have insulation of;
- Red color for positive conductor
 - Black color for negative conductor
 - Green color for earth conductor.

2.3.2. Cable Accessories

All accessories shall be provided for the complete cabling. These shall include but not limited to items such as saddles, clamps, fixing channels, connectors, cable joints (where necessary and as approved by the Employer’s Delegated Assistant), clips, lugs, tapes, solder, identification tags, bushes, glands, etc.

2.4. Installation

2.4.1. Cables in flexible/rigid pipes on surface

All cables for on surface pipes shall be installed through the pipes without the use of lubricants. The flexible/rigid pipes shall be fixed to wall/ceiling surface by means of cable clamps using Rawal plays and galvanized screws.

2.4.2. Underground Cable

The cables to be installed directly underground shall be laid in trench in single ties. The depth of cable underground, shall be three feet minimum, measured from the top of the largest cable to the general ground level. The burial depth may be increased as required due to site conditions or when crossing other service pipes and roads. Burial depth less than three feet and more than five feet shall require Employer's Delegated Assistant 's approval.

When cables crossroad, paved area, other services or other cables, they shall be laid in protective pipes of required size. Cables entering the buildings shall also be laid in protective pipes. The protective pipe ends, after installation of cables shall be plugged watertight by means of bituminized resin or equivalent method as approved by the Employer's Delegated Assistant. A minimum clearance of ten inches vertically and 20 inches horizontally shall be maintained between cables and other services.

Cable identification tags of corrosion resistant material shall be tied to cables with bronze wire at a maximum of 65 feet interval along the cable length for identification of cable and circuit. Above ground cable markers of 8 SWG (4 mm) sheet steel and 200 mm² shall be erected at 100 feet intervals along the straight trench, and at each bend and joint box for indication of presence of underground cable. For more than three feet wide trenches, cable markers shall be provided at both edges of the trench. The cable marker shall be finished in Gray heavy enamel paint over two base coats of anti-rust red oxide paint, with the necessary instructions indicated in approved colors.

The Contractor shall furnish samples of cable marker for approval of Employer's Delegated Assistant before installation. The marker shall be welded to an angle iron fixed to the ground on a cement concrete base or as directed by the Employer's Delegated Assistant. The earth continuity conductor shall be laid in the trench with the cables. The Contractor shall submit to the Employer's Delegated Assistant for approval, schedule of cable markers showing location of marker and instructions on each.

Before laying of cables in the trench, the bed of the trench shall be leveled and filled with a four-inch-thick layer of fine sand (1/32-inch diameter maximum particles size). The sand layer shall be leveled and the cables placed thereon; the cables shall be covered with a layer of fine sand four-inch thick measured above the top of the largest cable.

The cable protective bricks placed above the top of sand cover shall be of Class - C cement concrete, minimum two-inch thick and 12 inches x 12 inches square or as approved by the Employer's Delegated Assistant. The bricks shall be placed over the sand layer end to end to cover the entire length and breadth of the cable trench, after the concrete bricks are placed, the remainder of the trench shall be backfilled with earth in layer 16 inches thick. Each layer shall be thoroughly tamped and compacted.

Sufficient slack shall be left in cables for which purpose the cut lengths of cables shall also about 3% more in the measured lengths between terminations. At underground joint box, ample slack shall be left to prevent straining of cable joints due to settlement of the cable trench.

The cut lengths of cables wherever stated are only as a guide. The cable shall not be bent to a radius less than that recommended by the cable manufacturers.

Pipes/ pipes/ ducts for electrical, PSD & ITS etc. cables shall be properly sealed with the water proofing material “Plastic Polyurethane Foam” as per relevant ASTM standard to avoid rainwater entry to the pipes. The contractor shall also provide the technical data of the sealant material before the execution of the work.

3. CABLE TRAYS

3.1. General

The Contractor shall discuss the layout with the Employer’s Delegated Assistant and coordinate at Site with other services for exact route, location and position of the cable trays for electrical lines.

3.2. Applicable Standards/Codes

Latest editions of the following standards / codes shall be applicable for the materials in scope of this Section:

BS 729 - Hot dip galvanized coating on iron and steel articles

3.3. Materials

- The whole of the tray work, trays, fittings, supports shall be of mild steel hot dipped galvanized. The thickness of the protective sheath on any element shall not be less than 55 microns.
- Cable trays shall be constructed from mild steel hot dip galvanized and of minimum thickness of 1.5mm.
- Insert elements, bolts, screws, pins, etc., shall be mild steel cadmium plated.
- Tray work shall have oval perforations. Ladder type trays shall be used for vertical runs as approved by the Employer’s Delegated Assistant.
- All trays (straight and fittings) shall be welded construction and be a heavy duty returned-flanged, perforated type, unless specified otherwise. The minimum thickness of heavy duty returned flanged cable trays shall be 1.5mm.
- Tray components shall be accurately rolled or formed to close tolerances and all edges rounded. Flanges shall have full round smooth edges.
- Ladder racks shall be of similar construction. The rungs shall be spaced at maximum 300 mm. The system shall allow for installing additional rungs and for replacement of rungs.
- For all trays, flanges shall be a minimum of 50 mm deep, unless otherwise specified.
- Cable trays and accessories installed in hazardous and extremely corrosive environments shall be heavy duty grade stainless steel.

3.4. Installation

- Drilling, machining or cutting shall not be carried out after application of protective coat, unless previously agreed by the Employer’s Delegated Assistant. If cutting or drilling is necessary, edges shall be cleaned up and painted with zinc-based paint before erection.
- Installation of vertical runs of tray along the line of vertical expansion joints in structure of the facility shall not be allowed.
- Cables shall be fixed to the trays by means of PVC covered saddles or straps secured with brass or cadmium plated bolts, nuts and washers.

- 20% spare capacity shall be maintained once all cables have been installed on trays. Double banking of cables shall not be permitted space between adjacent cables shall be not less than the radius of the bigger cable.

The Contractor shall calculate the size of the tray and submit to the Employer’s Delegated Assistant for approval.

The Contractor shall check the minimum size as specified is large enough for his requirements and provide 20% spare capacity for future use.

3.5. Erection

Cable trays arranged one above the other shall have spacing in relation to their width not exceeding a ratio of 1:2 with a minimum distance of 150 mm.

3.5.1. Supports

Install fixings and supports:

- (a) at 3 meter centers
- (b) 50 mm from bends, tees, intersections and risers
- (c) as close as practicable to joints
- (d) each side of expansion joints.
- (e) Supports shall be selected from the following types, to suit the site conditions:
- (f) M12 steel threaded drop rods fixed to ceilings complete with GI channels or brackets
- (g) wall support brackets cantilever arms
- (h) steel channels

The cable trays shall be fixed in accordance with site conditions and manufacturer’s recommendations. Join cable tray and accessories with hardware per manufacturer’s recommendations. Avoid mid-span joints.

The Contractor shall submit, as required, all calculations relating to tray work and tray supports demonstrating acceptable mechanical stresses and sag. Cable trays installed on roofs shall be supported using GI brackets or concrete blocks. Removable cable tray cover shall be fitted.

3.6. Earthing Of Cable Tray

Cable trays and accessories shall be electrically and mechanically continuous throughout their length.

The entire cable tray system shall be bonded and 12 mm x 2.5 mm tinned copper links shall be bolted across each joint in the system by means of bronze nut and bolts, complete with flat and spring washers.

All cable trays shall be provided with earth continuity copper tape along the whole route of cable trays which shall be bonded to the main earthing system of the facility. The earth continuity copper tape shall be fixed on cable tray by means of PVC covered saddles or by other means approved by the Employer’s Delegated Assistant.

4. PIPES

4.1. General

The work under this section consists of supplying, installing, and commissioning of all material and services of the pipes.

The Contractor shall discuss the layout with the Employer’s Delegated Assistant and coordinate at Site with other services for exact route, location and position of the pipes for electrical lines.

The Contractor shall ensure exact location and route of pipes as per site requirements and as directed by the Employer’s Delegated Assistant.

4.2. Applicable Standard/Codes

Latest editions of the following standards / codes shall be applicable for the materials in scope of this Section:

- BS 6099 - PVC pipes and accessories.
- BS 3595 - PVC pipes & accessories.
- BS 4346 - Cement Solvent for jointing

4.3. PVC Pipe and Accessories

The PVC pipe shall be rigid. All pipes shall be minimum Class D (Working pressure - 12 bar). The buried PVC pipe should be able to withstand the external load acting upon it by continuous movement of heavy duty vehicles such as trucks. Cranes, forklift, etc. Where pipe change direction, manufactured smooth bends shall be used. Bending of pipes by heating or otherwise will be allowed in special cases only. Bending of pipes by heating shall be carried out by first filling the pipe with sand inside and then immediately removing the sand. The use of sharp 90-degree bends and tees will not be allowed. The bends shall conform to same specifications as given for PVC pipes. for joining of pipe all precautions and procedures recommended by manufacturer shall be followed.

4.4. Installation

4.4.1. PVC Pipe

Rigid PVC pipes shall be installed under roads and paved areas, at crossing with other services. The depth of the pipe shall vary according to the conditions at site, and approval of Employer’s Delegated Assistant shall be obtained prior to installation. In general the pipes shall be installed underground at the following depths measured from the top of the pipe:

- a) Under roads and paved surface 900 mm below the finished surface
- b) When crossing other services 250-mm vertical clearance. for the crossing length.
500 mm horizontal clearance with CC protective cover.

The trench of required dimensions shall be excavated and the bottom of trench cleaned and levelled. A Four-inch-thick bed of fine sand shall be provided over which the PVC pipes installed after proper alignment. Where two or more pipes are installed in the same trench the clearance

between pipes shall not be less than Two inches. After laying of pipe the trench shall be backfilled with clean-screened earth in layer of Four inches. Each layer shall be properly compacted.

Where underground cables enter connection terminal boxes the PVC pipe shall be installed on surface by means of PVC clamps at a maximum interval of 18 inches.

After installation, the ends of the pipe shall be plugged with material impervious to water and chemicals. All joints shall be sealed adequately to prevent entry of foreign elements.

The installation of pipes shall be completed in all respects including its fixing at terminations,

before cabling work is started. All sharp edges and burrs shall be removed by using reamer or any approved device. The pipe shall be thorough cleaned of dirt and dust from inside. the pipes shall be installed in proper co-ordination with other works.

5. EARTHING

5.1. General

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories of the complete earthing system

The Contractor shall discuss the electrical layout with the Employer’s Delegated Assistant and Coordinate at Site with other services for exact route, location and position of the electrical lines and equipment.

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

5.2. Applicable Standards/Codes

The latest editions of following standards/codes shall be applicable for the materials in scope of this section: -

- BS 951 - Earthing Clamps
- CP 1013 - Earthing
- BS 2874 - Nuts, bolts, washers, screws & rivets fixing.
- BS 1433 - Hard drawn bare copper conductor for earthing.

5.3. Material

5.3.1. Earth Electrode (Rod Type)

The earth electrode shall comprise ten feet long, 5/8 inch dia. copper deposited steel rod having flat head at drive end and pointed conical tip at the driven end. The tip shall be hardened to facilitate driving. At the top of the rod, a clamp for bolted connections shall be provided suitable for connection to the down conductor.

5.3.2. Earth Electrode (Bore Type)

The earth electrode shall comprise of Tinned copper earth spike. At the top of the pipe, a clamp for bolted connections shall be provided suitable for connection to the down conductor.

5.3.3. Earthing Lead

The earthing lead shall connect the earth electrode to earth connecting point and on the metallic part. It shall be round hard drawn bare electrolytic copper.

5.3.4. Earth Continuity Conductor

Earth continuity conductor (ECC) shall be hard drawn bare copper wire or single core XLPE insulated copper conductor cable of sizes.

The specifications for single core XLPE insulated or PVC/PVC cables used as ECC shall be same as those in relevant sections of Technical Specifications.

5.3.5. Earth Connecting Point

Earth connecting points shall comprise tinned copper bar, rectangular in shape, having dimensions of 350 x 50 x 6 mm. At least, six terminals for connection shall be arranged on the bar, which can be increased or decreased as required by the Employer’s Delegated Assistant.

The terminals shall have brass or tinned copper bolts, nuts and washers for protection against corrosion. Two holes shall be provided off Centre of the copper bar for fixing to the wall by means of 10 mm dia. nut and bolt/ Rawal bolt and shall be insulated by means of rubber gaskets/washers/ insulators.

5.4. Installation

5.4.1. General

The earthing system shall have earth resistance, including the resistance of soil, earth leads and ECC shall not be greater than five (05) ohms.

At all connections of earth continuity conductor to high mast or any other metallic body, proper size copper or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or terminations shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket.

5.4.2. Earth Electrode (Bore Type)

The earth electrode/spike shall be placed after bore at site. The bore shall be made up to permanent water level of 80 feet which ever is less. The earth electrode shall be connected to the earthing conductor of suitable size. The earthing conductors shall be laid in a perforated GI pipe of suitable size.

In case the soil conditions at site permit, the earth electrodes may be installed by hammering the electrode in soil, until the top of the rod is about 12 inches below the proposed ground level. If hammering down is not possible due to site conditions, a pit shall be first excavated in bare ground up to the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 20 inches, each layer tamped and compacted. The inspection chamber shall have a cover supported on angle iron frame. The cover shall be approved by the Employer’s Delegated Assistant and shall finish flush with the ground level.

5.4.3. Earth Electrode (Rod Type)

In case the soil conditions at site permit, the earth electrodes may be installed by hammering the electrode in soil, until the top of the rod is about 12 inches below the proposed ground level. If hammering down is not possible due to site conditions, a pit shall be first excavated in bare ground up to the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 20 inches, each layer tamped and compacted.

5.4.4. Earth Continuity Conductor

The body of all switchboards shall also be connected to earth by specified size of ECC. All other metal work shall also be connected to earth by specified size of ECC.

At any joint or terminations, the ECC shall be connected using proper accessories. No connection shall be made by twisting of earth conductors.

5.4.5. Earth Connecting Point

The earth connecting point shall be fixed on wall surface by means of brass screws.

6. LOW VOLTAGE SWITCHBOARDS

6.1. General

The work under this section consists of design, manufacturing, fabricating, supplying, installing, testing, and commissioning of all material and services of the complete LV (LV) switchboard for indoor installation.

The Contractor shall discuss the electrical equipment and power & control cables layout with the Employer’s Delegated Assistant and coordinate at site with other services for exact locations and positions of the electrical lines and equipment.

6.2. Low Voltage Switchboard

The LV switchboard shall be sheet steel fabricated. The LV switchboard shall be totally enclosed, dust and damp proof. The LV switchboard shall be complete in all respects with material and accessories, factory assembled, tested and finished. The enclosures of LV switchboards and Bus Tie Duct shall be provided with rubber gasket and a lockable hinged door with cam fastener.

6.3. Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

- IEC 947 - Triple pole Air Circuit Breakers
- BS 4752-1 - Triple pole Molded Case Circuit Breaker
- VDE 0641 - Single and Triple pole Miniature Circuit IEC 947 Breaker.
- IEC 947 - LV Switch gear and Control gear
- IEC 439 - Factory Built Assemblies of LV Switchgear
- IEC 4752 - Switch gear and control gear for Voltages up to and including 1 kV
- BS 88 - HRC Fuses
- IEC 73 - Colors for indicator lights and push buttons.
- IEC 446 - Identification of insulated/bare conductors

6.4. Components

The LV switchboard shall be provided with components as specified in these specifications.

Typical component specifications are given below: -

6.4.1. Bus Bars

The bus bars shall be made of high conductivity electrolytic copper and shall be completely isolated and mechanically braced for the specified fault level. The phase identification of bus bars shall be by colors applied on bus bars and these shall be red, yellow and blue for phases and white for neutral. The earth bus bar shall be green.

6.4.2. Moulded Case Circuit Breaker (MCCB)

The MCCB shall be molded case. The MCCBs shall have fixed Magnetic Short circuit and fixed Thermal Overload protections. All incoming circuit breakers shall be MCCBs.

6.4.3. Air Circuit Breaker (ACB)

Air Circuit Breaker (ACB) shall be of withdrawable metal-clad, flush mounted. Horizontal draw-out isolation and air break type suitable for installation on cubicle type of switchboard. They shall be three or four poles as specified. They shall consist of quick-make, quick-break, mechanically and electrically trip free mechanism to give double break in all poles simultaneously. The closing mechanism shall be of stored energy type, either manually or electrically charged.

6.4.4. Miniature Circuit Breaker (MCB)

These shall have fixed magnetic short circuit and fixed thermal overload protections. The miniature circuit breakers shall have a short circuit breaking capacity as per international standards. These Circuit Breakers shall be suitable for working on lighting and power circuits.

6.4.5. Air Break Magnetic Contactors

The contactors shall be of air-break type, suitable for the duty required. The main contacts shall be silver-tipped, butt-type with double break per pole. Each contactor shall be provided with an AC operating coil and shall have a minimum of two normally open (NO) and two normally closed (NC) auxiliary contacts wired up to terminals. Additional auxiliary contacts shall be provided as required to meet the system requirements.

6.4.6. Push Buttons

Push buttons shall be momentary make break contact type (normally open/normally close). These shall be suitable for flush mounting on switchboard, plastic faceplate etc. Push buttons shall have round/square head. These shall be of red color for 'ON' and green color for 'OFF' operations.

6.4.7. AC voltmeters

AC voltmeters shall be digital type and shall be suitable for flush mounting on front door of the switchboards.

6.4.8. Ammeters

AC ammeters shall be digital type and shall be suitable for flush mounting on front door of the switchboards.

6.4.9. Voltmeter Selector Switch

The voltmeter selector switch shall be complete with front plate, grip handle, and RY-YB-BR-OFF-RN positions.

6.4.10. Ammeter Selector Switch

The ampere meter selector switch shall be complete with front plate, grip handle, and R-Y-B-OFF positions.

6.4.11. Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, neon lamp and shall have rosettes of suitable color.

6.4.12. Current Transformers

Air-cooled, ring type current transformers shall be provided having transformation ratio. The current transformers shall be of suitable burden having accuracy class.

6.4.13. Line up Terminals

Line up terminals wherever provided for control of lighting, power and control circuits shall be suitable for voltage and size of conductors. The line-up terminals shall be suitable for channel mounting. All necessary accessories such as end-plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

6.5. Installation

The location shall be determined at site, keeping in view the site conditions and in coordination with other equipment.

LV switchboard for floor mounting shall be installed on already prepared CC cable trenches. The LV switchboards shall be protected to avoid any damage due to civil work.

All loose parts dispatched separately with the switchboard shall be installed as per manufacturer instructions and all adjustments or setting shall be made as required. All screws, nuts and bolts used for fixing the switchboard shall be Galvanized.

7. AMI Meters

AMI meters to be deployed at RTS should comply with relevant WAPDA/PEPCO specifications and applicable IEC standards for metering accuracy, performance, safety, and data communication. The meters shall support two-way communication, remote reading, load profiling, tamper detection, and remote connect/disconnect functionality. They should include integrated GSM/GPRS or RF communication modules, enable secure data exchange with the head-end system, and maintain event logging with timestamps. The meters must also be capable of accurately measuring and recording both import and export energy. In addition, they shall meet electrical, mechanical, and environmental endurance requirements to ensure reliable and accurate operation under local site conditions.

SECTION – V: CIVIL & STRUCTURE WORKS

1. Civil Works:

1.1 Design Standard and Code

For material and civil design, The Contractor shall conform to the applicable requirements of the latest revisions of following standards and publications, in principle.

ASTM	American Society for Testing and Materials
ACI	American Concrete Institute
ISO	International Standard Organization
ASCE/SEI - 7	Minimum Design Loads for Buildings and Other Structures
UBC	Uniform Building Code
PBC	Pakistan Building Code
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C150	Standard Specification for Portland Cement
ASTM C260	Standard Specification for Air Entraining Admixtures for Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C989	Standard Specification for Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D1586	Standard Penetration Test
ASTM D2937	Standard Test Method for Density of Soil in Place by the Drive - Cylinder Method

1.2 Design Conditions

The design values to be used in this Project are as follows:

(a) Minimum Seismic Design

Structures and portions thereof shall, as a minimum, be designed and constructed to resist the effects of seismic ground motions per Zone 3 (0.32g) as provided in Pakistan Building Code.

(b) Design Wind Pressure

Wind Pressure $P_w = C \times q$

Where, $q = \frac{1}{2} \times \rho V^2$

$\rho =$ Air density/acc. (0.125 kg sec²/m⁴)

V= Wind velocity (45 m/sec)

C = Shape factor

(For Circular equipment = 0.85)

(For Angular equipment = 1.2)

1.3 Design Of Foundations

1.3.1 Foundations

All foundations shall be designed with top level 200mm above natural surface level (NSL)/ Finish Floor Level (FFL) unless specified otherwise. Appropriate slope shall be provided at the top of each foundation to prevent accumulation of rainwater.

The loads for design of foundation shall be taken from the foundation reactions calculated in the design of respective solar panels after applying appropriate load factors. The Contractor shall submit design calculations and load analysis for design of footings, retaining/protection walls, building works and other allied works for Employer's Representative or his delegated Assistant's review under Sub-Clause 5.2 of CoC..

The uplift coming at each support member of PV mounting structure shall be solely encountered by the requisite foundation pad weight or as approved by the Employer's Representative or his delegated Assistant. However, on existing CGI sheets The Contractor shall ensure the anchoring arrangement/details for the PV mounted structure and get the approval from the Employer's representative or his delegated Assistant.

All the PV mounting structure should be galvanized with relevant standard as approved by the Employer's representative or his delegated Assistant.

Protective coatings shall also be applied on foundations in contact with the soil and cost of protective coatings shall be deemed included in the price of the respective civil work/foundation.

1.4 Earth Work

1.4.1 Levelling of Site

The Contractor shall level the Site as required and to the extent considered necessary by the Employer's Representative or his delegated Assistant.

1.4.2 Excavation

- Excavation under this section shall consist of the dewatering, removal, hauling, dumping, and satisfactory disposal of all materials from required excavations for levelling the site area and construction of Civil Works. Excavation in rock/gravel strata by means of drilling, blasting, chemicals etc. shall also be done by The Contractor wherever required for which no additional cost will be permissible by The Contractor.
- Any and all excess excavation for the convenience of The Contractor or over-excavation performed by The Contractor for any purpose or reason, except as may be ordered in writing by the Employer's Representative or his delegated Assistant, and whether or not due to the fault of The Contractor, shall be at the expense of The Contractor.

1.4.3 Filling and Back-Filling

- Except as noted otherwise in the Specifications or the drawings, all the materials for filling and back-filling shall comply with the following requirements:

- Material shall not include any harmful materials, such as fertile soil or pieces of wood, slurry, mud, organic and other unsuitable material. The Contractor shall submit test reports of chemical properties (sulphate, chloride, etc.), organic content and pH value for the material which shall subject to approval by the Employer’s Representative or his delegated Assistant.
- Material shall not be of an extreme swelling nature.
- The gradation of the general fill/borrow fill material shall conform to the following limits or as approved by the Employer’s Representative or his delegated Assistant:

Material Size, U.S. Sieve Series	Percent Finer Than, by Weight
No. 10	100
No. 50	70 – 95
No. 100	25 – 75
No. 200	0 – 15

- The compaction shall be made in the field by raming machines or other mechanical means as approved by the Employer’s Representative or his delegated Assistant. The layer of compacted earth filling shall not be more than 15 cm per lift, and it shall be graded as horizontally as possible, and shall be sufficiently compacted to produce not less than 95% of laboratory maximum dry density as determined by ASTM Designation D1557 “Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort”. Field dry density shall be measured according to ASTM D-1556 - Standard Test Method for Density and Unit Weight of Soil in Place by Sand - Cone Method or ASTM D-2937 “Standard Test Method for Density of Soil in Place by the Drive - Cylinder Method” or other methods as approved by the Employer’s Representative or his delegated Assistant.
- Unless otherwise specified the base of all ground floors shall be constructed in accordance with the following specification.
- Sand filling shall be done in layers not more than 4 inch (100mm.) thick and shall be rammed after saturation to such an extent that 100mm (4 inch.) Layer is reduced to about 75mm (3 inch.) after compaction.
- Density achieved should correspond to 95% of the compaction obtained by ASTM 1557 at optimum moisture content.
- The base shall be perfectly level. Sand shall conform in all respects to the specifications for fine aggregate except for its grading, i.e. it shall pass through sieve No.16 and not more than 30% shall pass through sieve No. 100.

1.5 Concrete

1.5.1 Materials

The Contractor shall furnish all materials for use in concrete, including but not limited to cement, sand, coarse aggregate, water, reinforcing bars, admixture (including ground slag) and concrete curing compound. Air-entraining agent and curing compound shall be accepted on manufacturer's certification of compliance with specification requirements. However, the Employer's Representative or his delegated Assistant reserves the right to require submission of and to perform tests on samples of the agent and/or compound prior to shipment and use in the Work at the cost of Contractor.

Cement

Cement shall meet the requirements of ASTM C150 and shall meet the false-set limitations specified therein. The cement shall be free from lumps and damaged cement when used in concrete. Adequate provisions shall be made to prevent absorption of moisture when cement is stored. Cement Type-I shall be used. No extra payment shall be made to The Contractor in case, if sulphate resistant cement is used.

Cement Mill Test Certificates, when requested, shall be provided for each shipment of cement. Under no circumstances shall the source of cement be changed without prior written approval of the Employer's Representative or his delegated Assistant.

Sand and Coarse Aggregate

Sand and coarse aggregate shall be furnished from any approved source. The sand particles shall be clean, hard, dense, durable, uncoated rock fragments that will pass a screen having 6.5mm square openings. The sand shall be well graded from fine to coarse and shall be free from injurious amounts of dirt, organic matter, and other deleterious substances.

The coarse aggregate shall consist of clean, hard, dense, durable, suitable graded, uncoated rock fragments, shall be free from injurious amounts of flakes and elongated pieces, organic matter, or other deleterious substances. The maximum size of crushed coarse aggregate shall be 38mm/19mm or as directed by the Employer's Representative or his delegated Assistant. The grading of these sizes shall conform to ASTM C33. Lean Bed should be prepared underneath for dumping of Coarse Aggregate & Fine Aggregate to avoid mixing of soil and loose particles in the dump at site.

The Contractor shall submit, for testing and approval, representative samples of the sand and coarse aggregate proposed for use in the concrete work. All aggregates shall conform to the requirements of ASTM C33 including Petro-graphic test. During construction The Contractor shall also arrange testing of sand and coarse aggregate if directed by the Employer's Representative or his delegated Assistant to determine compliance with Specifications. The cost of all laboratory testing of these samples shall be borne by The Contractor.

Following tests shall be performed on sand and coarse aggregate to be used in construction:

- Gradation Analysis
- Sodium Sulphate Soundness
- Water Absorption
- Fineness Modulus (for sand)

- Sulphate and Chloride
- Los Angeles Abrasion (for coarse aggregate)
- Alkali-Silica or Potential Reactivity
- Petro-graphic Examination for suitability with OPC and SRC
- Flakiness and Elongation Indices (for coarse aggregates)

Fine Aggregate for Plastering shall conform to the requirements of ASTM C897.

Water

Water used for mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or reinforcement and shall meet the requirements shown in Table below. A complete chemical analysis of water shall be submitted prior to the start of construction work and shall be required for each new water source being chosen. The cost of all laboratory tests of the samples shall be borne by The Contractor. No change in water source shall be permitted without prior approval by the Employer’s Representative or his delegated Assistant..

Total Dissolved Solids (TDS)	800 ppm (max)
Magnesium, Chlorides and Sulphates	300 ppm (max)
pH Value	6.5 – 8.0

Reinforcing Bars

Reinforcing bars shall be deformed bars conforming to ASTM Designation A615, Grade 60. Representative steel bar samples shall be collected from the site and tested in the laboratory approved by the Employer’s Representative. The testing shall be witnessed by the Employer’s Representative or his delegated Assistant.. The cost of all laboratory tests and travelling of Employer’s Representative or his delegated Assistant shall be arranged/borne by The Contractor. Negative variation in weight [mass] up to maximum 2.0% of reinforcement bar(s) from the applicable weight [mass] per unit length prescribed in Table 1 of ASTM A615 will be allowed for bar(s) placement. Contractor will have to make adjustments in bar spacing/number of bars to accommodate the excessive negative variation in weight [mass] if greater than 2.0%. Contractor will not be allowed for bar(s) adjustment in case of overweight [excessive mass] of any deformed bar.

Admixtures and Ground Slag

Admixtures to be used in concrete shall be subject to prior approval of the Employer’s Representative or his delegated Assistant, and shall meet the following requirements:

- (i) Chemical Admixtures
 - Air-entraining admixtures shall conform to the requirements of ASTM C260, "Standard Specification for Air-Entraining Admixtures for Concrete.
 - Water reducing or retarding admixtures (normal plasticizers) shall conform to the requirements of ASTM C494, "Standard Specification for Chemical

Admixtures for Concrete”, Type A or D, respectively.

- High range water reducing or retarding admixtures (super plasticizers) shall conform to the requirements of ASTM C494, Type F or G, respectively.
- Only one of the admixture Type A, D, F or G, shall be added at a time.
- Chloride bearing admixtures shall not be permitted.
- Super Plasticizers shall be checked for their compatibility with pozzolanic materials in blended cement concrete.

(ii) Ground Granulated Blast-Furnace Slag

In area where high sulphate and chloride contents are present in soil/water, finely ground granulated blast-furnace slag can be used as cementitious material in concrete by replacing SRC maximum up to 30%. The properties of ground granulated blast-furnace slag should conform to the requirements of ASTM C989.

The cost of all laboratory testing of these samples shall be borne by The Contractor. Contractor will not be paid extra cost for the procurement of ground granulated blast-furnace slag to the construction site.

Air-Entraining Admixture and Cold Weather Concreting

It is mandatory that in all the concrete works air-entraining admixture conforming to ASTM C 260 shall be used. Guide to Cold Weather Concreting (ACI 306R) specifying concrete producers through the selection processes that identify methods for cold weather concreting will have to be opted. The objectives of cold weather concreting practices are to: a) prevent damage to concrete due to freezing at early ages; b) ensure that the concrete develops the recommended strength for safe removal of forms; c) maintain curing conditions that foster normal strength development; d) limit rapid temperature changes; and e) provide protection consistent with intended serviceability of the structure. Concrete placed during cold weather will develop sufficient strength and durability to satisfy intended service requirements when it is properly proportioned, produced, placed, and protected. Contractor will not be paid for the admixtures and precautionary measures to safeguard the concrete (prior, during and after).

1.5.2 Composition

- (a) The Contractor shall determine the proportions of water, sand, coarse aggregate, cement and admixture (if required) needed to provide concrete, meeting the requirements of these Specifications and shall be approved by the Employer’s Representative or his delegated Assistant. Concrete ($210\text{kg}/\text{cm}^2$) which contains 25mm or 19mm maximum size aggregate shall have a cement content of not less than 380 kg per cubic meter. The net water-cement ratio by weight shall not exceed 0.5. Surface water contained in the aggregate shall be included as part of the mixing water in determining the water content. Reinforced concrete design will be checked in accordance with the ACI Code.
- (b) The Contractor will take minimum three test cylinders (152mm x 305mm) from the same batch and the average compressive strength at 28 days shall exceed $210\text{ kg}/\text{cm}^2$ (3000 psi) or $140\text{ kg}/\text{cm}^2$ (2000 psi) and no individual test value should fall more than $35\text{ kg}/\text{cm}^2$ (500 psi) from the minimum specified value.

The compressive strength of the concrete will be determined by the Employer’s Representative or his delegated Assistant. through the medium of test cylinders (152mm

x 305mm) made and tested in accordance with ASTM C39. The Contractor shall furnish all necessary sampling equipment such as slump cones, test cylinders, etc. at the site. This equipment is to be approved by the Employer’s Representative or his delegated Assistant. Or nominated person by Employer’s Representative. The cost of the material lab tests shall be borne by The Contractor.

The use of calcium chloride in concrete will not be permitted.

(c) The slump of concrete shall not exceed 75mm for Conventional Foundations and 150mm for piling.

1.5.3 Batching and Mixing

Unless specifically approved by the Employer’s Representative or his delegated Assistant., all concrete used on the Project shall be machine mixed. Hand mixing shall only be used when authorized by the Employer’s Representative and shall be performed under his directions.

1.5.4 Conveying and Placing of Concrete

Unless otherwise mentioned on the drawings or approved by the Employer’s Representative or his delegated Assistant., all concrete placed will be monolithic.

Forms shall be sufficiently tight to prevent loss of mortar from the concrete and shall be maintained rigidly in position until the concrete has hardened sufficiently to prevent damage by form removal. All surfaces of foundations upon or against which concrete is to be placed shall be free from standing water, mud and debris.

Concrete shall be vibrated (internal vibrators having a minimum frequency of 8,000 vibrations per minute) until it has been consolidated to the maximum practicable density, free from rock pockets of coarse aggregate, closes snugly against all surfaces of forms and embedded materials. Standby vibrators shall be available during concrete placement.

Exposed unformed surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonably smooth wood float or steel-trowel finish as directed.

The height of the end of buckets and hoppers shall be at most 1.0m above the level of placement.

1.5.5 Protection and Curing

The Contractor shall protect all concrete against injury until final acceptance.

The concrete, after being placed, shall be cured with water at least for fourteen (14) days or as directed by the Employer’s Representative or his delegated Assistant. Until it gains sufficient strength to a degree that works can be done without impairing it. Immediately after form removal, the surfaces should be kept continuously wet by water.

Bituminous Emulsion Waterproof & Protective Coating will be applied below ± 0.00 level to all structure elements. A minimum of two applications shall be required, and the applications shall be 100 percent effective. Surfaces to be treated shall not be coated with curing compound. No extra payment will be made to The Contractor for treating concrete surfaces with bituminous compound.

1.5.6 Repair of Concrete

Any concrete that is damaged or defective from any cause; that is honey-combed, fractured or otherwise defective, and concrete damaged because of excessive surface depressions or any imperfections and irregularities on concrete surfaces, shall be removed, replaced and corrected to bring the surfaces to the prescribed lines. The removal and replacement of damaged or

defective concrete, and the correction of surface imperfections and irregularities shall be made with concrete dry pack, or mortar (Portland cement-sand mortar), or at the option of The Contractor, with epoxy-bonded concrete, or epoxy-bonded epoxy mortar, where and as applicable for the type of repair involved. All repairs should be completed within 24 hours after removal of forms, and as directed by the Employer’s Representative or his nominated person.

1.6 Steel Structures

This Section comprises the Standards and Specifications pertaining to the fundamental requirements of design, manufacture, testing, inspection, supply and erection of structural steel including galvanized anchor bolts, base plates, stiffeners, rafters, post, purlins etc. for supporting the solar panels.

All drawings and statements shall be in English language and Metric System of measurements shall be used.

Design, manufacturing, testing, inspection, supply, erection, installation, commissioning and guaranteeing of all steel support structures required or specified or implied herein are included in the scope of the Contract. The material and fabrication shall be the best of their respective kinds and to a standard not less than specified herein.

All steel material shall be hot dip galvanized. The Contractor shall ensure proper fitting and alignment of offered structures.

The Contractor shall be responsible for submitting all detail designs and drawings as required or specified herein based on information provided in the Contract Documents and as directed by the Employer’s Representative or his delegated Assistant.

The Contractor shall submit the Finite Element Model (FEM) along with the calculations for each structural component for review and approval from the Employer’s Representative or his delegated Assistant.

The Contractor shall prepare as-built drawings/documentation and submit to the Employer’s Representative or his delegated Assistant.

The minimum thickness of the structural steel element shall not be less than 2.5mm.

1.6.1 Structural Loadings

Loading and design shall be in accordance with the requirements of the latest ASCE Manual and ASCE Standard 10 based on the information hereof.

1.6.2 Wind Loads

Structures shall be designed for (i) wind acting at 90 degrees to the surfaces (ii) wind acting at 135 degrees (45 degrees) to the surfaces. Wind pressure corresponding to 160 km/hr wind velocity acting horizontally in any direction at 25°C everyday temperature shall be used and as per the latest guidelines provided by the ASCE or PBC.

1.6.3 Snow Loads

Structures shall be designed against snow loadings as per ASCE 7-22.

1.6.4 Vertical Loads

Equipment weights and dead loads together with estimated construction/maintenance loads as required.

1.6.5 Loading Due to Thermal Forces

Thermal stresses caused by a temperature variation as indicated in special provisions shall be taken and expansion joints shall be provided at the appropriate locations.

1.6.6 Earthquake Intensity

Horizontal earthquake acceleration of an intensity of minimum 0.32g acting in any direction shall be considered for the design of ground structures acting in any direction irrespective of their height and flexibility. The above value shall be considered as the Peak Ground Acceleration (PGA).

All the joints and base mounted fastening of free-standing electrical equipment such as circuit breakers, dis-connectors/isolators, instrument transformers, line traps, bus bars, surge arresters and post insulators shall be designed to resist the effects of an acceleration intensity minimum 0.32g in any direction.

1.6.7 Slenderness Ratio (L/r)

Determination of L/r ratio and allowable compressive stress shall be followed as:

The maximum L/r ratio of a member shall not exceed to the following limits:

For main compression member	150
For secondary members carrying calculated stresses	200
For redundant members without calculated stresses	250

1.6.8 Materials

All materials shall be of the highest grade free from defects and imperfections of recent manufacture, unused and of the classification and grades designated, conforming to the requirements of the latest revision of the relevant Standards cited herein. All structural steel sections, plates and its connection bolts, nuts, washers shall be hot dip galvanized after fabrication.

1.6.9 Structural Steel

All structural steel shall be supplied in accordance of minimum Grade A50 for Parking Shed and steel structure for roof/ground mounted and roof/ground elevated shall be supplied in accordance with minimum Grade A36.

1.6.10 Bolts and Nuts

All steel structure connection bolts and nuts shall be of steel and shall conform to the requirements of ISO 898-1 (minimum 6.8 property class), ISO 898-2 (minimum 6.8 property class), DIN 7990 and DIN 555. All steel structure connection bolts, nuts, washers shall be of minimum 12 mm size.

All connections shall be bolted type and shall be designed for 100%-member capability. 5% surplus of bolts, nuts, washers and check nuts shall also be supplied. A connecting bolt shall contain one nut, one washer and one check nut.

1.6.11 Steel Fabrication

Holes

All holes shall be clean-cut without torn or ragged edges. All burrs resulting from reaming or drilling shall be removed. All holes shall be cylindrical/elliptical and perpendicular to the member. The diameter of the finished hole shall be 1.5 mm greater than the nominal diameter of the bolt.

Welding

Welding shall be performed in accordance with the latest edition of "Code for Arc and Gas Welding in Building Construction", as formulated by the American Welding Society or equivalent Standard.

A shielded arc-welding process shall be used. All welds shall be made in such a manner that residual shrinkage stresses will be reduced to a minimum.

Galvanizing

All plates, members and shapes shall be hot dipped galvanized in accordance with ASTM Designation A123 or equivalent Standard. All bolts, nuts and washers shall be hot dipped galvanized in accordance with ASTM A153 or equivalent Standard. Re-threading of bolt threads after galvanizing will not be permitted.

All necessary precautions shall be taken in the selection of steel and its fabrication and preparation for galvanizing to prevent embrittlement of any item or parts of item including bolts and nuts.

Material on which galvanizing has been damaged shall be re-dipped. Any member on which the galvanized coating becomes damaged after having been dipped twice shall be rejected.

1.7 Minimum Design Requirements

(a) Roof Elevated, Roof Mounted and Ground Mounted Structures:

- Wind Speed = 100mph or as per latest BCP-21/ASCE7-22
- Wind Pressure = As per BCP-21 or latest ASCE 7-22
- Seismic Zone = As per Latest seismic Map of Pakistan
- Concrete Strength = 21MPa for 28 days cylindrical strength
- Structural Steel Grade = A-36
- Galvanization of Structural Steel = As per ASTM A123 & A153
- Minimum Member thickness for columns = 2.5mm
- Minimum Member thickness for Rafter, Purlin & Bracing = 2.0mm
- Galvanized Steel Base Plate thickness = 6mm Minimum
- Reinforcement Steel Grade = G-60 (413MPa UTS)
- Galvanized Steel Bolt Class = 6.8
- Connection Detail = Proper bolted and Welded connection as per design requirements.
- PV mounting Structure Design = Proper Computer Aided Design (CAD) on Finite Element Based (FEM) Software (i.e ETABS, SAP2000 etc.)
- Grouting = As approved by the Employer's Representative or his delegated Assistant.
- Water Proofing = Chemical water proofing as approved by the Employer's Representative or his delegated Assistant.
- Replacement of GI Sheets = Replacement shall be carried out wherever applicable

- Replacement and Addition of Wooden Planks = Replacement & Addition shall be carried out wherever applicable
- Fixing Arrangements (i.e. U-Clamp & Middle Clamp) detail of PV modules along with jointing/clamps detail of GI sheets with PV module should be provided by The Contractor for safe installation

(b) Parking Shed:

- Wind Speed = 100mph or as per BCP-21/ASCE7-22
- Wind Pressure = As per BCP-21 or ASCE 7-22
- Seismic Zone = As per Latest seismic Map of Pakistan
- Concrete Strength = 21MPa for 28 days cylindrical strength
- Bitumen Coating = All concrete work shall be coated with 2 coats of bitumen compound after stripping of the form work as a curing compound
- Structural Steel Grade = Fy-50
- Galvanization of Structural Steel = As per ASTM A123 & A153
- Minimum Member thickness for columns = 3.0mm
- Minimum Member thickness for Rafter, Purlin, Bracing & Stiffeners = 2.5mm
- Minimum Dia. for Sag Rod = 10mm
- Galvanized Steel Base Plate thickness = 6mm Minimum
- Reinforcement Steel Grade = G-60 (413MPa UTS)
- Steel Bolt Class = 6.8
- Class of Anchor Bolt = 6.8
- Length & Dia. of Anchor Bolt = as per design requirements
- Connection Detail = Proper bolted and Welded connection as per design requirements.
- PV mounting Structure Design = Proper Computer Aided Design (CAD) on Finite Element Based (FEM) Software (i.e. ETABS, SAP2000 etc.
- Grouting = As approved by the Employer's Representative or his delegated Assistant.

Water Proofing = Chemical water proofing as approved by the Employer's Representative or his delegated Assistant.

SECTION – VI: OPERATION AND MAINTENANCE

1. OPERATION & MAINTENANCE (O&M) FOR ROOFTOP SOLAR POWER PLANTS

1.1. Introduction

The Rooftop PV Hybrid Systems are designed for an operation lifetime of at least 25 years. Their optimal performance is sensitive to best-in-class O&M practices, which will ensure the best performance during the 25-years period. The Bidder is required to describe in detail his definite plans how to execute the below described requirements for the defined mandatory O&M period. As part of that, the bidder shall provide an organisational chart and CVs of the key O&M staff as well as the locations where staff and facilities (e.g. spare parts inventory) will be located. Any failure to describe a convincing concept will be leading to a rejection of the bid.

1.2. General Scope of Work

The Contractor shall provide operational guarantee for the PV Hybrid System for the first three (03) years after commissioning. Any repair or replacement of component(s) during this time shall be at the expense of the Contractor. Later repair or replacement shall be at the expense of the Contractor as long as it is caused by component failure during warranty period, workmanship of installation or lacking O&M execution during the Contractor’s O&M phase.

The Contractor will provide the complete O&M service during this duration at its own expense. The Contractor has to warrant the performance of the PV Hybrid System within his area of influence, as well as the Availability and time consumed for detection of malfunctions and its repair. The Contractor shall provide a full-service Operation and Maintenance service in order to maintain a fully functional PV Hybrid System for each building including all equipment, subsystems and structures.

This shall include, but not be limited to, the following items:

- Preventive maintenance according to maintenance programs, such as periodic preventive maintenance of inverters, batteries, and PV modules etc., according to manufacturers’ requirements.
- Scheduled inspection routines: E.g. PV modules to check for discoloration, first signs of delamination, loose wires in the electronics, corrosion of mounting structures, erosion.
- Maintenance of spare parts inventory (prompt replenishment of used spare parts) including continuous reporting of status and consumption.
- Corrective maintenance with guaranteed response and reaction times, including all repair and replacement costs.
- Technical operation of the PV Hybrid System including presence of O&M personnel close to the Project site as required to fulfil all O&M Contract obligations.
- Regular cleaning of the PV Hybrid System site, preventive and corrective maintenance of civil works and cabinets.
- Smooth functioning of data communications over Centralized Monitoring System (CMS).
- Provision of regular service reports about performance, repairs, maintenance, and tests.
- Regular performance of variance analysis of the entire fleet of PV Hybrid Systems.

- Ensuring that any warranties and insurance policies for the PV Hybrid System are assignable / transferrable to Employer in case of change of Contractor.
- Provision of all O&M personnel trained and certified as far as applicable. The staffing concept and selected key employees shall be presented to the Employer for approval.
- Arrangement of service contracts with specialized sub-contractors, permitting the requested response and reaction times and quality of work required to maintain the PV Hybrid System.

1.3. Hiring / Training Period / Initial Inspection

The Contractor’s Personnel must be nominated by the Contractor no later than 8 weeks prior to operations start date of the first PV Hybrid System and contractually hired no later than 4 weeks prior to operations start date of the first PV Hybrid System.

The Contractor’s O&M Personnel shall be certified experts with the PV Hybrid System and its documentation, to enable an efficient operation & maintenance from handover day. The Contractor shall also understand all pending items (e.g. punch-list) and performance deficits (if any) for which the Contractor is responsible for, after operations start date.

The O&M Personnel shall familiarize themselves with the specific PV Hybrid System equipment and maintenance requirements as imposed by the component manufacturers and Employer. In addition, the O&M Contractor shall arrange and provide all training as a prerequisite for the selected staff and provide the respective certificates.

The O&M Contractor shall establish all maintenance routines, inspection checklists, working files, etc. as required.

At this phase, the O&M Contractor must always coordinate with Employer and keep Employer updated regarding progress of preparation, status of construction, pending issues of construction, commissioning and testing.

At the end of the mandatory O&M phase and if the contract is not extended further, the Contractor shall give sufficient and adequate training to the Employer’s staff (or its subcontractor’s staff) that will continue the O&M works.

1.4. Centralized and Remote Monitoring Systems (CMS and RMS)

The Contractor shall provide a CMS and RMS that must be capable of providing a reliable, stable and continuous (24/7) centralized and remote access with the monitoring system of the PV Hybrid System.

Centralized and remote access to all operational data for the PV Hybrid System must guarantee the uninterrupted transfer and acquisition of operational data.

The provided monitoring systems will be subject to review and approval by Employer prior to procurement. It must provide different access levels and access rights.

The communication network between the PV Hybrid System and the monitoring systems will be built with common and standardized components and network cables. The long-term availability of spare parts must be assured. Standardized communication protocols must be used.

The following functionalities are required:

- I. Remote monitoring and management of the whole system by Contractor on a 7-days 12-hour daytime basis, with the capability of web-based information sharing.
- II. Continuous transmission of monitoring data to centralized monitoring server.
- III. Data must be readily available for the fulfilment of all warranties.
- IV. Remote backup of centralized monitoring data.
- V. Frequent string level data collection (30-min sampling interval), analysis, and display of the fundamental parameters of the system and sub-system. Real-time transmission of Alarms.
- VI. Alarms / alerts and timely notification of key performance indicators.
- VII. Monthly, quarterly and annual reporting including opening/closing of service tickets, spare parts used, and any deviations from the guaranteed Performance.
- VIII. Status of overvoltage protection and grounding protection (DC).
- IX. Separate monitoring of inverters, battery charger and batteries (current and voltage).
- X. Provision of on-call service for the Employer for availability outside business hours and during weekends (24/7).
- XI. Any reductions in performance must be logged.
- XII. The data must present the current status of the PV Hybrid System, including the string level monitoring, battery SOC and SOH status, current production, balance of energy flow within system and via its system boundaries, daily, monthly and annual overview, and the current power being exported to the grid (in future).
- XIII. The remote monitoring must also control the operation of the PV Hybrid System. To ensure this, the PV Hybrid System data should be sent to a central server and stored permanently.
- XIV. The remote monitoring must also include the ticketing of faults and resolution measures taken.
- XV. the Contractor shall provide to Employer permanent online read access to the remote monitoring system for parallel monitoring of the PV Hybrid System’s raw data and performance. Additionally, the Contractor shall send the data automatically and regularly (minimum every 30 min) to an ftp server set up through CMS.
- XVI. The data transfer costs (fees for internet connection, etc.) are to be paid by the Contractor.
- XVII. The log data must be provided continuously, completely, and stored in CMS for a minimum period of five (5) years for all measuring channels. The on-site data storage should be provided for one (01) month.

The Bidder should detail the IT system architecture (the physical link, internet, transport, and application layers), hardware and software descriptions of servers, bus drivers, communication cables, and security and information exchange protocols for the data management outlined above. It should also explain the data backup processes to be implemented to ensure timely information for preventive and corrective measures in order to maintain optimal system output.

1.5. Allocation of O&M Personnel

The Contractor will provide all O&M personnel, trained and certified as far as applicable. The staffing concept and selected key employees shall be presented to the Employer for approval.

The Contractor shall arrange service contracts with specialized sub-contractors permitting the requested response times and the required quality of work to maintain the PV Hybrid System.

All operational data shall be logged on-site in parallel to the remote monitoring data storage.

2. SCOPE OF SUPPLY AND SERVICES FOR THE O&M OF ROOFTOP SOLAR POWER PLANTS

2.1. Quarterly Inspections

The Contractor shall perform quarterly inspections of the PV Hybrid System. The inspections must follow the detailed inspection procedure and be documented accordingly. The scope must include the following (as a minimum):

2.2. PV Modules and Supporting Structure

- Visual inspection of all PV modules regarding damage.
- Visual damage inspection of all accessible cable trenches and cable trays.
- Visual inspection and random testing of PV module DC connectors.
- Check for loosening of PV module clips. Clips should be replaced if necessary. (Scope: Min. 10% per inspection including documentation of location; 100% during 3-year PV Hybrid System inspection).
- Testing of sturdiness of mounting foundation / system and random substructure corrosion inspection.

2.3. Inverters

- Functional check of inverter ventilator system and filters (if applicable).
- Test of the internal circuit breakers and power switches, emergency shutoff test.
- Visual inspection of all fuses.
- Inspection of overvoltage protection and upstream fuses regarding external damage.
- Functional check of internal and external overvoltage and under voltage protection through operation of test terminal.
- Functional insulation monitoring check.
- Check of control and auxiliary voltages.
- Check of the safety circuit for the interruption of the AC-grid protection in the case of failure (emergency shutoff, over-/ under voltage, over temperature, etc.).
- Visual inspection of AC and DC clamps for tightness and discolouring, tightening of clamps.
- Inspection of the interior of the inverter regarding dust deposit, dirtiness, humidity, water penetration from outside. The inverter shall be cleaned if necessary.
- Testing of inverter features according to manufacturer’s maintenance schedule.
- Maintenance of inverters according to manufacturer’s instructions.

2.4. Battery Charge Controller

- Inspection of the exterior of the battery charge controller regarding dust deposit, dirtiness, humidity. The battery charge controller shall be cleaned if necessary.
- Testing of battery charge controller features according to manufacturer’s maintenance schedule.
- Maintenance of battery charge controller according to manufacturer’s instructions.
- Batteries / Electricity Storage

- Inspection of the exterior of the batteries regarding dust deposit, dirtiness, humidity. The batteries shall be cleaned if necessary.
- Testing of battery features according to manufacturer’s maintenance schedule, including remaining battery capacity.
- Maintenance of batteries according to manufacturer’s instructions

2.5. Enclosure Cabinet for Inverters and Batteries

- Functional check of enclosure cabinet ventilator system and filters (if applicable).
- Inspection of the interior of the electrical cabinet regarding dust deposit, dirtiness, humidity, water penetration from outside. The cabinet shall be cleaned if necessary.
- Visual damage inspection of all accessible cable trenches and cable trays.

2.6. Security System / Theft Protection

- Random test and retightening of security bolts if necessary, according to manufacturer’s instructions.

2.7. Additional Inspections

- Functionality testing of the remote monitoring system.
- Adequacy of settings for battery charge settings.
- Maintenance of all PV Hybrid System components according to manufacturer’s instructions.
- If applicable: Inspection of all aspects required from the applicable permits (environmental, building, etc.).

The Contractor has to modify the inspections routines as well as the frequency of the special inspection in case of specific the requirements and/or norms will be defined or modified by relevant authorities in Pakistan and/or grid operators.

2.8. Roof Maintenance

Roof maintenance includes all procedures necessary to avoid PV module shading and faults due to problems of the rainwater drainage. Any blockage of roof drains shall be cleared on each site visit.

In case the integrity of the roof is affected due to improper installation of the PV modules and/or the supporting structure, such as leakages through the affected roof, the Contractor shall carry out all the repairs at his own cost.

3. PERFORMANCE OF MAINTENANCE AND REPAIR WORKS

The results of the inspection and maintenance works, as well as the deactivations, must be documented in a report (blank maintenance report example shall be delivered by the Contractor as part of the O&M Works).

For the performance of the contractual services, the Contractor will be obliged to observe and respect the component manufacturer’s maintenance and operation specifications and regulations (especially for the PV modules, inverters and batteries), in particular during the warranty period.

For the performance of the contractual services, the Contractor will be obliged to observe and respect local laws, regulations and international PV standards.

Throughout the duration of the Contract, the Contractor will be held responsible for public safety at the PV Hybrid System.

4. PERFORMANCE GUARANTEES

Every fault message must be registered and stored by the on-site, centralized and remote monitoring software. According to the fault message, the Contractor will issue a fault diagnosis within a response time of 24 hours (24/7) and, as far as possible, immediately restart the operation of the affected part of the PV Hybrid System.

- All fault messages and results relevant for the operation of the PV Hybrid System are to be documented in the ticketing system. Any fault messages resulting in fault calls must be documented in the corresponding monthly reports, indicating start and end of fault, reason and/or any repair work performed, as well as the respective components of the PV Hybrid System fault management / warranty defects
- Fault management procedures must include necessary communication of faults, coordination of on-site appointments with service staff or service partners, as well as the corresponding and general operational structure.
- Fault management procedures must include the preparation, handling and support in events covered by insurance, and the enforcement of claims for compensation to third parties, including the component manufacturers.
- The Contractor is obliged to identify potential warranty defects and support Employer in obtaining rectification from the respective manufacturer. The Contractor shall be responsible for coordinating through Employer all claims related to warranty defects and their rectification during the respective product warranty period.
- Operational defects that are not considered as warranty defects must be rectified as soon as possible by the Contractor within its scope of work.
- All defects are to be documented within the same day of detection, and a summary provided to Employer on a monthly basis in the corresponding monthly report. All fault and defect rectification must be included in the monthly reports, with reference to the initial alarm/notification of occurrence.
- All incurred repair times outside of the fault rectification time identified above will be considered as unavailability of the affected PV Hybrid System component.
- All replacements and repairs are to be covered by Contractor’s annual remuneration under the Contract within the initial O&M Period of three (03) years.

4.1. Liquidated Damages for Failure to Comply with Performance Guarantees

- The scope of service shall include any working times for all fault calls including travel times and any travel costs.
- If faults cannot be identified completely from the fault message or the restart of operation is not possible, additional service staff or service partner shall take action with standard tools and spare parts. The following fault rectification times shall apply, which will start (i) as soon as the fault message is received by the monitoring system, or (ii) as soon as the fault has been detected onsite, or (iii) as soon as the fault is detected during regular on-site controls.

Fault Rectification Time		
	Fault / Error / Defect	Rectification time
Priority 1	- Failure of complete communication with RMS - Failure of battery backup system - Failure of at least 50% of connected PV strings or inverter	2 Calendar days
Priority 2	- Failure of single PV modules or single PV module string	4 Calendar days

The fault call is to include on-site fault diagnosis, as well as an immediate fault correction, if possible. The fault must be corrected within the fault rectification time and, failing that, an in-depth diagnosis of the fault must be performed indicating further measures.

In-case the fault is not rectified within the fault rectification time as defined above, then the Contractor shall pay to the Employer Liquidated Damages (LDs) as stated in Volume-I.

Fault calls can be performed without prior consent of Employer.

4.2. Approval of Extensive Repairs

Extensive repairs requiring an amendment of the PV Hybrid System or an exchange of original equipment for different types (i.e. the installation of non-original components), must be approved by Employer. All non-original components (e.g. a specific inverter or battery type) must be procured from the original component manufacturer (e. g. the inverter manufacturer needs to remain the same, but the inverter or battery type can be modified).

4.3. Repair Works Documentation

All major repair works (defined as all repair works which require spare parts not fully provided by the spare parts inventory) and insurance compensations must be documented in the corresponding monthly reports.

4.4. Inspection of Repair Works

The Employer reserves the right to inspect the repair works within three months (90 days) of receiving the repair works documentation. Employer reserves the right to consult an independent expert in the event that any doubt arises as to the Contractor’s performance.

4.5. Spare Parts Inventory and Maintenance Tools

The Contractor will provide a spare parts inventory by the start of O&M Period at the latest. The spare parts inventory will be placed in Employer’s designated premises. e.g. in a specific container with safety locks and connected to a security surveillance system.

The Contractor shall operate and maintain the spare parts inventory during the term of the O&M Period. The Contractor will be responsible for the immediate replenishment of the spare parts. The Contractor is responsible to cover all cost for the replenishment of the spare parts inventory within its annual remuneration under the Agreement.

The status and consumption of the spare parts inventory must be included in the corresponding monthly reports.

The Contractor must provide the necessary set of maintenance tools to perform the services.

5. SCOPE OF SUPPLY FOR SECURITY SERVICES

The Contractor will not be responsible for Security Services of the PV Hybrid System. The Client will be responsible for the security of each PV Hybrid System against any theft and vandalism.

5.1. Reporting of all O&M Activities

Monthly and annual reports based on the data of the remote monitoring are to be prepared by O&M Contractor and provided to Employer within 4 four weeks after the end of the corresponding reporting period. The reports must include the reporting any deviations from the expected performance of the PV Hybrid System.

Any fault messages resulting in fault calls must be documented in the corresponding monthly reports indicating start and end of fault, reason and/or any performed repair works, as well as the respective components of the PV Hybrid System.

The status and consumption of the spare parts inventory must be included in the corresponding monthly reports.

The results of inspection performed maintenance works, as well as deactivations must be documented in a report.

The specific reporting format of each report type will be subject to review and approval by Employer and its OE prior to the execution of the O&M Contract.

6. MISCELLANEOUS

6.1. Change of Inspection and Maintenance Work Procedures

The Contractor shall perform the work in accordance with all applicable laws. In case of conflict between the specified requirements and the applicable law, the Contractor shall propose a solution to adapt the works accordingly and resolve the matter in a mutual sense for Employer’s approval.

6.2. Person in Control of PV Hybrid Systems

The Contractor must propose at least one main responsible and suitable person in charge of the PV Hybrid Systems for buildings for each district, the “O&M Manager”. These persons must fulfil all local requirements, permits and standards, must have sufficient experience and be approved by Employer and be available for communication with Employer (mobile phone) during the above-defined O&M times. Any replacement or substitute of these persons will be subject to approval by Employer.

6.3. Handover of Documentation after end of O&M Contract

Within one month after the end of the O&M Contract, the Contractor must hand over the complete electronic, printed and written documentation for the O&M of the PV Hybrid Systems. This includes the complete documentation which was previously handed over to the Contractor by

Employer or its service provider. This also includes the complete raw data of the PV Hybrid System monitoring acquired through the remote monitoring system.

6.4. Codes, Standards, Regulations, Permit, etc.

State of the art O&M is required. The fulfilment of all relevant IEC and Pakistani norms, standards and regulations is the full responsibility of the Contractor.

The O&M Works for the PV Hybrid Systems must fulfil all applicable international and regional norms, standards, and grid connection requirements.

The Contractor must comply with all applicable permits and the conditions imposed on the PV Hybrid System by all authorities.

The Contractor must fulfil all applicable health and safety standards required by the relevant Pakistani authorities during the entire Operation and Maintenance phase

7. Rooftop Plant BESS O&M

7.1. System Operation and User Interface

Roof top Solar BESS systems shall feature user-friendly mobile applications and cloud-enabled monitoring. The system automatically manages charging from PV arrays and provides backup power during grid outages.

Systems generate user-friendly notifications through mobile applications:

- State of Charge notifications: As per Employer’s Requirements
- State of Health status: Continuous
- Load Disconnection Notifications

7.2. Maintenance and Safety

Biweekly visual inspection of system indicators, quarterly cleaning of ventilation areas, and annual professional maintenance ensure safe operation. The system's IP65 enclosure protection and low noise operation (≤ 65 dB(A)) enable indoor installation.

Annual inspection by certified technicians includes BMS diagnostics, electrical connection testing, and performance verification. The system's integrated safety features minimize maintenance requirements while ensuring long-term reliability.

7.3. Warranty and Support

All Roof top Solar BESS systems include 10-year product warranty with performance guarantee of $\geq 70\%$ initial capacity after 10 years or 6000 cycles @ 80% DoD. Monitoring enables proactive support and rapid issue resolution within 48-hour response time guarantee.

ANNEXURE I – DRAWINGS

Preambles to Annexure 1

The drawings included in this Part are provided for reference and general guidance only. For specific PV modules and inverters, complete set of Employer’s requirements has set forth under section I (Scope of Work) , Section II (General Project Requirements), Section III (DC Systems), Section IV (AC Systems), and Section V (Civil & Structure Works) shall prevail, which shall be subject to Employer’s approval prior to procurement and delivery at site.

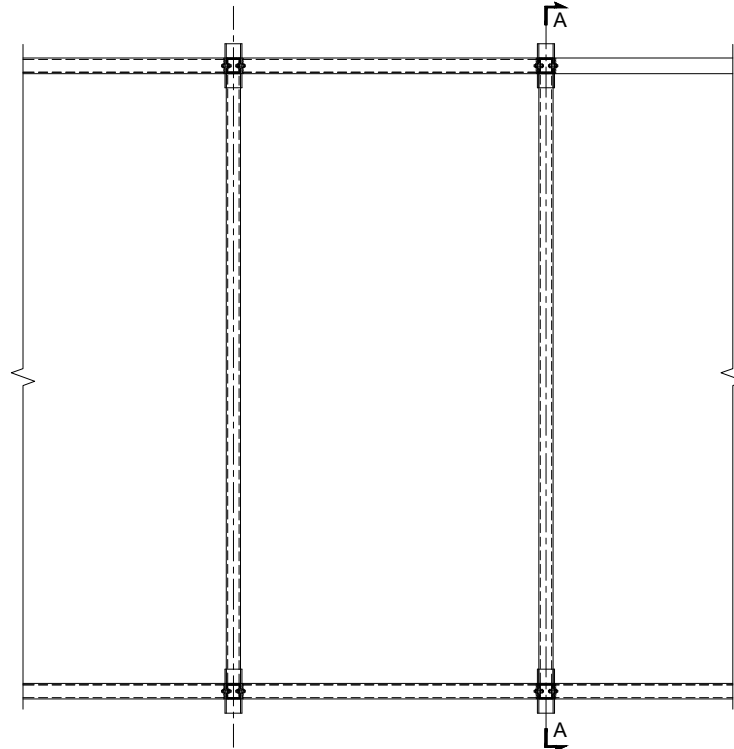
These drawings shall not be considered as Issued for Construction (IFC) documents. In accordance with Sub-Clause 5.2 [Contractor’s Documents] of the Conditions of Contract, the Contractor shall be solely responsible for preparing, submitting, and obtaining approval of its own detailed design and construction drawings. The Contractor shall ensure that its design complies fully with the Employer’s Requirements, applicable standards, and good industry practice.

Any discrepancies, omissions, or variations in the reference drawings shall not relieve the Contractor of its obligations to complete the Works in full compliance with the Contract.

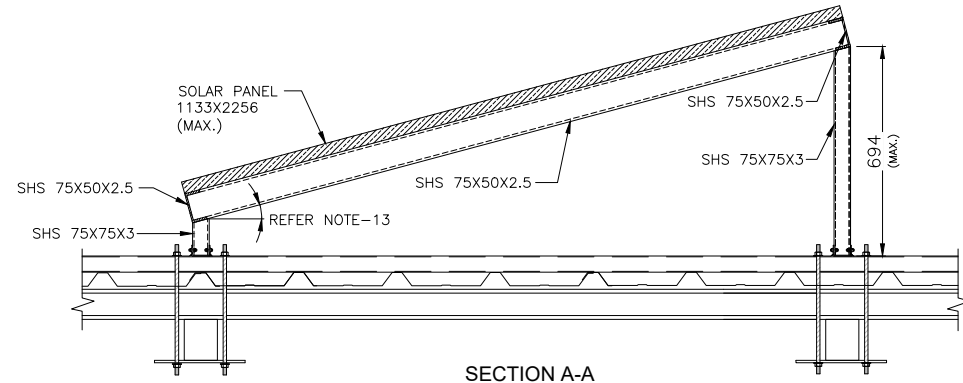
The list of drawings is also attached herewith attached

Sr. No.	Drawing No.	Drawing Title
1	4894/TD/STR/01	CGI Structure
2	4894/TD/STR/03/01	Typical Solar Panel Framing for Ground Elevated Structure
3	4894/TD/STR/03/02	Typical Solar Panel Framing for Ground Elevated Structure
4	4894/TD/STR/03/03	Typical Solar Panel Framing for Ground Elevated Structure
5	4894/TD/STR/04/01	Typical Solar Panel Framing for Ground Mounted Structure
6	4894/TD/STR/04/02	Typical Solar Panel Framing for Ground Mounted Structure
7	4894/TD/STR/02/01	Typical Solar Panel Framing for Parking Shed
8	4894/TD/STR/02/02	Typical Solar Panel Framing for Parking Shed
9	4894/TD/STR/02/03	Typical Solar Panel Framing for Parking Shed
10	4894/TD/STR/02/04	Typical Solar Panel Framing for Parking Shed
11	4894/TD/STR/05/01	Typical Solar Panel Framing for R.C.C Roof Mounted Structure
12	MV / LV – 21	1-10 KW Single Line Diagram
13	MV / LV – 22	10-20 KW Single Line Diagram
14	MV / LV – 23	20-30 KW Single Line Diagram

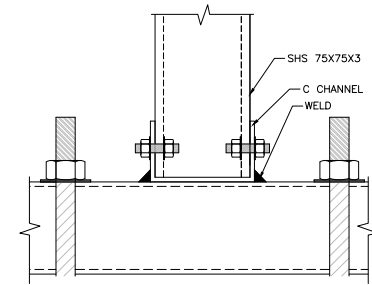
Sr. No.	Drawing No.	Drawing Title
15	MV / LV – 24	30-50 KW Single Line Diagram
16	MV / LV – 25	50-70 KW Single Line Diagram
17	MV / LV – 26	70-100 KW Single Line Diagram
18	MV / LV – 27	100-125 KW Single Line Diagram
19	MV / LV – 28	125-150 KW Single Line Diagram
20	MV / LV – 29	150-200 KW Single Line Diagram
21	MV / LV – 30	200-250 KW Single Line Diagram
22	MV / LV – 31	300 KW Single Line Diagram
23	MV / LV – 32	350 KW Single Line Diagram
24	MV / LV – 33	400 KW Single Line Diagram
25	MV / LV – 34	500 KW Single Line Diagram
26	MV / LV – 35	700 KW Single Line Diagram
27	MV / LV – 36	Earthing Details
28	MV / LV – 37	Lightning Arrestor



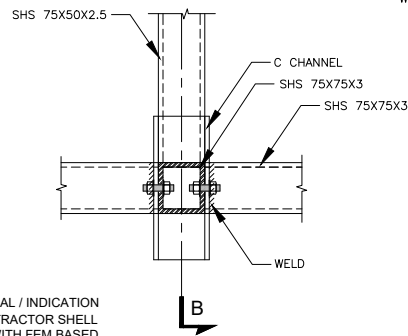
TYPICAL STRUCTURAL FRAMING AND SHEETING PLAN



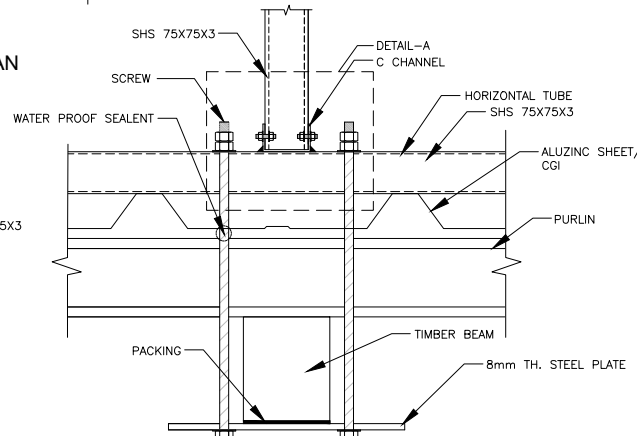
SECTION A-A



DETAIL-A



FIXING DETAIL



SECTION B-B

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL STEEL GRADE SHALL HAVE MINIMUM YIELD STRENGTH OF 250 Mpa.
4. ALL WELD SHALL BE OF E70XX ELECTRODE.
5. ALL STEEL STRUCTURE AND ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED (MIN 85 MICRON).
6. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE 304) AND ANTI-THEFT.
7. IT IS ASSUMED THAT THE EXISTING STRUCTURE IS ADEQUATE TO BEAR THE LOADINGS FROM STRUCTURAL FRAMING OF SOLAR PANEL.
8. TWO DRAINAGE CLIPS SHALL BE PROVIDED FOR EACH MODULE IN THE LAST/LOWEST ROW OF THE MODULES IN A SHED.
9. ALL BEAM TO BEAM & BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING AT LEAST 4MM THICKNESS.
10. AN APPROVED WATER PROOF SEALANT SHOULD BE PROVIDED AT EACH PUNCHING POINT IN ORDER TO AVOID WATER LEAKAGE.
11. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
12. CONTRACTOR TO ENSURE THAT THE EXISTING DRAINAGE CHARACTERISTICS OF THE ROOF TOP ARE NOT COMPROMISED.
13. FOR ANGLE REFER TO SIMULATION DRAWINGS/REPORT.

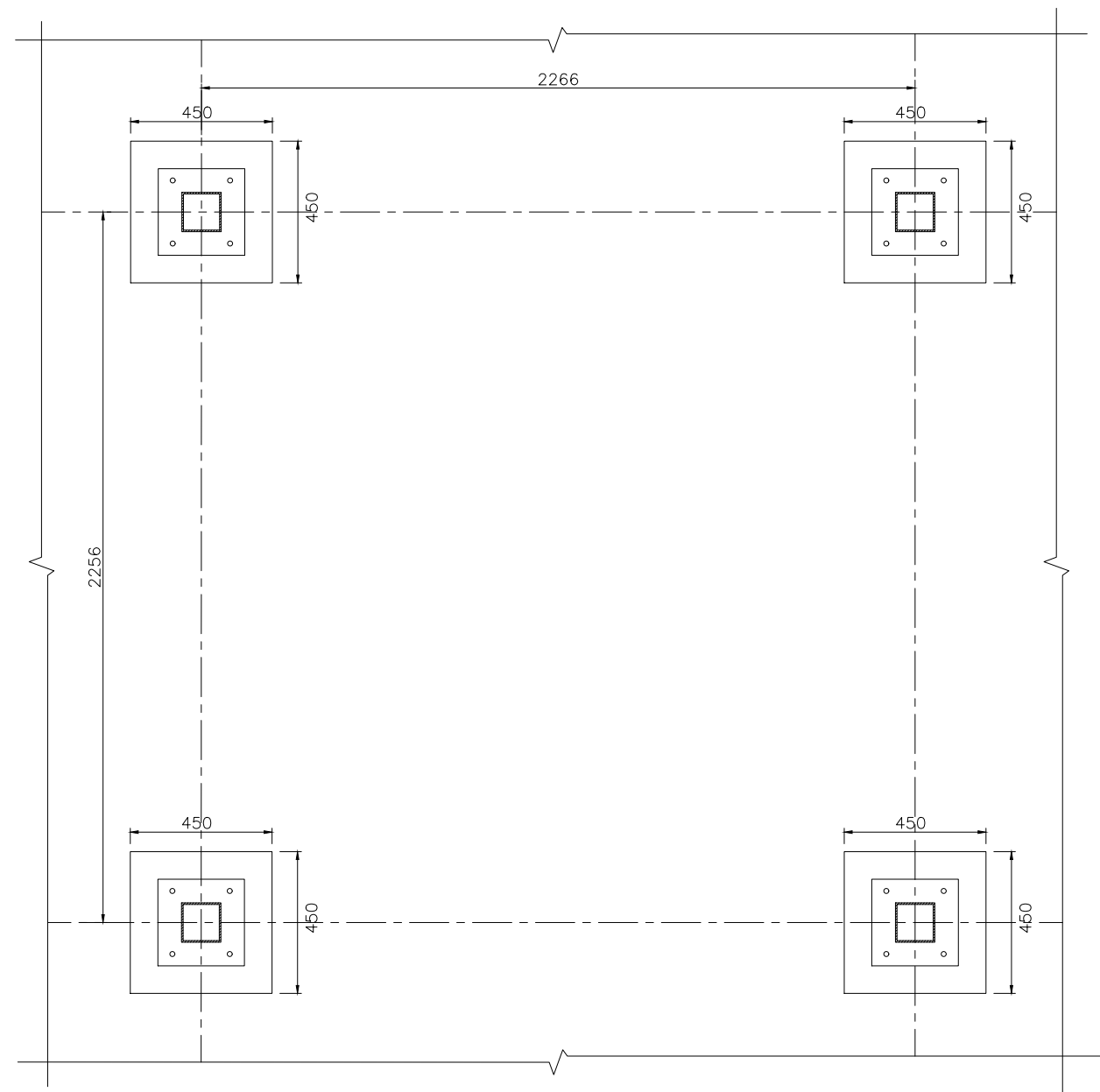
NOTE:

THESE ARE MINIMUM REQUIRED CONCEPTUAL / INDICATION DRAWINGS ONLY HOWEVER, THE EPC CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS ALONG WITH FEM BASED MODEL FOR APPROVAL PURPOSES.

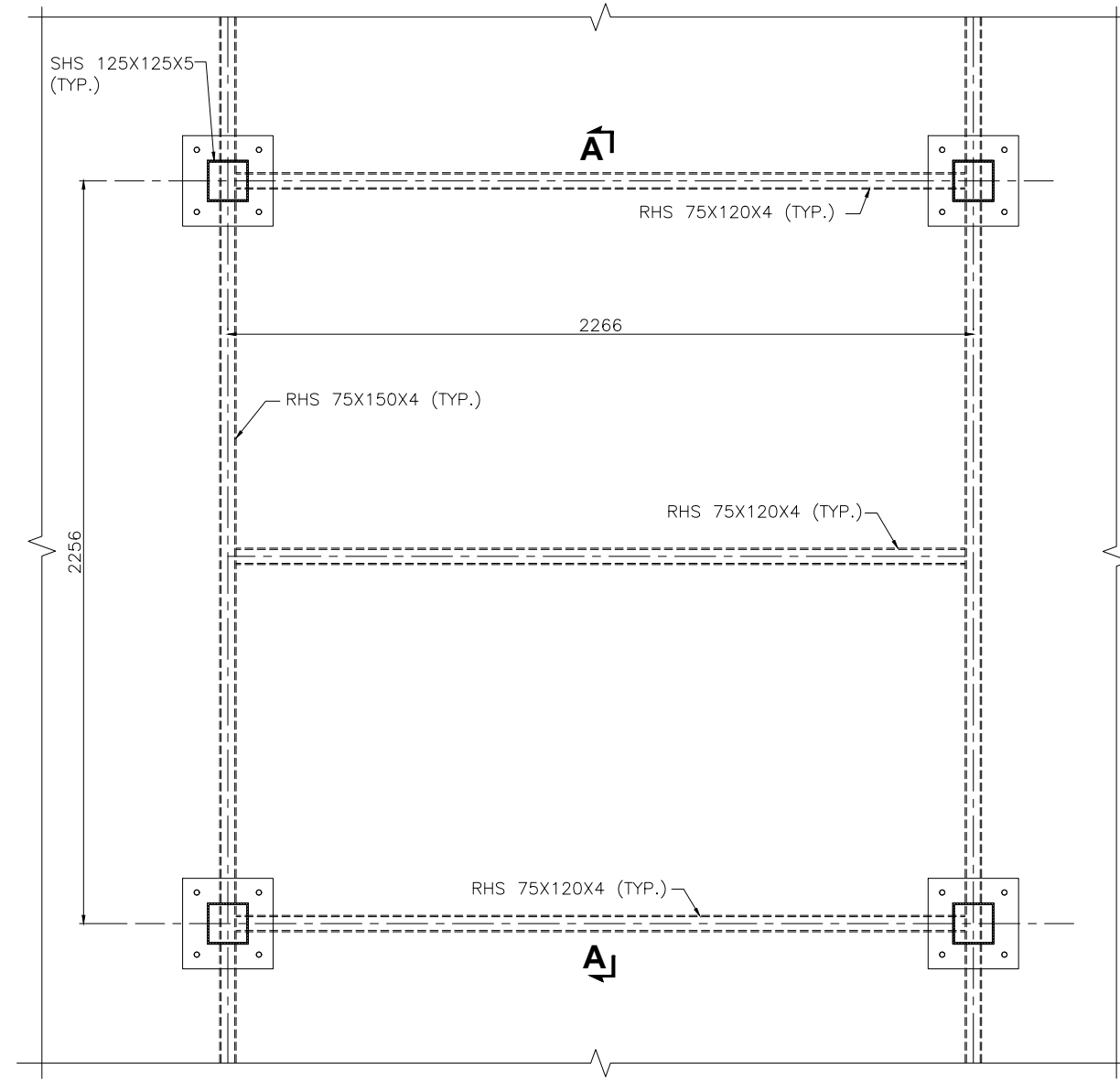
CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</p> <p>HEAD OFFICE- NESPAK HOUSE, I.C. BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	CLIENT	04			DRAWN	M.A	PROJECT	<p>CGI STRUCTURE</p> <p>100 WM DISTRIBUTED SOLAR PV PLANTS AT VARIOUS SITES IN GILGAT BALTISTAN</p>	SCALE	
	WATER & POWER GILGAT BALTISTAN	03			SUBMITTED		DATE		DATE	NTS
		02			RECOMMENDED				MAR. 2025	
	01			CHD./VER.			4894/TD/STR/01	REV.	↕	
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED					

NOTES:
1. REFER NOTE ON SHEET G02.




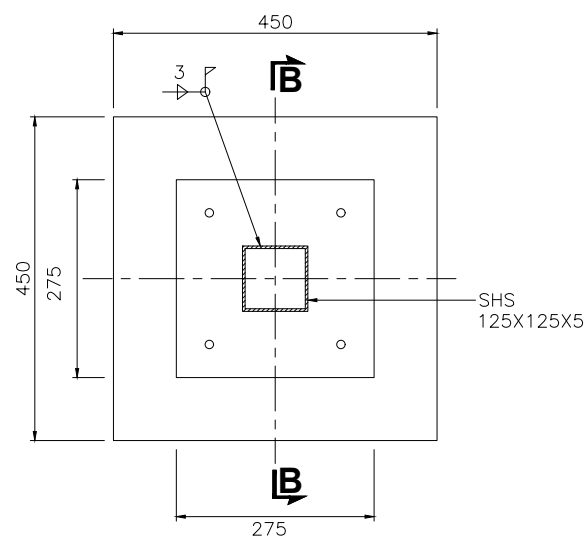
FOUNDATION LAYOUT PLAN



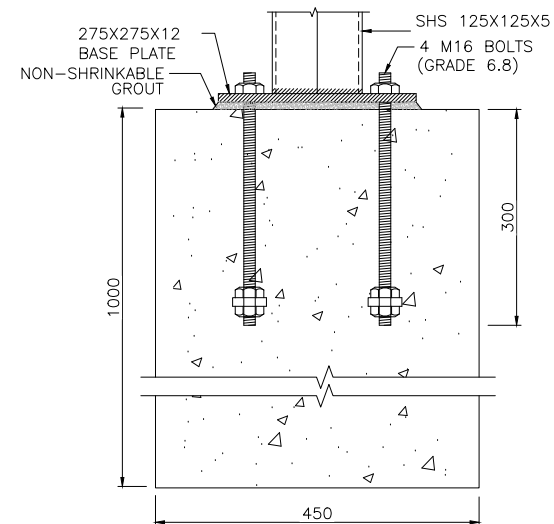
TYPICAL STRUCTURAL FRAMING PLAN

NOTES:
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 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT	04			DRAWN	S.A	PROJECT	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
	WATER AND POWER GILGAT BALTISTAN	03			SUBMITTED		100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	DATE	DRAWING No.	NTS
		02			RECOMMENDED			MAR-2025	4894/TD/STR/03/01	REV.
		01			CHD./VER.					
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED					



CONCRETE BLOCK DETAIL



SECTION B-B

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
11. WELDED ELECTRODES SHALL BE 70XX.
12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.5 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN $1.5T/\text{FT}^2$.
17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
21. THE STRENGTH OF P.C.C IS 14MPa , AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa .
22. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
23. REFER TO SIMULATION REPORT FOR ANGLE.

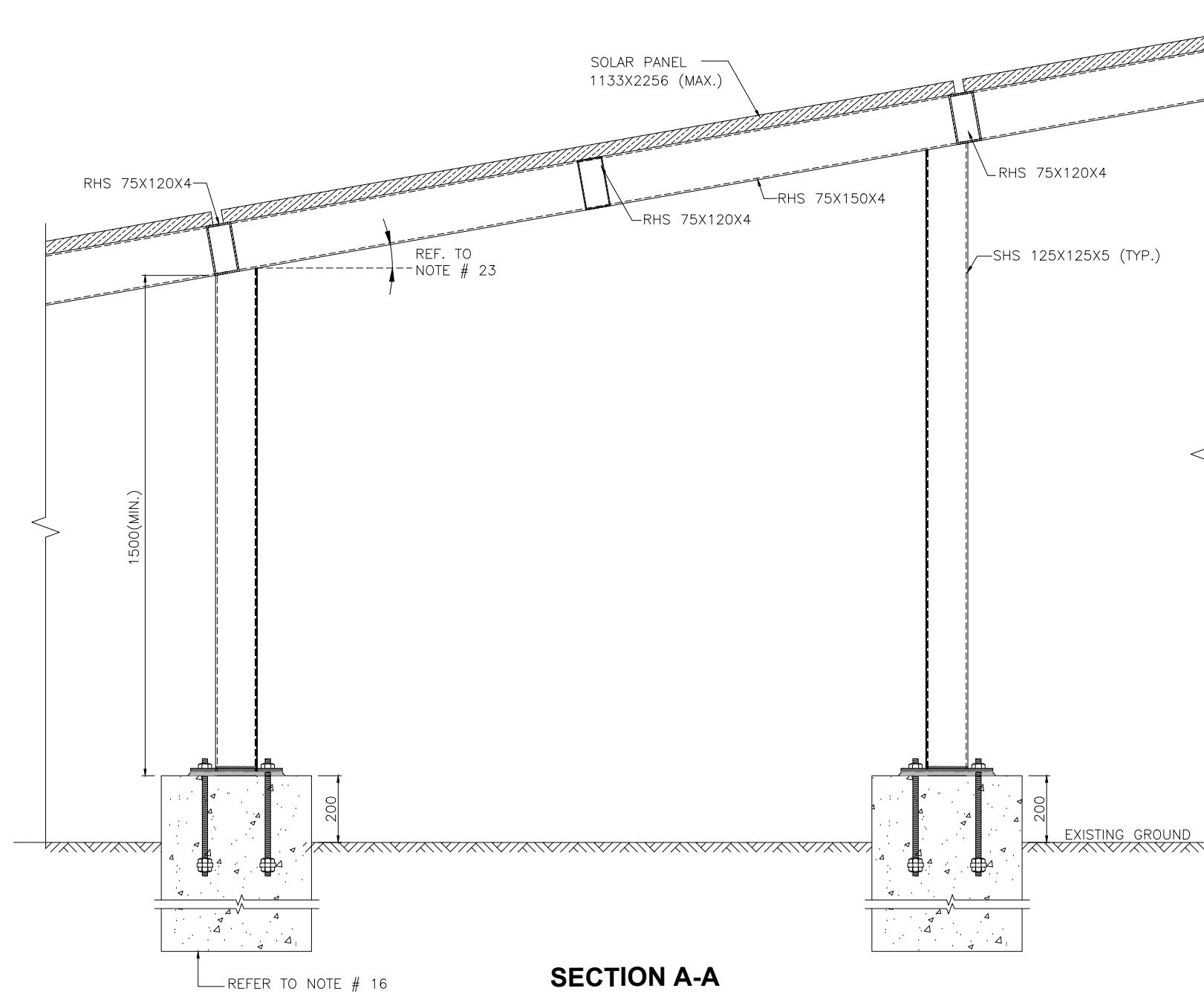
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CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
		03			SUBMITTED					NTS
		02			RECOMMENDED					
		01			CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.
								MAR-2025	4894/TD/STR/03/02	0


NOTES:
1. REFER NOTE ON SHEET G02.



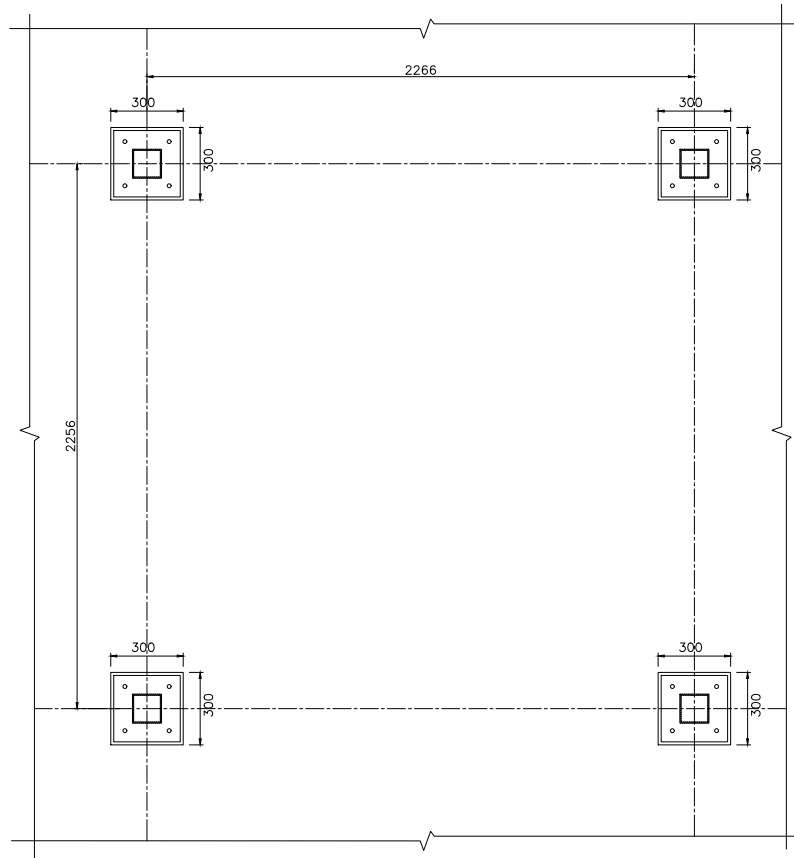
SECTION A-A

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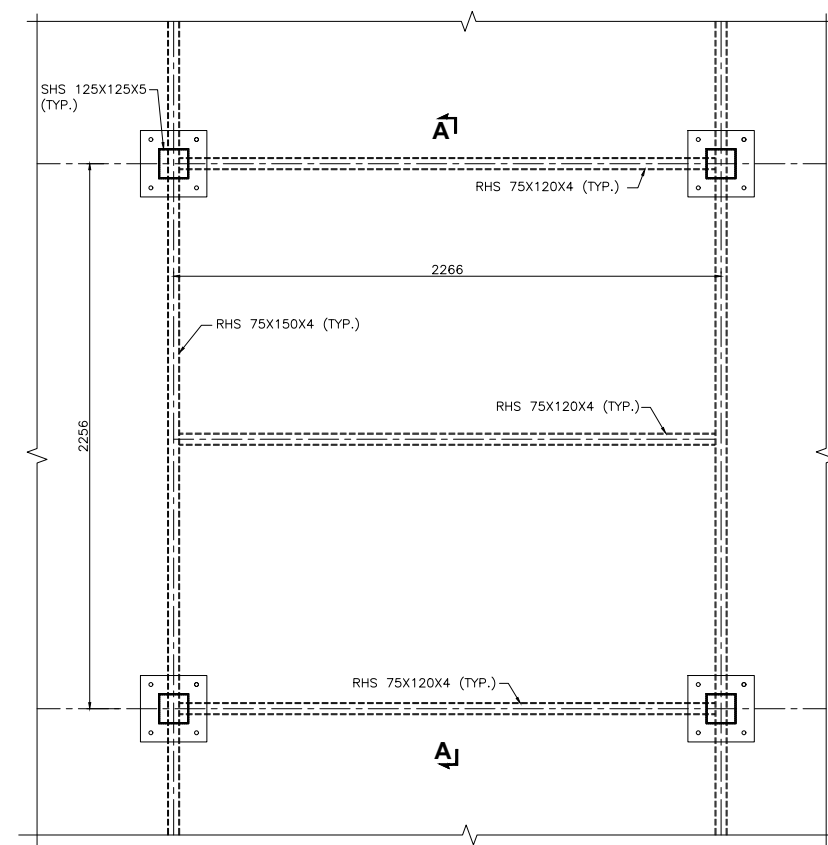
CONCEPTUAL DESIGN

 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
		03			SUBMITTED					NTS
		02			RECOMMENDED					
		01			CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.
								MAR-2025	4894/TD/STR/03/03	0

NOTES:
1. REFER NOTE ON SHEET G02.




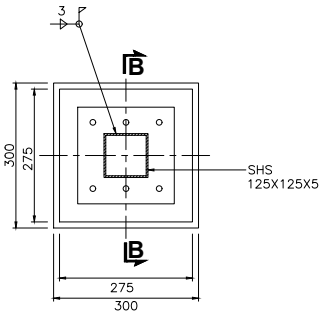
FOUNDATION LAYOUT PLAN



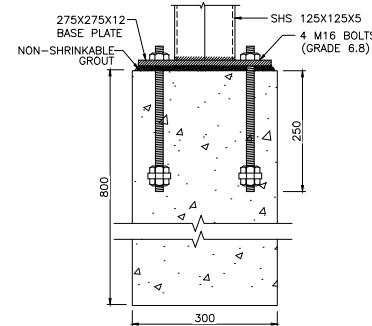
TYPICAL STRUCTURAL FRAMING PLAN

NOTES:
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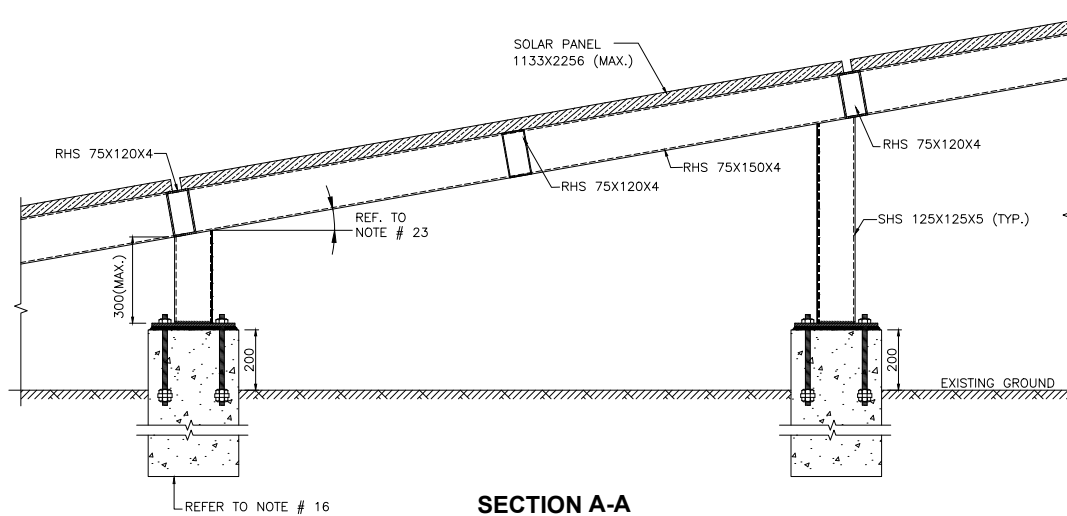
 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04				DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	TYPICAL SOLAR PANEL FRAMING FOR GROUND MOUNTED STRUCTURE		SCALE
		03				SUBMITTED			NTS		
		02				RECOMMENDED					
		01				CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.	
								MAR-2025	4894/TD/STR/04/01	1	



CONCRETE BLOCK DETAIL



SECTION B-B



SECTION A-A

- GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MM.
 2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
 3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
 4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
 5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
 6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
 7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
 8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
 9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
 10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
 11. WELDED ELECTRODES SHALL BE 70XX.
 12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
 13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
 14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
 15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.5 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
 16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN 1.5T/FT².
 17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
 18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
 19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
 20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
 21. THE STRENGTH OF P.C.C IS 14MPa, AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa.
 22. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
 23. REFER TO SIMULATION REPORT FOR ANGLE.

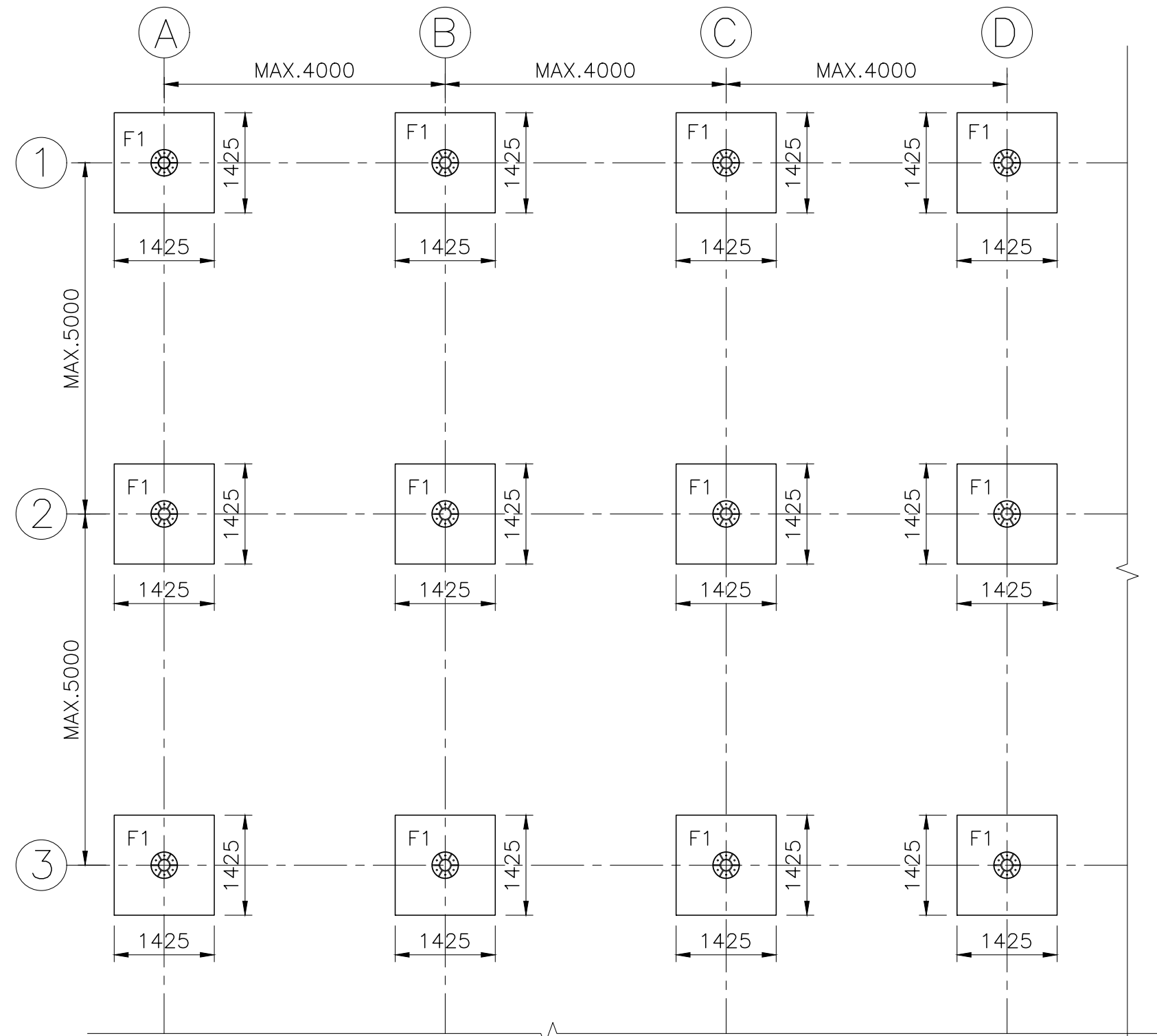
NOTES:

THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</p> <p>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	<p>CLIENT</p> <p>WATER AND POWER GILGAT BALTISTAN</p>	04				DRAWN	S.A	<p>PROJECT</p> <p>100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN</p>	<p>TYPICAL SOLAR PANEL FRAMING FOR GROUND MOUNTED STRUCTURE</p>		SCALE
		03				SUBMITTED			NTS		
		02				RECOMMENDED			DATE	DRAWING No.	REV.
		01				CHD./VER.			MAR-2025	4894TD/STR/04/02	1
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED					

NOTES:
1. REFER NOTE ON SHEET G03.



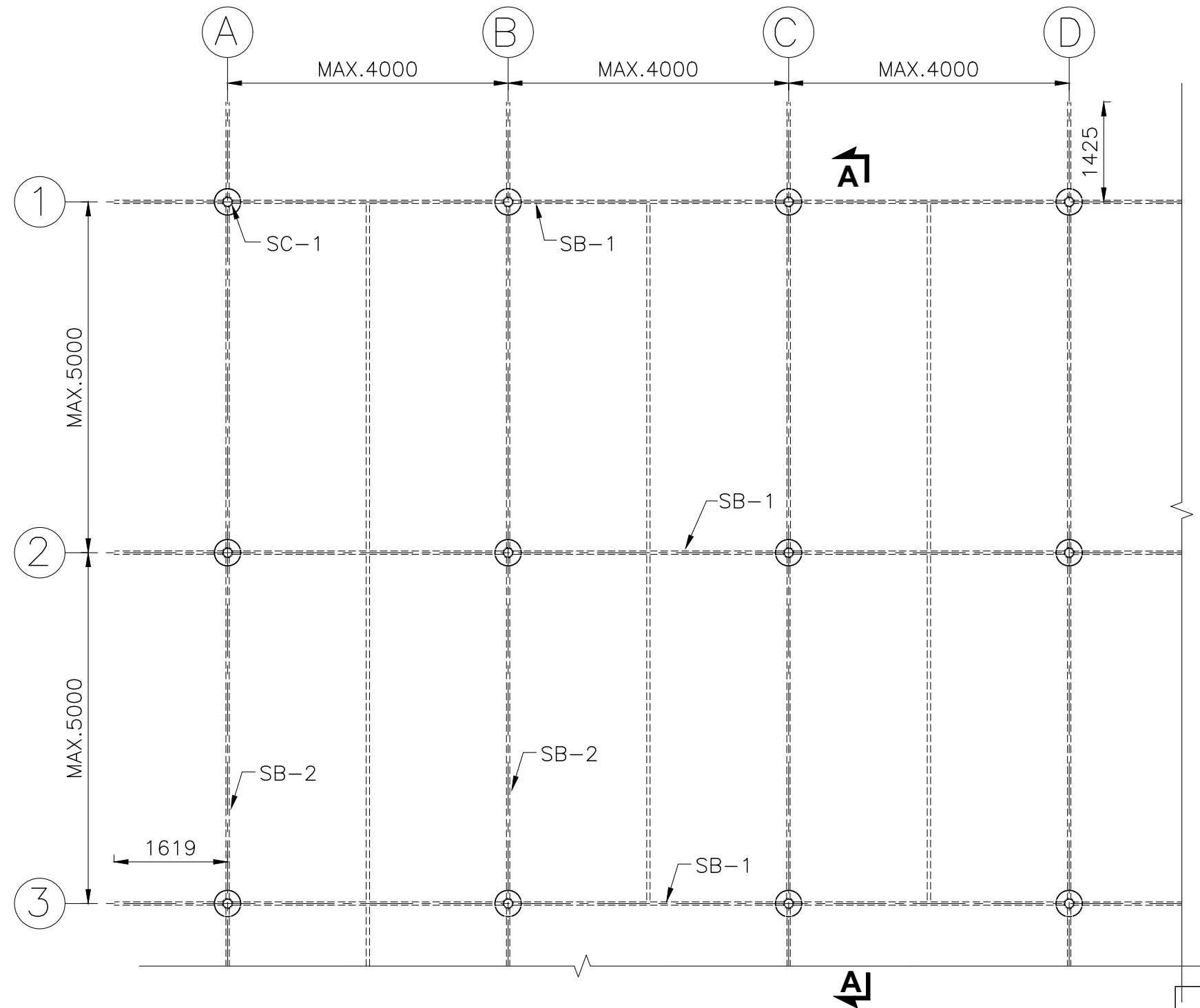
FOUNDATION LAYOUT PLAN

NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. <small>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</small>	CLIENT	WATER AND POWER GILGAT BALTISTAN	04		DRAWN	S.A	PROJECT	SCALE
				03		SUBMITTED		NTS
				02		RECOMMENDED		
				01		CHD./VER.		
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED		PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	DATE MAR-2025
							SOLAR PANEL FRAMING FOR PARKING SHED DRAWING No. 4894/TD/STR/02/01	REV. 0

NOTES:
1. REFER NOTE ON SHEET G03.



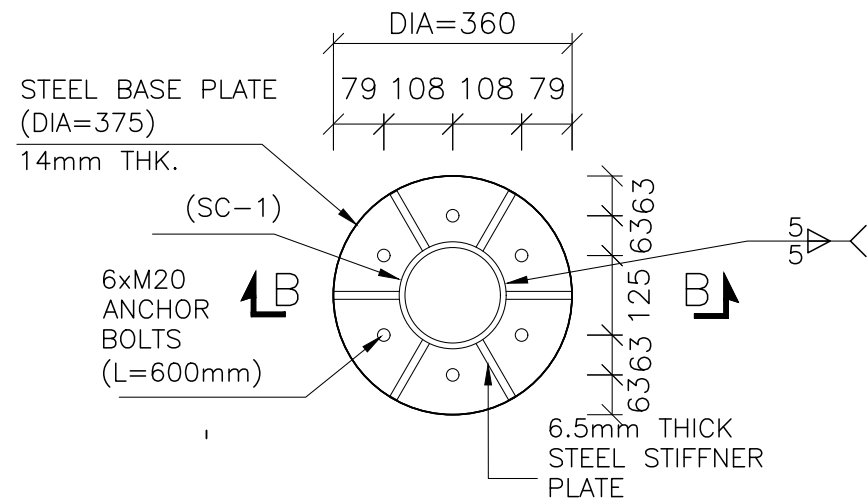
FRAMING LAYOUT PLAN

MEMBERS	SIZE/DESIGNATION
SC-1	I-SECTION OF 150X75X6mm
SB-1	I-SECTION OF 150X75X6mm
SB-2	C-CHANNEL OF 125X75X3mm

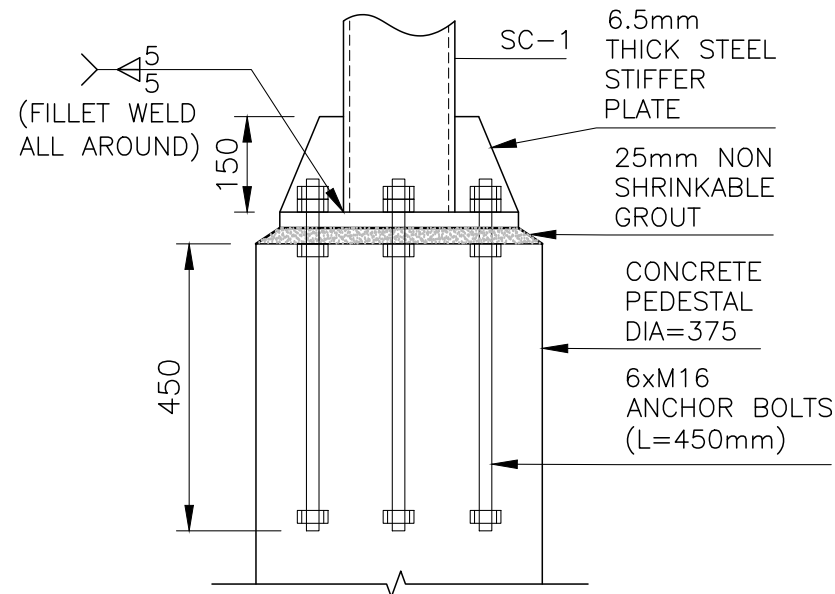
NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

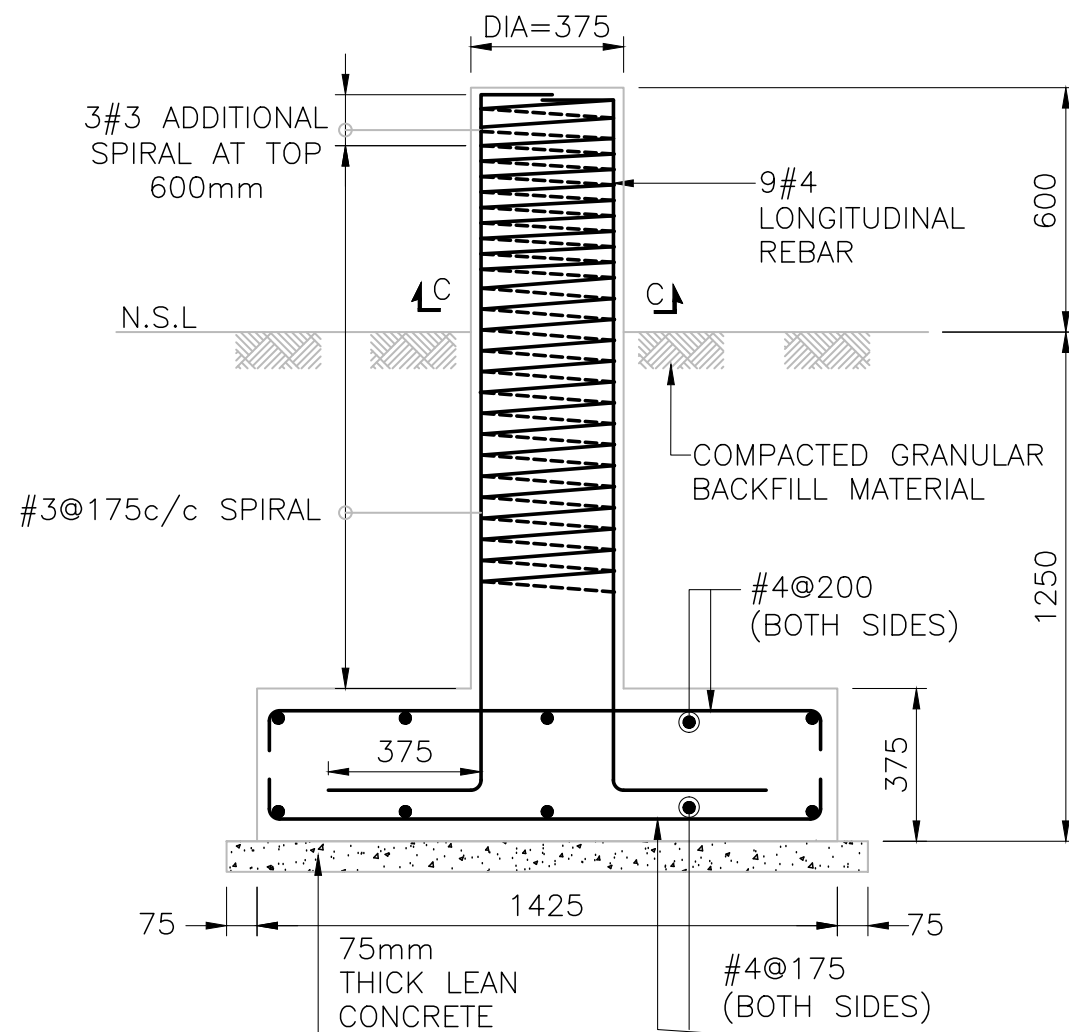
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED		SCALE
		03			SUBMITTED				DATE	DRAWING No.
		02			RECOMMENDED			MAR-2025	4894/TD/STR/02/02	REV.
		01			CHD./VER.					0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



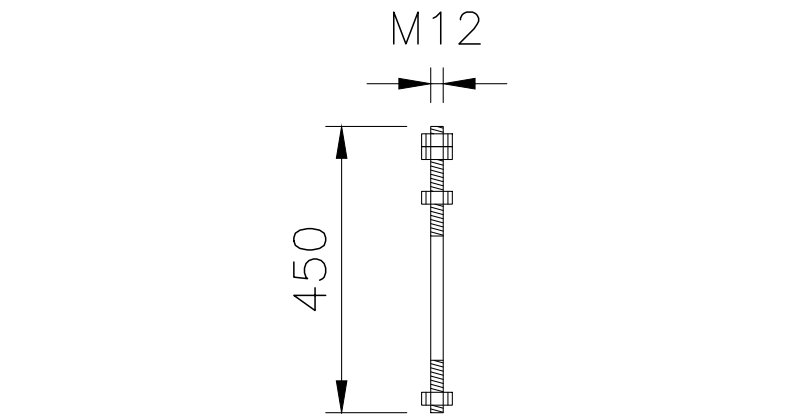
TYPICAL BASE PLATE DETAIL



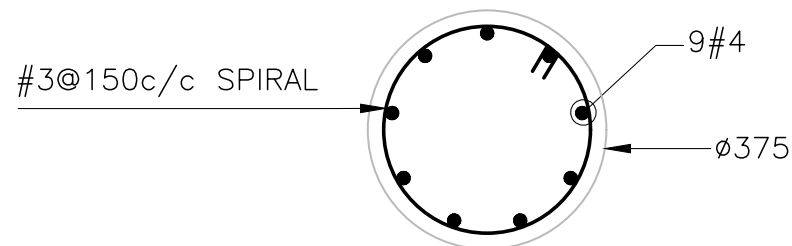
SECTION B-B



TYPICAL FOUNDATION REBAR DETAIL (F1)



TYPICAL BOLT DETAIL



SECTION C-C

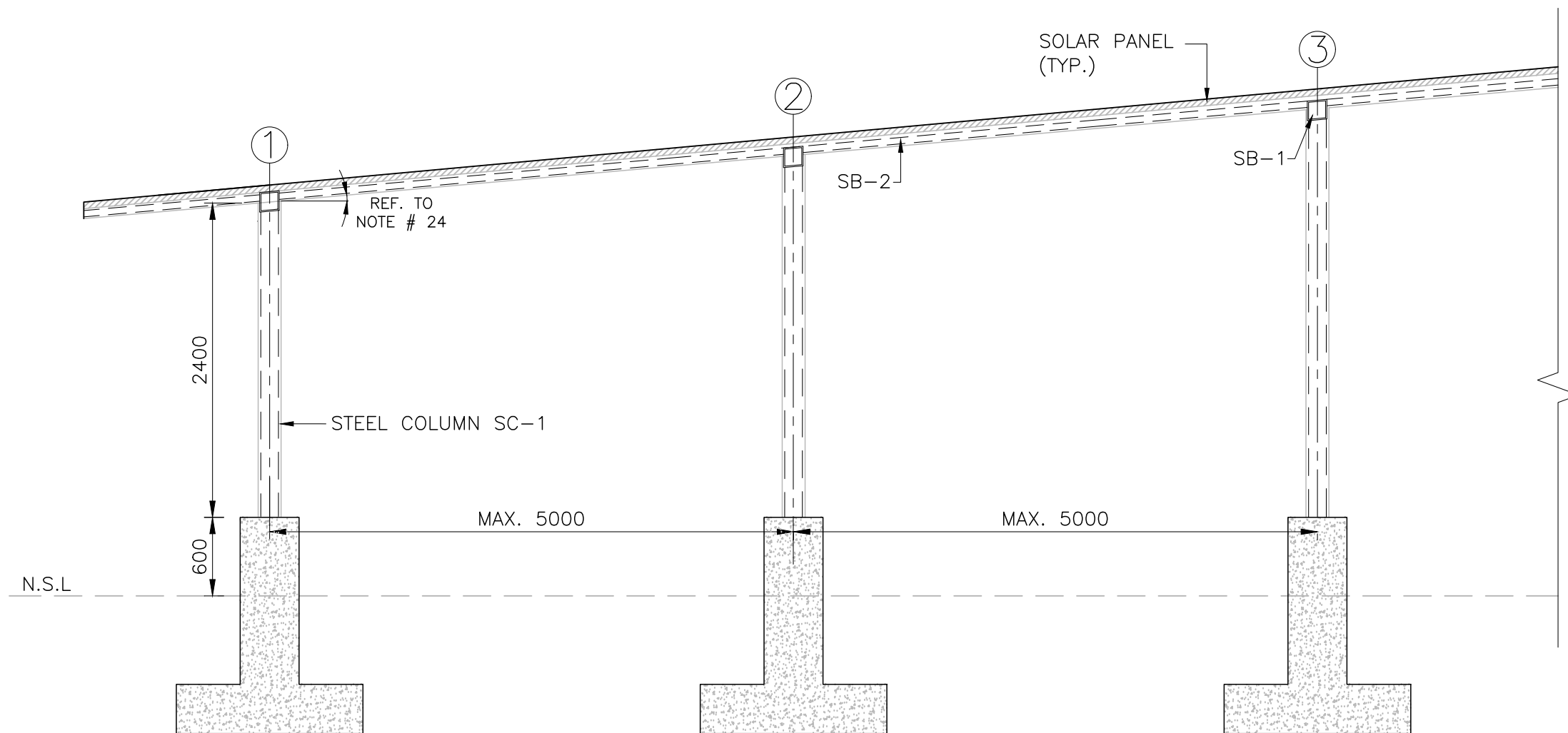
GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
11. WELDED ELECTRODES SHALL BE 70XX.
12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.0 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN 1.5T/FT^2 .
17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
21. THE STRENGTH OF P.C.C IS 14MPa , AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa .
22. THE CABLE TRAY WILL BE ATTACH WITH THE STRUCTURE IF REQUIRED.
23. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
24. REFER TO SIMULATION REPORT/DRAWING FOR ANGLE.

NOTES:
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CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04				DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED	SCALE	
		03				SUBMITTED				NTS	
		02				RECOMMENDED					
		01				CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			DATE	DRAWING No.	REV.
									MAR-2025	4894/TD/STR/02/03	0



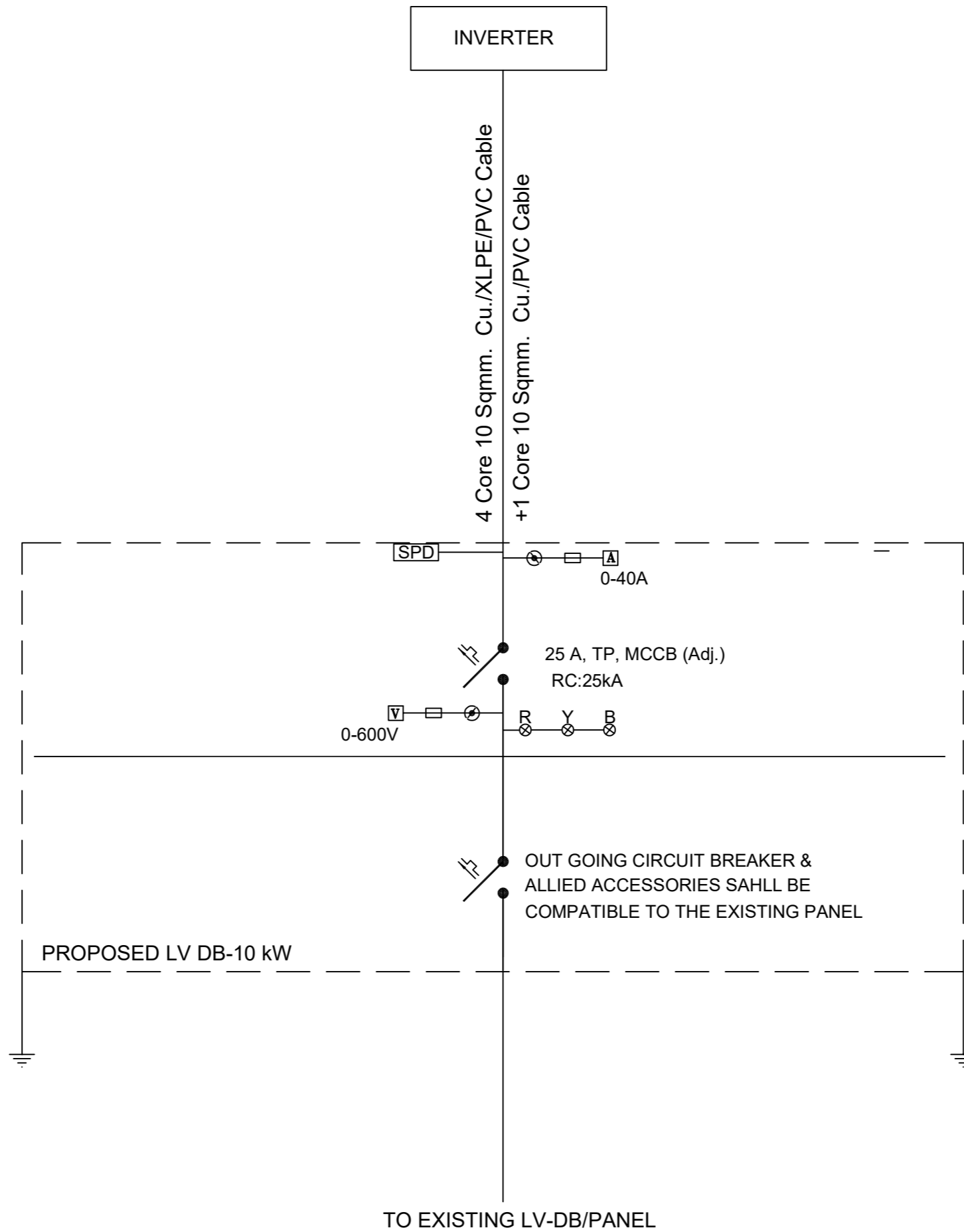
SECTION A-A

MEMBERS	SIZE/DESIGNATION
SC-1	I-SECTION OF 150X75X6mm
SB-1	I-SECTION OF 150X75X6mm
SB-2	C-CHANNEL OF 125X75X3mm

NOTES:
 THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

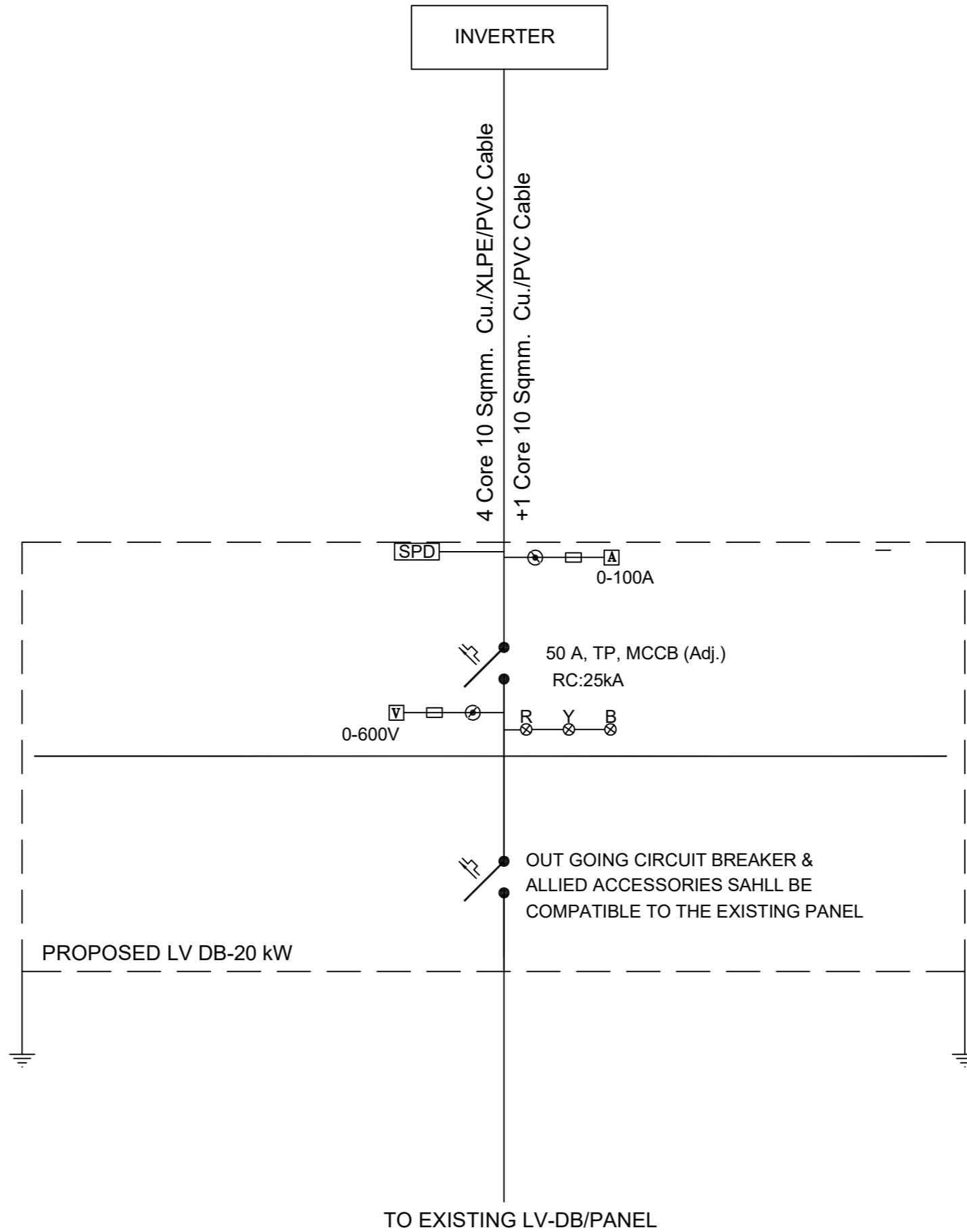
<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	<p>CLIENT</p> <p>WATER AND POWER GILGAT BALTISTAN</p>	04			DRAWN	S.A	<p>PROJECT</p> <p>100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN</p>	<p>SOLAR PANEL FRAMING FOR PARKING SHED</p>		SCALE
		03			SUBMITTED				DATE	DRAWING No.
		02			RECOMMENDED			MAR-2025	4894/TD/STR/02/04	REV.
		01			CHD./VER.					0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

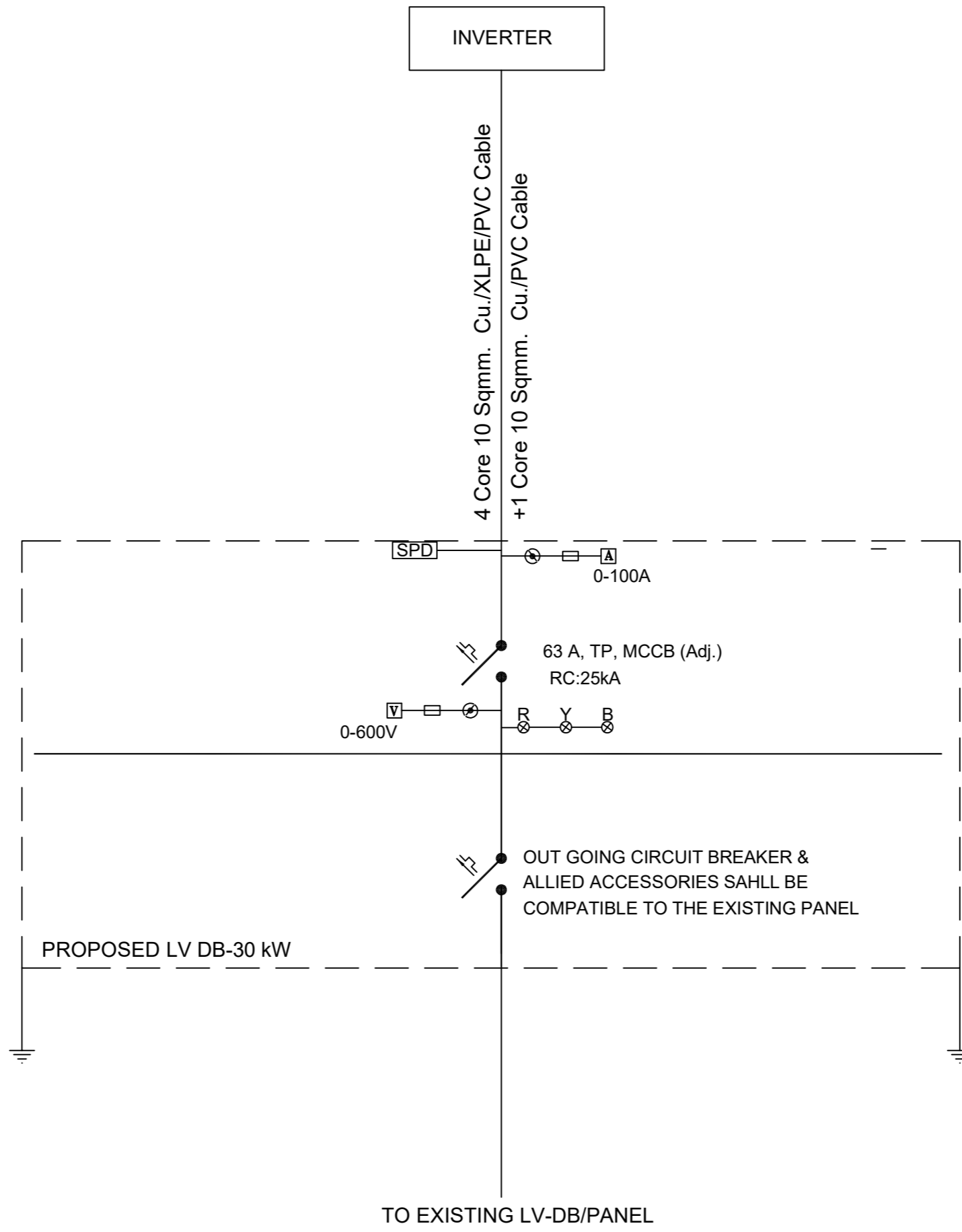
CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04			DRAWN	SH	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(1-10 KW) SINGLE LINE DIAGRAM		SCALE
	03			SUBMITTED					
	02			RECOMMENDED					
	01			CHD./VER.					
REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.	
						AUG, 2025	MV/LV-21	0	



NOTE:

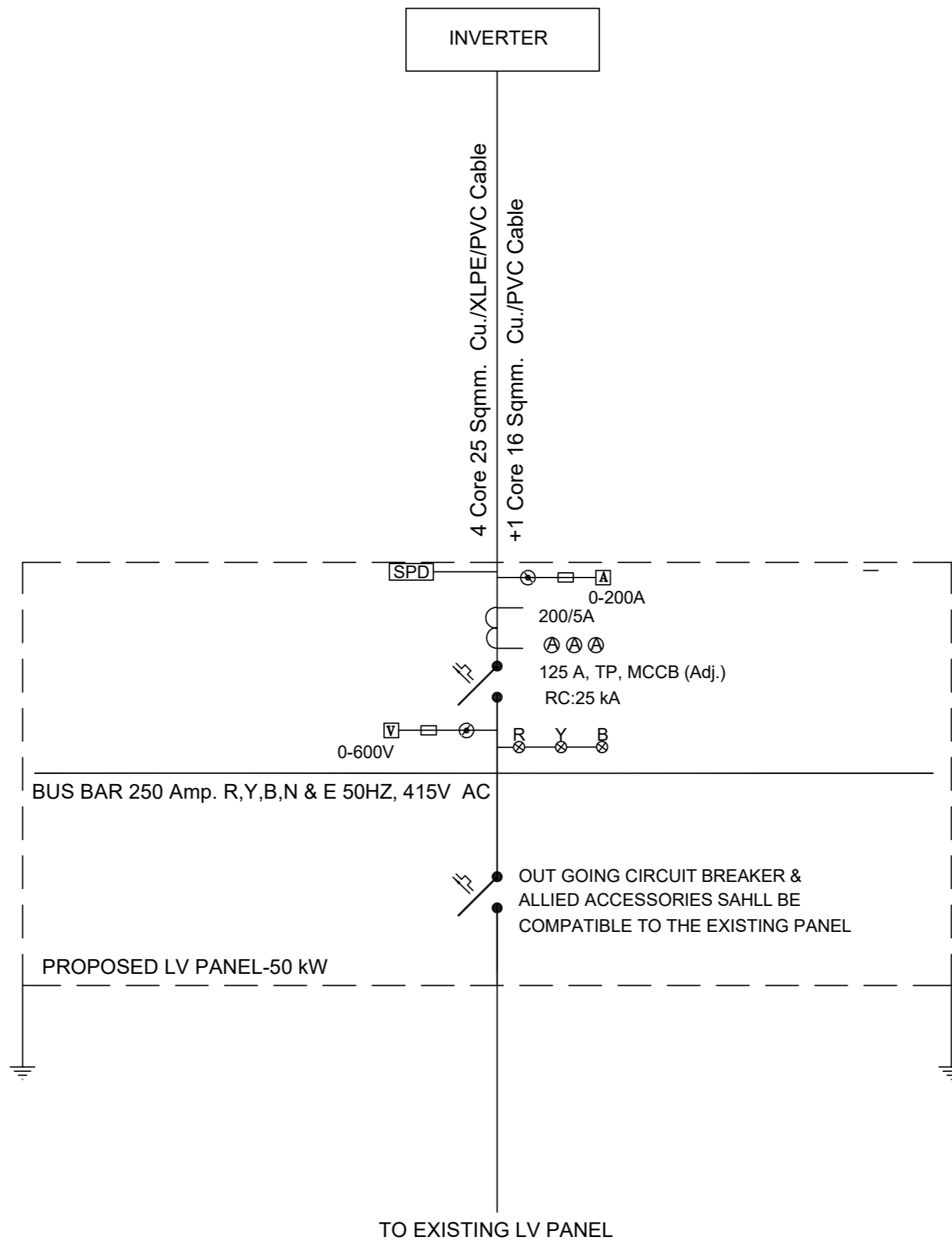
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04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:
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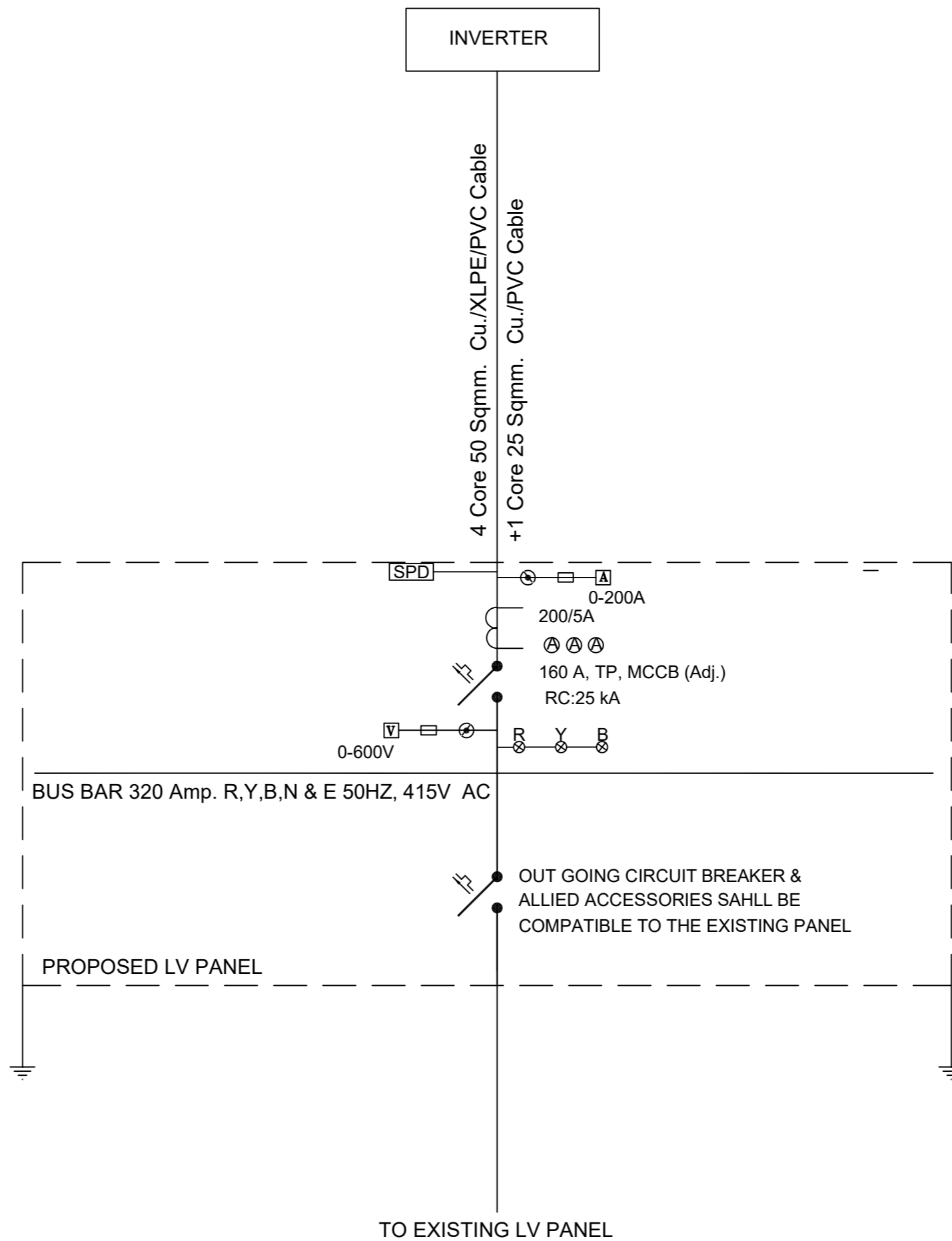
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04			DRAWN	S.H	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(20-30 KW) SINGLE LINE DIAGRAM		SCALE	
	03			SUBMITTED						NTS
	02			RECOMMENDED						
	01			CHD./VER.						
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.	
							AUG, 2025	MV/LV-23	0	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

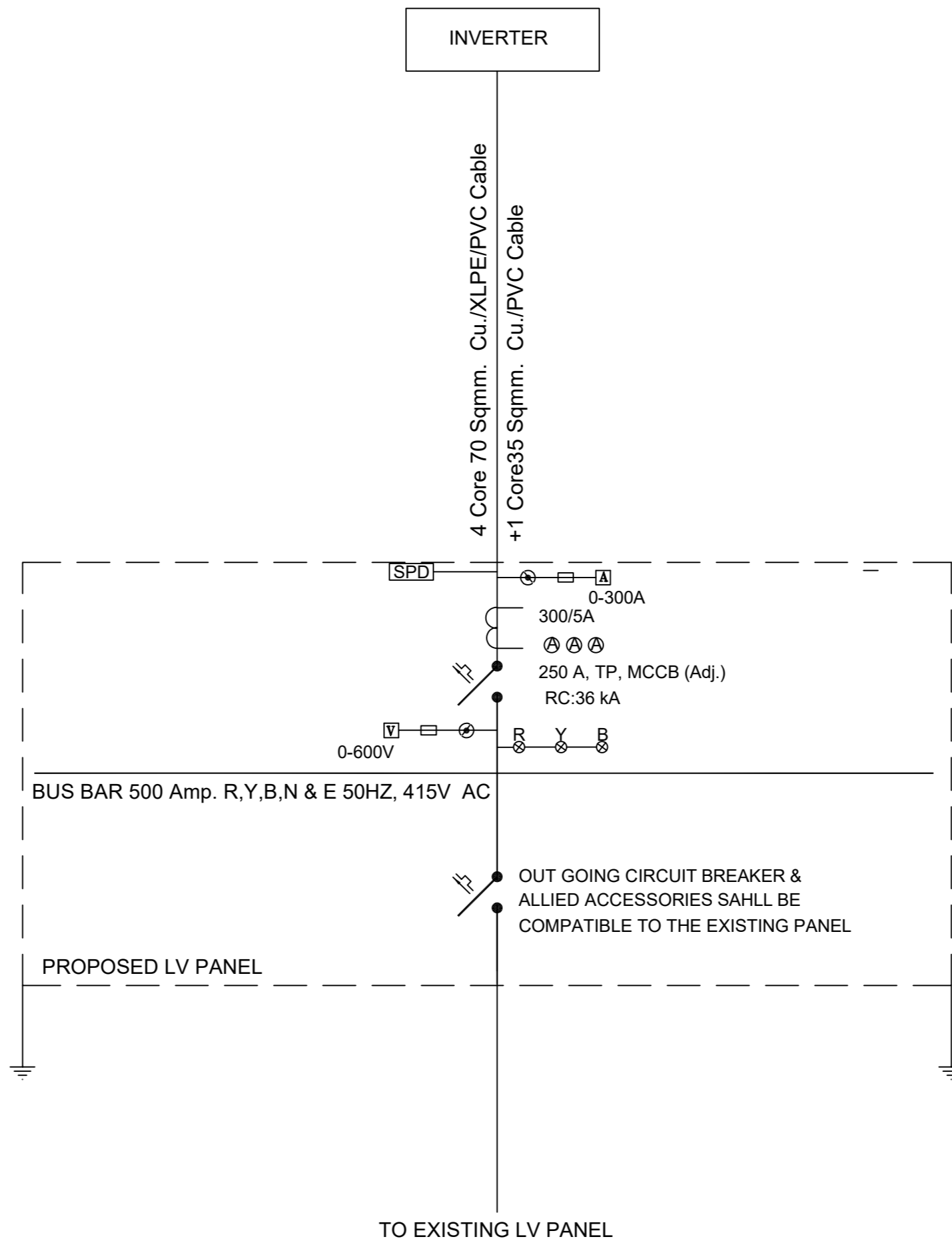
04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



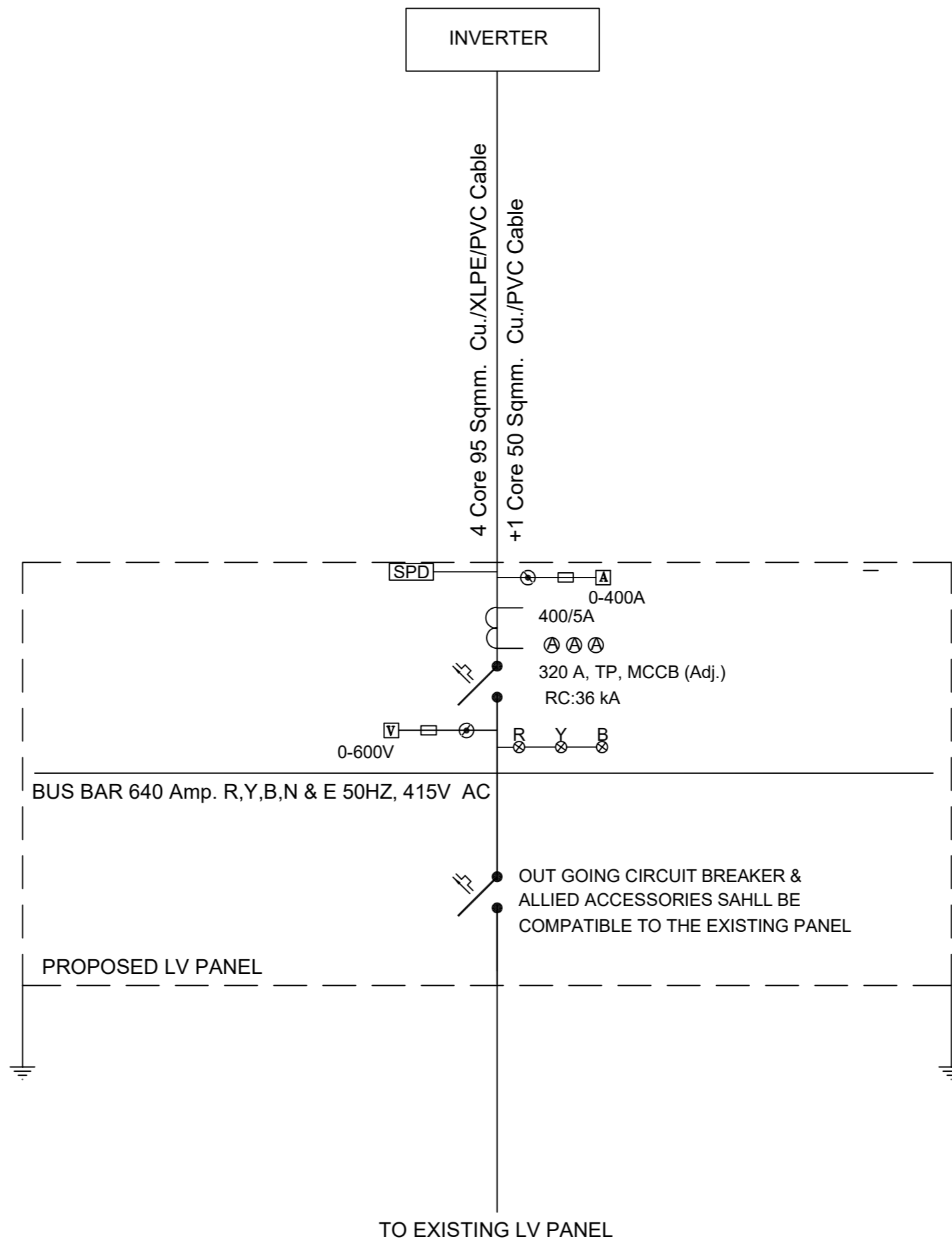
NOTE:
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04			
03			
02			
01			
REV.	DATE	DESCRIPTION	APPROVED

DRAWN	S.H	PROJECT
SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
RECOMMENDED		
CHD./VER.		
APPROVED	APPROVED	

(70-100 kW) SINGLE LINE DIAGRAM	
DATE AUG 2025	DRAWING No. MV/LV-26

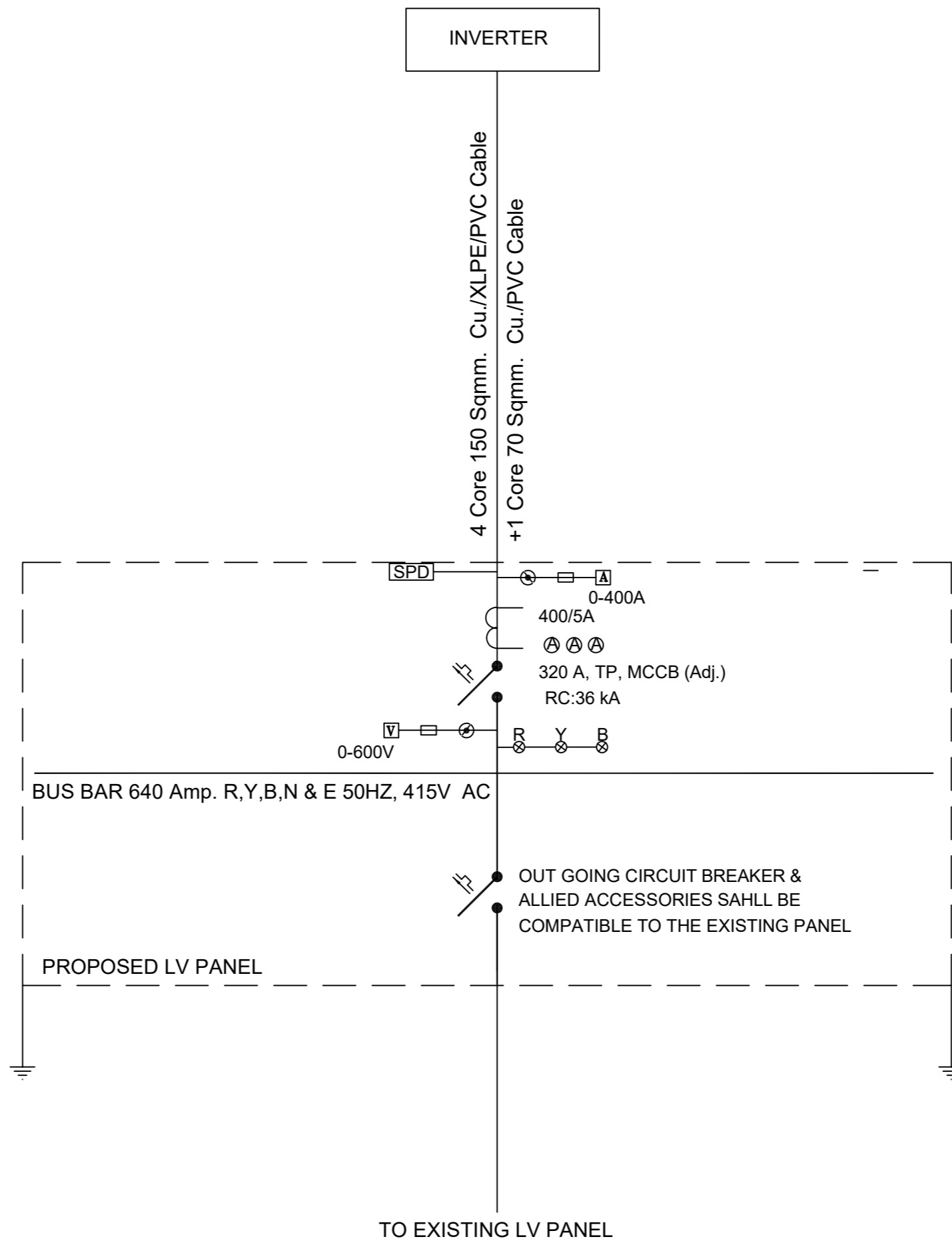
SCALE NTS
REV. 0



NOTE:

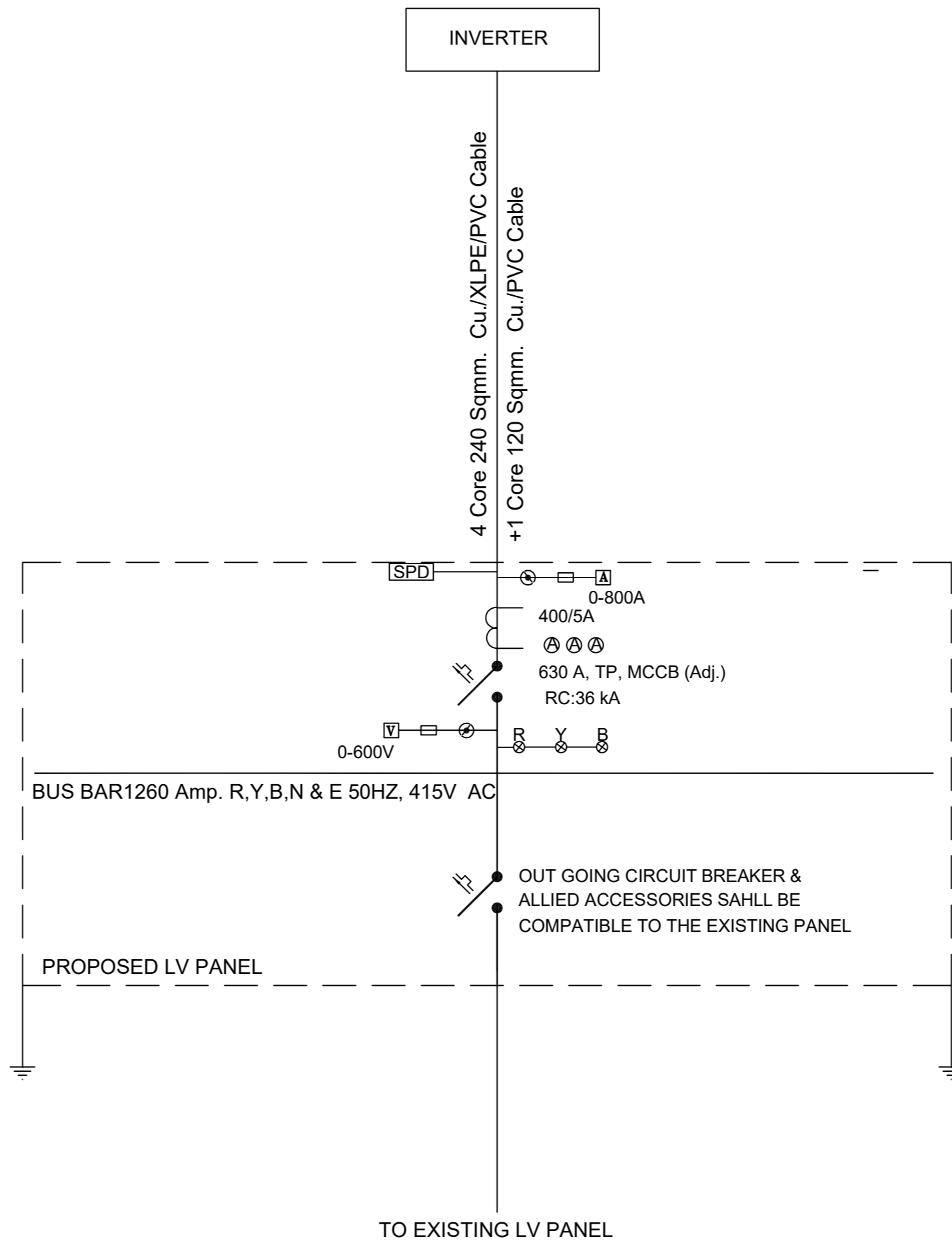
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04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



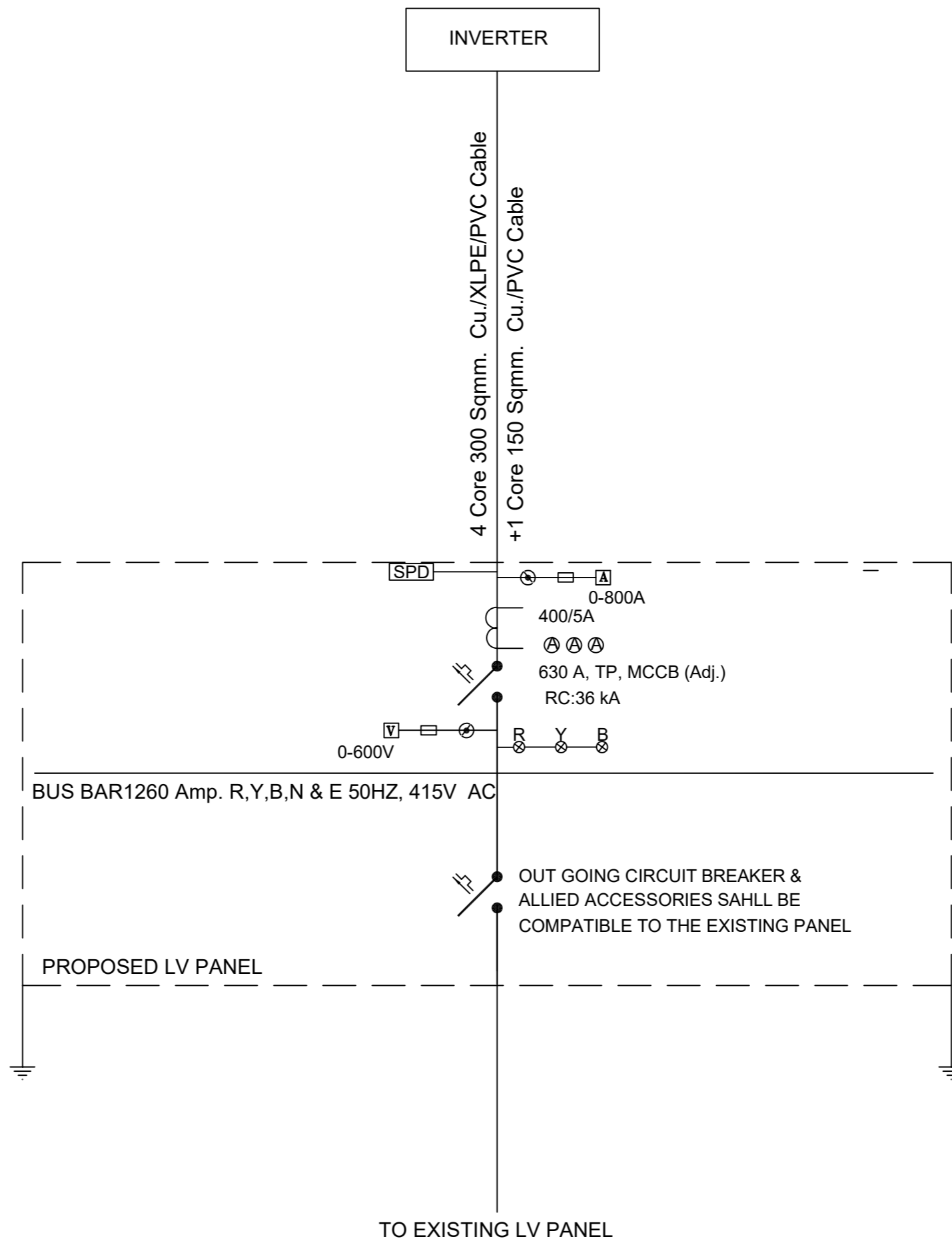
NOTE:
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04				DRAWN	S.H	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(125-150 KW) SINGLE LINE DIAGRAM	SCALE
	03				SUBMITTED				NTS
	02				RECOMMENDED				
	01				CHD./VER.				
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED				
							DATE	DRAWING No.	REV.
							AUG. 2025	MV/LV-28	0



NOTE:
 THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04				DRAWN	S.H	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(150-200 KW) SINGLE LINE DIAGRAM	SCALE
	03				SUBMITTED				NTS
	02				RECOMMENDED				
	01				CHD./VER.				
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.
							AUG 2025	MV/LV-29	0



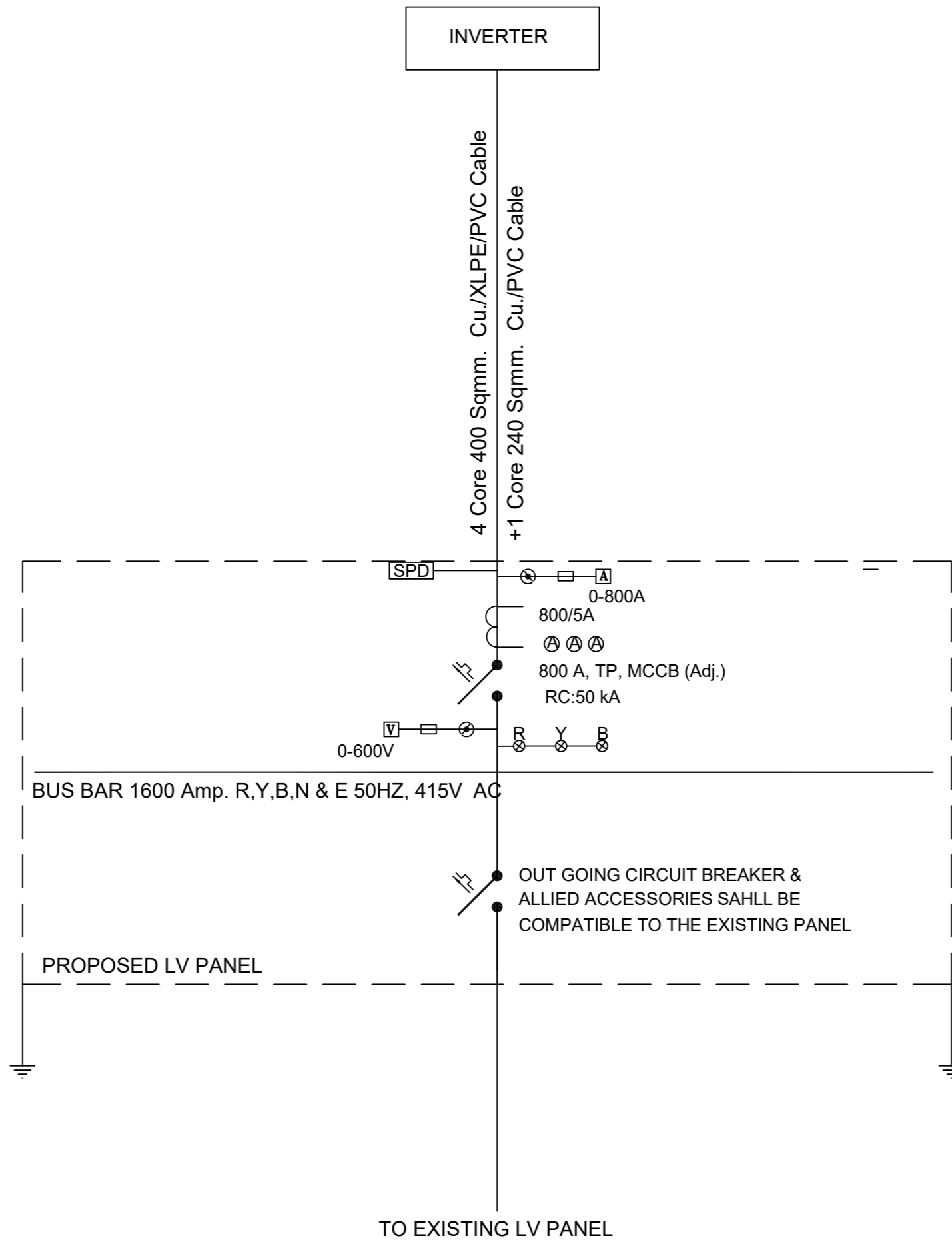
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REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

	DRAWN	S.H	PROJECT
	SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
	RECOMMENDED		
	CHD./VER.		
	APPROVED	APPROVED	

(200-250 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-30	REV.

(200-250 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-30	REV.



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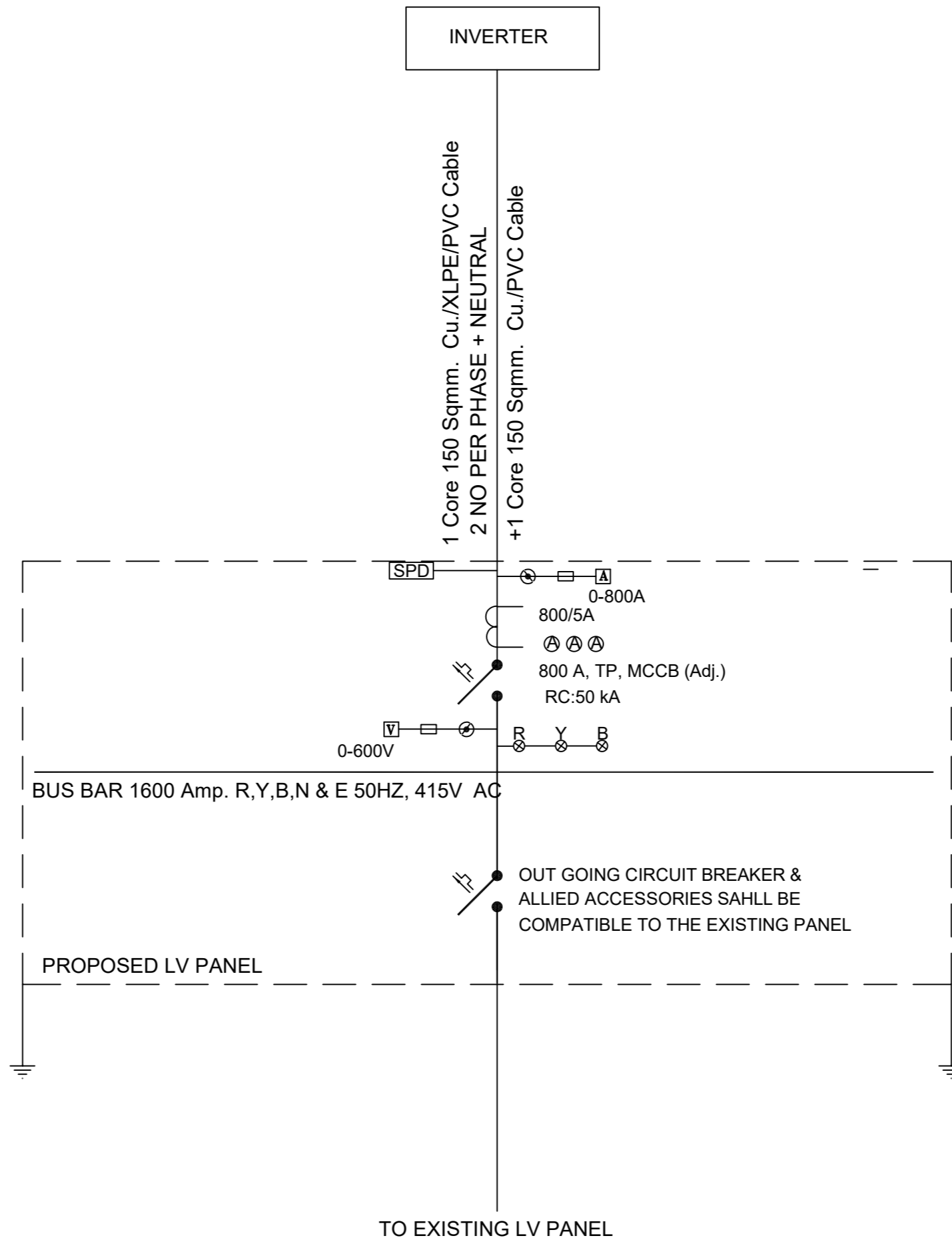
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PROJECT
**100 MW PROJECT OF SOLARIZATION IN
 GILGIT BALTISTAAN**

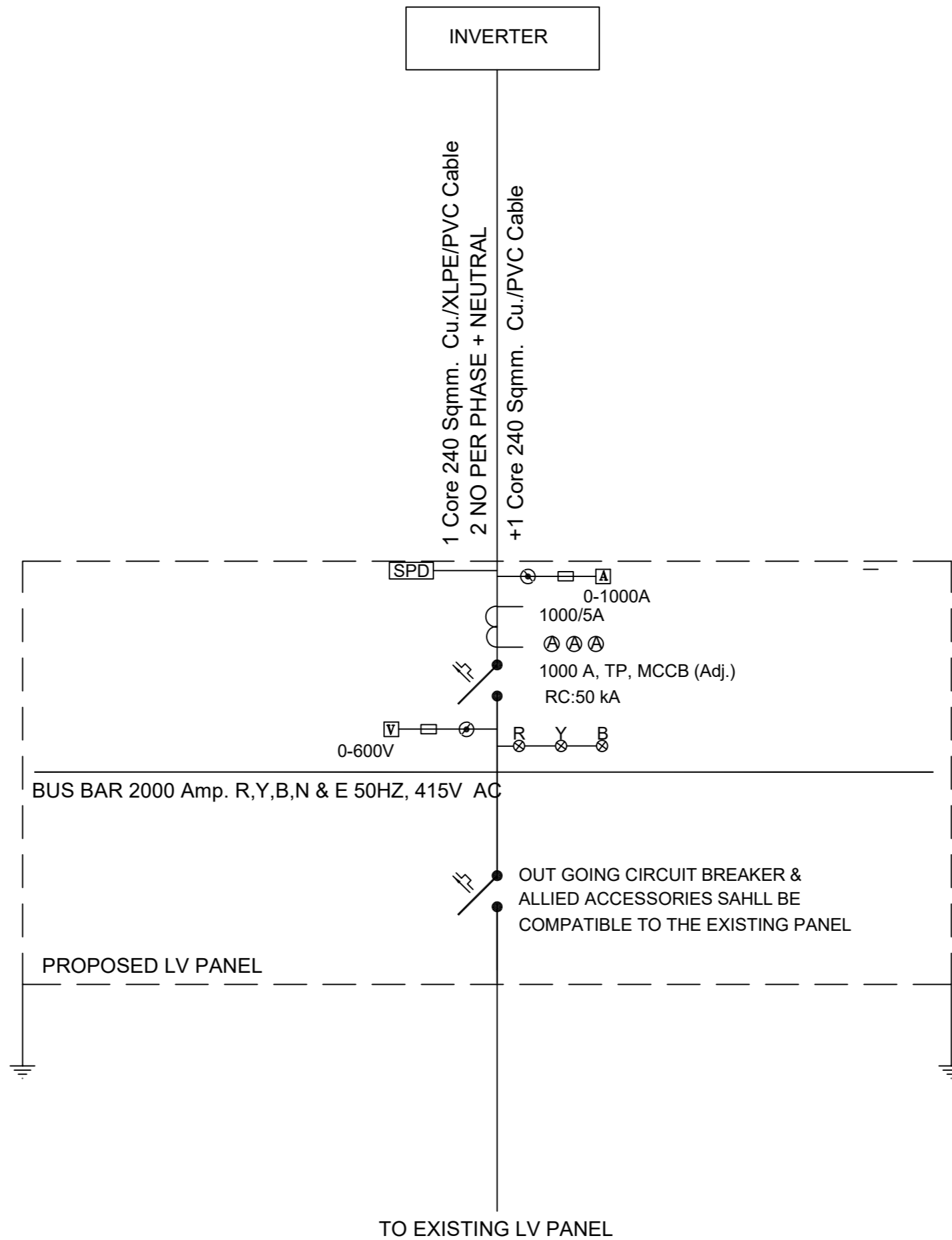
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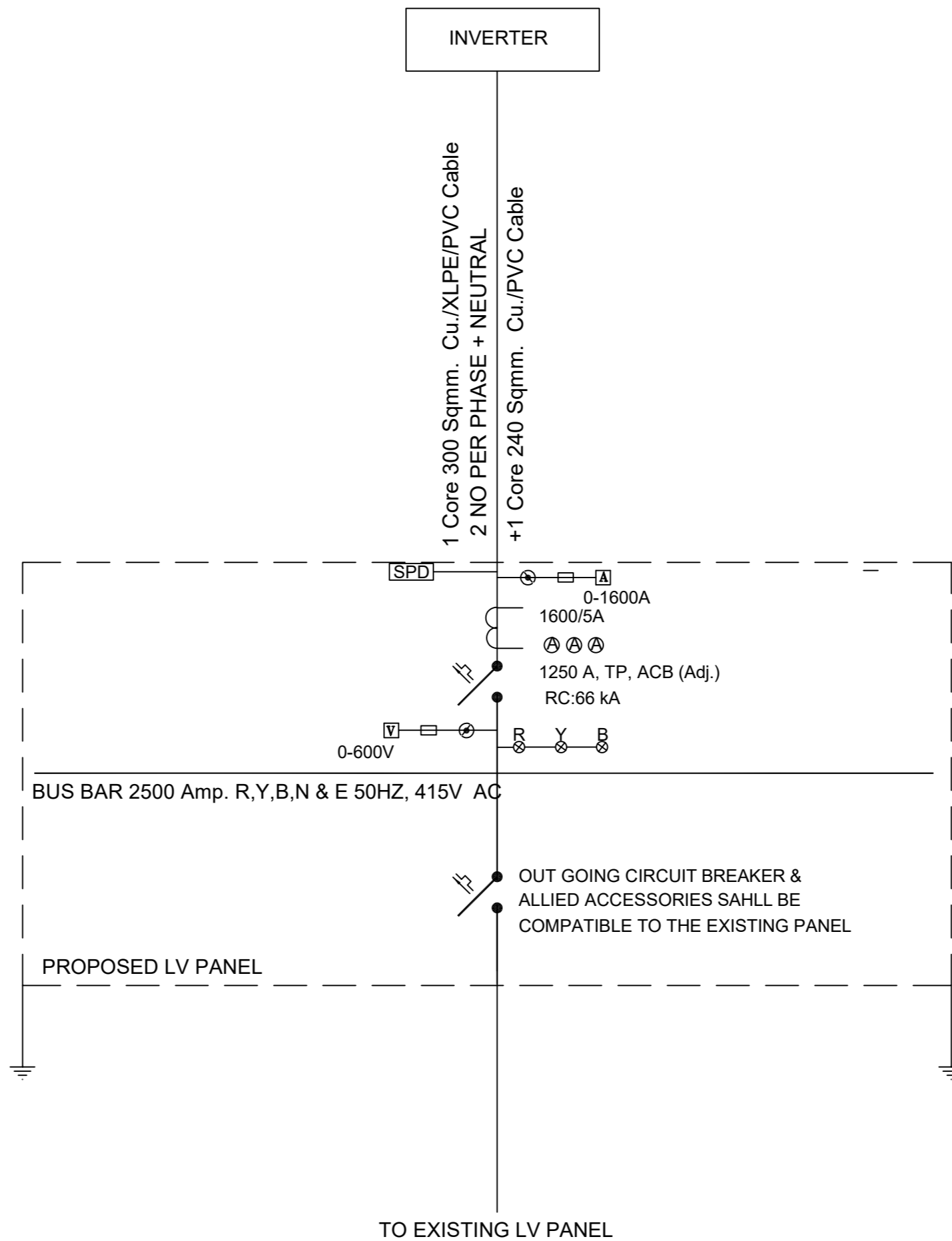
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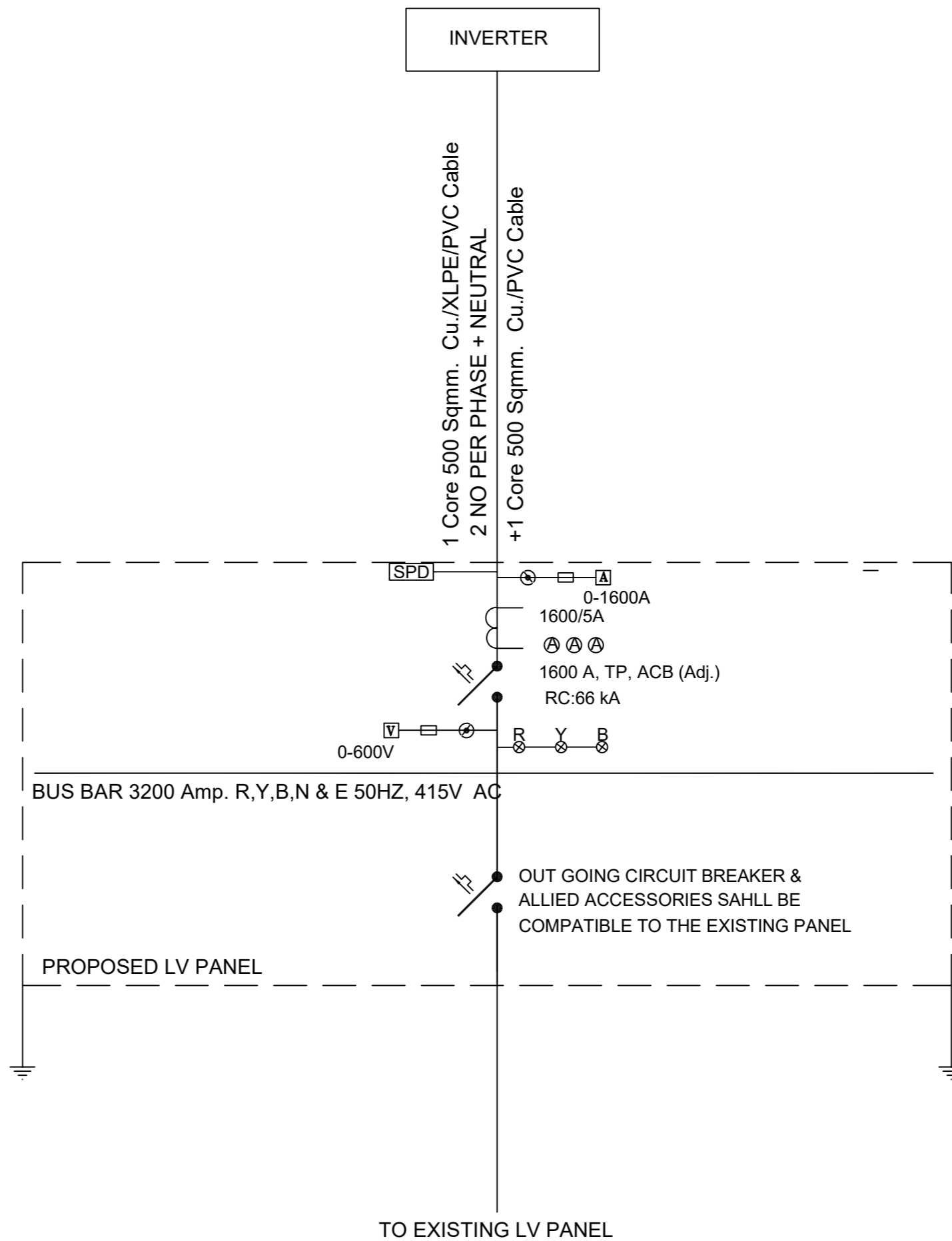
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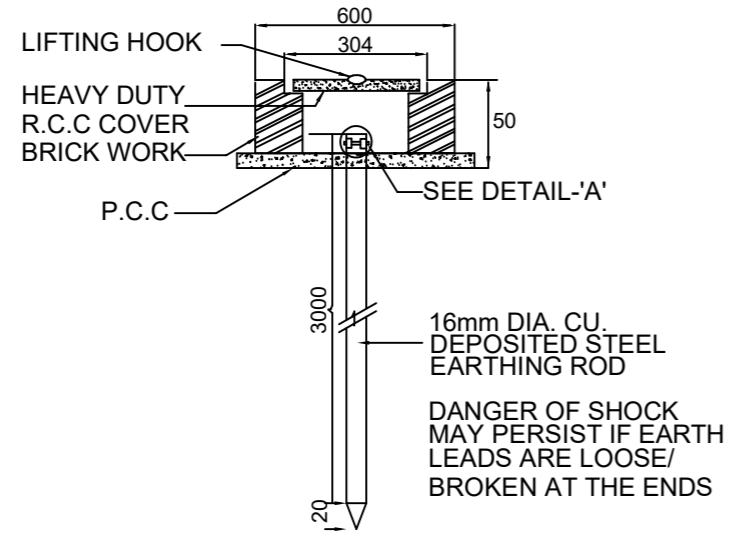
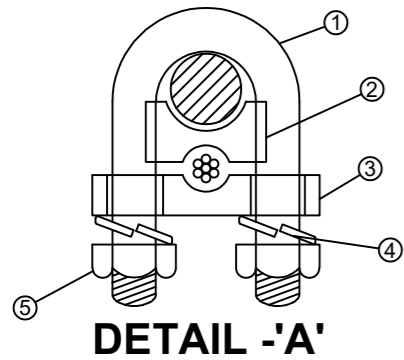
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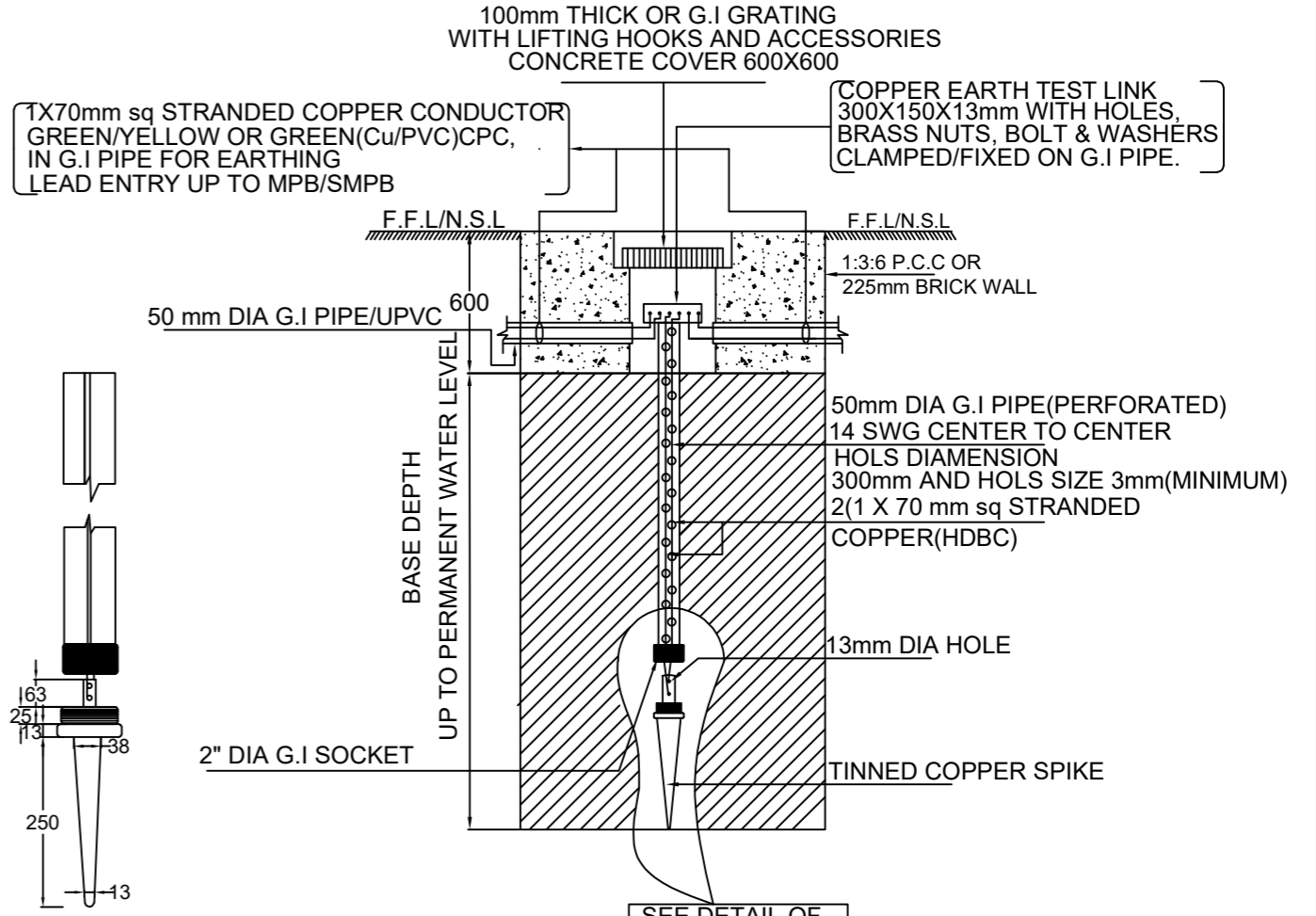
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REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

ROD TYPE EARTHING DETAIL



ITEM NO.	ITEM NAME	MATERIAL
1	U-BOLT	MILD STEEL
2	SPACER	CAST IRON
3	BASE	MILD STEEL
4	SPRING WASHER	CARBON STEEL
5	NUT	MILD STEEL

BORE TYPE EARTHING DETAIL



DETAILS OF EARTHING SPIKE

NOTE
EARTH PIT DIMENSION: 450X450X600

NOTES

1. THIS DRAWING IS FOR INDICATIVE DESIGN MODEL AND SHOULD BE READ IN CONJUNCTION WITH SPECIFICATIONS AND ITEMS OF BILL OF QUANTITIES.
2. EARTH BORE SHALL BE MADE AT 2000MM (2M) AWAY FROM FOUNDATION/STRUCTURE.
3. DISTANCE BETWEEN TWO EARTH BORES SHALL NOT BE LESS THAN 3000MM (3M)
4. CONNECTION SHALL BE BOLTED WITH THIMBLES, BRASS NUTS, BOLTS/WASHER ETC.
5. CONTRACTOR SHALL MEASURE EARTHING RESISTANCE IN THE PRESENCE OF SITE ENGINEER, FOR FINAL ACCEPTANCE.
6. THE VALUE OF EARTH RESISTANCE SHALL BE INCORPORATED IN FINAL AS-BUILT DRAWINGS.

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04				DRAWN	S.H	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(EARTHING DETAILS FOR PANELS)	SCALE
	03				SUBMITTED				NTS
	02				RECOMMENDED				
	01				CHD./VER.				
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							DATE	DRAWING No.	REV.
							AUG. 2025	MV/LV-36	



WATER AND POWER DEPARTMENT, GILGIT
BALTISTAN



5.70 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT-II)

**BIDDING DOCUMENTS
ON EPC/TURNKEY BASIS
(SINGLE STAGE TWO ENVELOPE)**

VOLUME – I



November 2025



National Engineering Services Pakistan (Pvt.) Ltd. (NESPak)

1-C, Block N, Model Town Extension, Lahore, Pakistan

Tel: +92-42-99090000, Web: www.nespak.com.pk E-mail: power@nespak.com.pk

5.70 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN LOT-II

INDEX TO BIDDING DOCUMENTS

VOLUME – I

**BIDDING PROCEDURES
AND
CONDITIONS OF CONTRACT**

1. Section I – Instruction to Bidders (ITB)
2. Section II – Bid Data Sheet (BDS)
3. Section III – Evaluation & Qualification Criteria
4. Section IV – Bid Forms
5. Section V – General Conditions (GC)
6. Section VI – Particular Conditions
7. Section VII – Contract Forms and Schedules



No. PD/100MW/SPP/1(1)/2025/

Gilgit dated 22nd November 2025

DRAFT INVITATION FOR BIDS

Contract No. and Title: ICB-01 EPC/Turnkey Contracts for Implementation of Rooftop Solarization of Gilgit Baltistan (18.15 MW_{DC}, in 3 Lots)

1. The Water and Power Department, Gilgit Baltistan, Pakistan (the “Employer”), has allocated PSDP funds for the implementation of the 100 MW_{DC} Distributed Solarization of Gilgit Baltistan Project. As a part of this Project, the present Invitation for Bids relates to Rooftop Solarization works aggregating 18.15 MW_{DC}. The Employer has divided these works into three separate Lots for procurement on an Engineering, Procurement, and Construction (EPC) / Turnkey basis. Bids are open to all Bidders eligible in accordance with the Bidding Documents.
2. The Employer invites sealed Bids (Technical and Financial Bids) from eligible Bidders as defined under Clause ITB.4 of Instruction to Bidders for one, **several, or all Lots** listed below. However, **each Lot shall be awarded under a separate Contract, and no Bidder shall be awarded more than one Lot.** The Works comprise the detailed engineering design, construction, supply, erection, installation, testing, and commissioning of Rooftop Solar PV Plants with integrated Battery Energy Storage Systems (BESS), followed by a Defects Notification Period of three (3) years, and provision of Operation and Maintenance services for three(3) years, further extendable on the option of the Employer as specified in the Bidding Documents.

A foreign Bidder may participate only as part of a joint venture with a Pakistani constructor duly registered/licensed with the Pakistan Engineering Council (PEC). This requirement is prescribed in the Bidding Data Sheet (BDS) pursuant to the Procuring Agency’s authority under Rules 18–20 of the Gilgit-Baltistan Public Procurement Rules, 2022, and the PEC registration requirements applicable to foreign constructors. The Works mainly comprise the following:

Sr. NO	DISTRICT NAME	TOTAL NUMBER OF BUILDINGS	PV (kWp)	BESS (kWh)	Bid Security Amount (PKR) For Each Lot
LOT I (Gilgit Region): 9.11 MW_{dc} and 4.952 MWh					
1	Gilgit	78	5,229	2,755	18 million
2	Hunza	61	1,533	844	
3	Nagar	56	965	533	
4	Ghizer	41	1,379	820	
LOT II (Baltistan Region): 5.70 MW_{dc} and 3.892 MWh					
1	Skardu	78	4,155	2,839	10 million
2	Ghanche	42	652	347	
3	Shigar	35	530	481	
4	Kharmang	20	368	225	
LOT III (Diامر-Astore Region): 3.34 MW_{dc} and 2.269 MWh					
1	Astore	41	1,246	722	5 million
2	Chillas	47	2,097	1,547	



Government of Gilgit Baltistan
OFFICE OF THE PROJECT DIRECTOR
100 MW SOLARIZATION OF GB PROJECT
W&P Department Gilgit-Baltistan

3. International Competitive Bidding will be conducted in accordance with the Gilgit-Baltistan Public Procurement Rules, 2022, under the "Single Stage - Two Envelope" Bidding Procedure (Rule 39 (b)), separately for each Lot.

Bidders may obtain further information, inspect, and acquire the complete set of Bidding Documents for the desired Lot(s) from the **Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email:pd100mwpsolar@gmail.com**

4. Interested Bidders may purchase a complete set of Bidding Documents for any Lot on submission of a written application to the above office and upon payment of a non-refundable fee of PKR 20,000 (Pakistani Rupees Twenty Thousand Only) per Lot. Requests for delivery of Bidding Documents can be made by sending a written application to the above Office. The application must include a pay order/demand draft in favor of the Project Director for the non-refundable fee of PKR 20,000/- per Lot and charges of PKR 5,000/- for local delivery or PKR 30,000 for overseas delivery per set or proof of online submission in the **account Titled "Executive Engineer Billing Division W&PD" IBAN NO: PK72MPBL0286027140132801**. The documents will be sent by courier. No liability will be accepted for loss or late delivery.
5. Each Bid must be submitted separately for each Lot and must be accompanied by a Bid Security for the corresponding amount specified in the table of this RFP, in the form of a bank guarantee from a scheduled bank in Pakistan or from a foreign bank, duly counter-guaranteed by a scheduled bank in Pakistan. The Bid Security must be valid for a period of not less than 180 days after the date of Bid opening. Bids for the desired Lot(s) must be delivered to the address above on or before 1330 hrs (Pakistan Standard Time) on December 26, 2025.
6. Technical Bids will be opened for each Lot immediately at 1400 hours on the same day at the address above, in the presence of Bidders' representatives who choose to attend at the same address.
7. Bidders are permitted to submit Bids for one, several, or all Lots. However, in the interest of ensuring wider participation and effective implementation, the Employer shall award only one (1) Lot to any Bidder (whether participating individually or as a part of joint venture).
8. A Pre-Bid meeting will be held as follows. Bidders are strongly encouraged to attend.
- Date: December 12, 2025
 - Time: 1100 hrs
 - Venue: **Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan**
9. This advertisement is also available on GBPPRA website <https://www.gbppra.gov.pk/> and W&PD GB Website <https://wpdgb.gov.pk/> .

Office of Project Director

100 MW Distributed Solarization of Gilgit Baltistan Project
Water and Power Department
Gilgit Baltistan, Pakistan

Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email:pd100mwpsolar@gmail.com

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PART-I: BIDDING PROCEDURES

SECTION I - INSTRUCTIONS TO BIDDERS (ITB)

A. General

1. Scope of Bid	<p>1.1 The Employer, as specified in the BDS, issues these Bidding Documents for the execution and completion of the Engineering, Procurement and Construction (EPC) / Turnkey Works for Distributed Solar Photovoltaic Plants as described in Volume-II (Employer's Requirements). The name, identification and number of lots (contracts) of this RFB are specified in the BDS.</p> <p>1.2 Unless otherwise stated, throughout these Bidding Documents definitions and interpretations shall be as prescribed in the Section V (General Conditions).</p> <p>1.3 Throughout these Bidding Documents:</p> <ul style="list-style-type: none">(a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, fax, including if specified in the BDS, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;(b) "The word "Bidding Documents" is synonymous with "Bid", the word "Bidding Documents" or "Bidder" with "Bidder" and the words "Bidding Documents" and "request for bids documents" with "bidding document(s)", as applicable."(c) if the context so requires, "singular" means "plural" and vice versa.(d) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Employer. It excludes the Employer's official public holidays;(e) "Works" refers to Works, subject of these Bidding Documents, to be executed on EPC/Turnkey contracting arrangement;(f) "ES" means environmental and social(g) "Contractor's Personnel" is as defined in Sub-Clause 1.1.14 of the General Conditions; and(h) "Employer's Personnel" is as defined in Sub-Clause 1.1.29 of the General Conditions.
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	<p>(i) “Taking Over” is defined as the taking over at the end of the EPC phase and the simultaneous start of the O&M phase of the particular Section as per relevant conditions of the Contract, which shall not constitute final acceptance or a waiver of defects.</p>
<p>2. Source of Funds</p>	<p>2.1 The Employer has received funds from Government of Pakistan towards the cost of the Project named in the BDS. The Employer intends to apply a portion of the funds to eligible payments under the Contract for which these Bidding Documents are issued.</p>
<p>3. Fraud and Corruption</p>	<p>3.1 The Employer will reject a Bid if it determines that the Bidder recommended for award, or any of its personnel, or its agents, or its sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract under this Bidding process.</p> <p>3.2 The Employer will blacklist and hence forthwith debar a Bidder or individual, at any time, in accordance with the prevailing Gilgit-Baltistan Public Procurement Rules, 2022 (Rule 22)</p> <p>The Bidder shall sign and stamp the Integrity Pact provided in Contract Forms and Schedules of the Bidding Documents for all government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the Bidder non-responsive.</p>
<p>4. Eligible Bidders</p>	<p>4.1 A Bidder may be a firm that is a private entity, a state-owned enterprise or institution subject to ITB 4.8 or any combination of such entities in the form of a joint venture (JV) under an existing agreement. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified in the BDS, there is no limit on the number of members in a JV.</p> <p>4.2 The Bidder (single entity or each member in the JV) shall be duly licensed by the Pakistan Engineering Council (PEC). In case, the bidder is a single entity it shall have valid PEC licence in category C1 and in case of JV, the combined value of limits of all the JV members shall not be less than that of C1. The Bidder (single entity or any member in the JV) shall also be registered with the Private Power and Infrastructure Board (the “PPIB”) and have a valid PPIB Certificate (applicable for the Local Firm, if certificate</p>

	<p>yet not issued valid payment proof is acceptable) issued under AEDB Certification Regulations, 2021.</p> <p>However, a foreign firm may submit a valid PEC provisional license in a relevant category with its Bid but shall obtain and submit a full PEC license before signing of the Contract and commencement of Works</p> <p>Foreign firm shall not be eligible to participate in Bidding process individually. Foreign firm shall enter into joint venture with Pakistani firm registered with the Pakistan Engineering Council in equivalent/compatible category and submit the joint venture agreement delineating inter alia the division of responsibilities among each JV member, to the Employer before participating in Bidding process in accordance with PEC Construction and Operation of Engineering Works Byelaws, 1987.</p> <p>4.3 Pakistani firm must be on Active Taxpayer List of the Federal Board of Revenue and provincial revenue authority/ board where applicable.</p> <p>4.4 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:</p> <ul style="list-style-type: none">(a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or(b) receives or has received any direct or indirect subsidy from another Bidder; or(c) has the same legal representative as another Bidder; or(d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the Bid of another Bidder, or influence the decisions of the Employer regarding this Bidding process; or(e) any of its affiliates participates as a consultant in the preparation of the Employer's Requirements for the Works that are the subject of the Bid; or(f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer as the Employer's Representative for the Contract implementation; or(g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly
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	<p>controls, is controlled by, or is under common control with that firm; or</p> <p>(h) has a close business or family relationship with a professional staff of the Employer (or of the project implementing agency) who: (i) are directly or indirectly involved in the preparation of the Bidding Documents or Employer's requirements of the Contract, and/or the Bid evaluation process of such Contract; or (ii) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Employer throughout the Bidding process and execution of the Contract.</p> <p>4.5 A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid for the same Lot, except for permitted alternative Bids for the same Lot. However, a Bidder may participate in more than one Lot. For the avoidance of doubt, a subcontractor cannot be a member of a JV and a subcontractor at the same time in the Bidding process. Such participation shall result in the disqualification of all Bids in all Lots in which the said firm is involved. However, a firm that is not an individual Bidder or a JV member in a Bid may participate as a subcontractor in more than one Bid.</p> <p>4.6 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.10. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed sub-contractors or sub-consultants for any part of the Contract including related Services.</p> <p>4.7 All members constituting the Bidder including proposed subcontractors do not appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and the Gilgit-Baltistan Public Procurement Regulatory Authority (GBPPRA) and other relevant federal/provincial authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.</p> <p>4.8 Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Employer, that they (i) are legally and financially</p>
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	<p>autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.</p> <p>4.9 A Bidder shall not be under suspension from submitting Bids by the Employer as the result of the operation of a Bid Securing Declaration.</p> <p>4.10 Eligible countries to participate in this Bidding process shall be all countries, except those restricted under the laws, rules, or policies of Pakistan or Gilgit-Baltistan, or under international obligations (e.g., UN sanctions). Any country-specific restrictions, if applicable, will be notified in the BDS.</p> <p>4.11 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.</p>
<p>5. Eligible Materials, Equipment, and Services</p>	<p>5.1 The materials, equipment and services to be supplied under the Contract may have their origin in any country subject to the restrictions specified in the laws of Pakistan, the Gilgit-Baltistan Public Procurement Rules, 2022, or any applicable international obligations (including UN sanctions) and all expenditures under the Contract will not contravene such restrictions. At the Employer’s request, Bidders may be required to provide evidence of the origin of materials, equipment and services.</p>

B. Contents of Bidding Documents

<p>6. Sections of Bidding Document</p>	<p>6.1 The Bidding Documents consist of two (02) Volumes, Volume-I and Volume-II which include all the sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8:</p> <p>VOLUME-I: BIDDING PROCEDURES AND CONDITIONS OF CONTRACT</p> <p>Part-I: Bidding Procedures</p> <p>Section I - Instructions to Bidders (ITB) Section II - Bid Data Sheet (BDS) Section III - Evaluation and Qualification Criteria Section IV - Bid Forms</p> <p>Part-II: Conditions of Contract and Contract Forms and Schedules</p> <p>Section V - General Conditions Section VI - Particular Conditions Part A - Contract Data Part B - Special Provisions</p>
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	<p>Section VII - Contracts Forms and Schedules</p> <p>VOLUME-II: EMPLOYER’S REQUIREMENTS</p> <p>Section I - Scope of Works Section II - General Project Requirements Section III - DC Systems Section IV - AC Systems Section V - Civil & Structure Works Section VI - Operation and Maintenance Annexure I - Drawings</p> <p>6.2 The Invitation to Bids issued by the Employer, is not part of this Bidding Documents.</p> <p>6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the document, responses to requests for clarification, the Minutes of the pre-Bid meeting (if any), or Addenda to the Bidding Documents in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.</p> <p>6.4 The Bidder is expected to examine all instructions, forms, terms, and Employer’s requirements in the Bidding Documents and to furnish with its Bid all information or documentation as is required by the Bidding Documents.</p>
<p>7. -</p>	<p>7.1 A Bidder requiring any clarification of the Bidding Documents shall contact the Employer in writing at the Employer’s address specified in the BDS or raise its enquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. The Employer will respond to any request for clarification within the time given in the BDS, provided that such request is received prior to the deadline for submission of Bids within a period specified in the BDS. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Documents as a result of a request for clarification, it shall do so following the procedure under ITB 8.</p> <p>7.2 The Bidder is advised to visit and examine the Site of the Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract. The costs of visiting the site shall be at the Bidder’s own expense.</p> <p>7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and</p>

	<p>lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.</p> <p>7.4 The Bidder’s designated representative is invited to attend a pre-Bid meeting and/or a site visit, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.</p> <p>7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than three days before the meeting.</p> <p>7.6 Minutes of the pre-Bid meeting, including the text of the questions raised without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3. Any modification to the Bidding Documents that may become necessary as a result of the pre-Bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITB 8 and not through the minutes of the pre-Bid meeting.</p>
<p>8. Amendment of Bidding Documents</p>	<p>8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Documents by issuing addenda.</p> <p>8.2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Employer in accordance with ITB 6.3.</p> <p>8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 23.2.</p>
<p>9. Cost of Bids</p>	<p>9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer will in no case be responsible or liable for those costs regardless to the conduct or outcome of the Bidding process.</p>

<p>10. Contacting the Employer</p>	<p>10.1 From the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the Bid, it should do so in writing.</p> <p>10.2 If a Bidder tries to directly influence the Employer or otherwise interfere in the Bid evaluation process and the Contract award decision, its Bid may be rejected.</p>
<p>11. Language of Bids</p>	<p>11.1 Unless otherwise specified in the BDS, the Bid prepared by the Bidder and all correspondence and documents related to the Bid exchanged by the Bidder and the Employer shall be written in the English Language. Any printed literature furnished by the Bidder as part of its Bid may be in a language not specified in the BDS, as long as such literature is accompanied by a translation of its pertinent passages into the language of the Bid, in which case, for purposes of interpretation of the Bid, the translation shall govern.</p>

C. Preparation of Bids

<p>12. Documents Comprising the Bid</p>	<p>12.1 The Bid shall comprise two Parts, namely the Technical Bid and the Financial Bid. These two Bids shall be submitted simultaneously in two (02) separate sealed envelopes (single-stage, two-envelope Bidding Process). One envelope shall contain only information relating to the Technical Bid and the other, only information relating to the Financial Bid. These two envelopes shall be enclosed in a separate sealed outer envelope marked “ORIGINAL BID”.</p> <p>12.2 The Technical Bid submitted by the Bidder shall comprise the following:</p> <ul style="list-style-type: none"> (a) Letter of Technical Bid, prepared in accordance with ITB 13; (b) Security: Bid Security in accordance with ITB 19; (c) Alternative Technical Bid, if permissible in accordance with ITB 14; (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 21.1; (e) documentary evidence that the Bidder is eligible and qualified to perform the Contract if its Bid is accepted, in accordance with ITB 17; (f) documentary evidence that the Works offered by the Bidder conform to the Bidding Documents, in accordance with ITB 18;
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	<p>(g) Bidders shall give details of all departures in their Technical Bid with respect to the contractual terms and conditions and/or to the required technical features specified in the performance and/or functional requirements, that they would like the Employer to consider during the evaluation of the Technical Bid;</p> <p>(h) in the case of a Technical Bid submitted by a JV, JV agreement, indicating at least the parts of the Works to be executed by the respective members;</p> <p>(i) list of subcontractors, in accordance with ITB 18.3;</p> <p>(j) any other document required in the BDS or elsewhere.</p> <p>12.3 The Financial Bid submitted by the Bidder shall comprise the following:</p> <p>(a) Letter of Bid - Financial Bid: prepared in accordance with ITB 13;</p> <p>(b) Schedule of Rates and Prices: completed in accordance with ITB 15 and ITB 16;</p> <p>(c) Alternative Financial Bid: if permissible in accordance with ITB 14;</p> <p>(d) Financial Disclosure: The Bidder shall furnish in the Letter of Financial Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid; and</p> <p>(e) Other: any other document required in the BDS or elsewhere.</p> <p>12.4 The Technical Bid shall not include any financial information related to the Bid Price. Where material financial information related to the BidPrice is contained in the Technical Bid, the Bid shall be declared non-responsive.</p>
<p>13. Letter of Bid, and Schedules</p>	<p>13.1 The Bidder shall complete the Letter of Technical Bid and Letter of Financial Bid using the relevant forms furnished in Section IV (Bid Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 21.3. All blank spaces shall be filled in with the information requested.</p>
<p>14. Alternative Technical Bids</p>	<p>14.1 Alternative Bids are not permitted.</p>

<p>15. Bid Prices</p>	<p>15.1 The Bidders shall fill up the Schedule of Rates and Prices attached to this Bidding Documents indicating the Lump Sum amounts of the works to be performed under the Contract. Prices on the Schedule of Rates and Prices shall be entered keeping in view the instructions contained in the Preamble to the Schedule of Rates and Prices. The Bidders shall quote for the entire Works on a “single responsibility” basis such that the Bid Price, subject to any adjustments, in accordance with the Contract, covers all the Contractor’s obligations under the Contract. The Works shall include any work which is necessary to satisfy the Employer’s Requirements and Schedules, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.</p> <p>15.2 The cost of any items that the Bidder may have omitted is deemed to be included in the total Bid Price and will not be paid for separately by the Employer.</p> <p>15.3 All indirect taxes i.e., custom duties, sales taxes, VAT levies, other charges and similar taxes payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of Bids, shall be included in the rates and prices and the Bid Price submitted by the Bidder. However, the Employer shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax Withholding Tax. Turnover Tax, Super Tax etc.) payable by the Contractor and the Contractor’s Personnel.</p> <p>15.4 In the case of Fixed Price, prices quoted by the Bidder shall be fixed during the Bidder’s performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.</p>
<p>16. Bid Currencies</p>	<p>16.1 The currency of the Bid and the currency of payments shall be Pakistani Rupee (PKR) only and further referred to as “the local currency” except where expressly permitted in the BDS for a portion of foreign currency costs.</p> <p>For imported Plant and Materials quoted in PKR, the prices quoted by the Bidder shall not be subject to adjustment during performance of the Contract on account of exchange rate parity.</p> <p>16.2 A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer’s country shall bear all costs and risks for arranging such currencies including exchange rate parity.</p>

<p>17. Documents Establishing the Qualification of the Bidder</p>	<p>17.1 The Bidder shall meet the qualification criteria as provided in Section III (Evaluation and Qualification Criteria).</p>
<p>18. Documents Establishing Conformity of the Works</p>	<p>18.1 Pursuant to ITB 12.2(f), the Bidder shall furnish, as part of its Bid documents establishing the conformity to the Bidding Documents of the Works that the Bidder proposes to execute on EPC/Turnkey basis under the Contract.</p> <p>18.2 The documentary evidence of the conformity of the Works with the Bidding Documents may be in the form of literature, drawings and data, and shall include:</p> <ul style="list-style-type: none"> (a) the documents specified in Section IV (Bid Forms) - Technical Bid. (b) detailed description of the essential technical and functional/performance characteristics of the proposed Works, in response to the Employer’s Requirements. (c) adequate evidence demonstrating the substantial responsiveness of the Works to the Employer’s Requirements. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative standards, in its technical Bid, provided that it demonstrates to the Employer’s satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Performance / Functional requirements specified by the Employer. <p>18.3 The Bidder shall be responsible for ensuring that any proposed subcontractor complies with the requirements of ITB 4, and that any Works to be provided by the subcontractor comply with the requirements of ITB 5 and ITB 18.1.</p>
<p>19. Securing the Bid</p>	<p>19.1 The Bidder shall furnish as part of its Bid, a Bid Security in original form in the amount specified in the BDS in PKR or an equivalent amount in a freely convertible currency.</p> <p>19.2 The Bid security shall be in the form of an unconditional bank guarantee issued by a Scheduled Bank in Pakistan operating or branch in Gilgit or a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan operating or branch in Gilgit</p> <p>19.3 The Bid Security shall be submitted either using the Bid Security Form included in Section IV (Bid Forms) or in another</p>

	<p>substantially similar format approved by the Employer prior to Bid submission. In either case, the form must include the complete name and address of the Bidder. The Bid Security shall be valid for at least twenty-eight days (28) beyond the original date of expiry of the Bid validity, or beyond any extended date if requested under ITB 20.2.</p> <p>19.4 Any Bid not accompanied by a substantially responsive Bid Security shall be rejected by the Employer as non-responsive.</p> <p>19.5 The Bid Security of the Bidders shall be returned as promptly as possible once the successful Bidder has furnished the required Performance Security and signed the Contract except the Bid Security of bidders declared non-responsive at the technical evaluation shall be returned with their Financial Bid after the evaluation of Technical Bid.</p> <p>19.6 The Bid Security may be forfeited:</p> <p>(a) if a Bidder withdraws its Bid prior to the expiry date of the Bid validity specified by the Bidder on the Letter of Bid or any extended date provided by the Bidder; or</p> <p>(b) if the successful Bidder:</p> <p>(i) fails to accept the correction of his Bid Price in accordance with ITB 36.3; or</p> <p>(ii) fails to furnish a Performance Security, in accordance with ITB 45; or</p> <p>(iii) fails to sign the Contract, in accordance with ITB 44; or</p> <p>(iv) is found involved in corrupt and fraudulent practices, in accordance with ITB 3.</p> <p>19.7 The Bid Security of a JV shall be in the name of the JV that submits the Bid. If the JV has not been legally constituted into a legally enforceable JV at the time of submission of Bids, the Bid Security shall be in the name of either JV member(s).</p>
<p>20. Period of Validity of Bids</p>	<p>20.1 Bids shall remain valid for the period specified in the BDS after the deadline for submission of Bids or any extended date if amended by the Employer in accordance with ITB 8. A Bid that is not valid until the date specified in the BDS, or any extended date if amended by the Employer in accordance with ITB 8, shall be rejected by the Employer as non-responsive.</p> <p>20.2 In exceptional circumstances, prior to the date of expiry of the Bid validity, the Employer may request that the Bidders extend the date of validity for a specified additional period which may not be</p>

	<p>more than the original Bid validity period. The request and the responses to the request shall be made in writing. A Bidder may refuse the request without risking forfeiting the Bid Security. A Bidder agreeing to the request will not be required or permitted to modify its Bid but will be required to ensure that the Bid Security is extended for a correspondingly longer period, pursuant to ITB 19.3.</p>
<p>21. Format and signing of Bid</p>	<p>21.1 The original and all copies of the Bid, each consisting of the documents listed in ITB 12, shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder. The authorization must be in writing as specified in the BDS and included in the Bid pursuant to ITB 12.2(d). The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid where entries or amendments have been made shall be signed or initialled by the person signing the Bid.</p> <p>21.2 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.</p> <p>21.3 The Bid shall contain no interlineations, erasures, or overwriting, except to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.</p> <p>21.4 The Bidder shall furnish in the Letter of Financial Bid (Section IV) information regarding commissions or gratuities, if any, paid or to be paid to agents relating to this procurement and to the execution of the Contract should the Bidder be successful.</p>

D. Submission of Bids

<p>22. Submission, Sealing and Marking of Bids</p>	<p>22.1 Unless the BDS states that Bids are to be submitted electronically the following procedures shall apply</p> <p>(a) The Bidder shall deliver the Bid in two separate, sealed envelopes. One envelope containing the Technical Bid and the other the Financial Bid. These two envelopes shall be enclosed in a sealed outer envelope and clearly marked "Bid - Original". in accordance with Rule 39(b) of the Gilgit-Baltistan Public Procurement Rules, 2022 (Single Stage – Two Envelope procedure).</p>
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	<p>(b) In addition, the Bidder shall prepare copies of the Bid, in the number specified in the BDS. Copies of the Technical Bid shall be placed in a separate sealed envelope marked “Copies: Technical Bid”. Copies of the Financial Bid shall be placed in a separate sealed envelope marked “Copies: Financial Bid”. The Bidder shall place both of these envelopes in a separate, sealed outer envelope marked “Bid - Copies”. In the event of any discrepancy between the original and the copies, the original shall prevail.</p> <p>The Bidder shall also provide complete searchable PDF version as well as Word, Excel etc., versions of the Technical Bid only on flash drive provided that in case of discrepancy, the hard copy shall prevail</p> <p>22.2 The inner and outer envelopes shall:</p> <p>(a) bear the name and address of the Bidder.</p> <p>(b) be addressed to the Employer, at the address given in the BDS for ITB 23.1; and</p> <p>(c) bear the name of the Bid, as specified in the BDS for ITB 1.1, and the statement “Do Not Open Before [time and date],” to be completed with the time and date specified in the BDS for ITB 23.1.</p> <p>22.3 If the outer envelope is not sealed and marked as required by ITB 22.1 and ITB 22.2, the Employer will assume no responsibility for the Bid’s misplacement or premature opening.</p>
<p>23. Deadline for Submission of Bids</p>	<p>23.1 Bids must be received by the Employer at the address specified, and no later than the time and date specified, in the BDS.</p> <p>23.2 The Employer may, at its discretion, extend this deadline for submission of Bids by amending the Bidding Documents in accordance with ITB 8.3, in which case all rights and obligations of the Employer and Bidders will thereafter be subject to the deadline as extended.</p>
<p>24. Late Bids</p>	<p>24.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 23. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.</p>
<p>25. Withdrawal, Substitution,</p>	<p>25.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted, and before the deadline for submission of Bids,</p>

and Modification of Bids	<p>by sending a written notice, duly signed by an authorized representative, including a copy of the authorization in accordance with ITB 21.1, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:</p> <p>(a) prepared and submitted in accordance with ITB 21 and ITB 22 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “Withdrawal,” “Substitution, (“Technical Bid” and/or “Financial Bid”)” “Modification (“Technical Bid” and/or “Financial Bid”);” and</p> <p>(b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 23.</p>
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E. Opening of Technical Bids

26. Opening of Technical Bids by Employer	<p>26.1 Except as in the cases specified in ITB 24 and ITB 25, the Employer shall conduct the Technical Bids' opening in public, in the presence of Bidders` designated representatives and anyone who chooses to attend, and at the address, date and time specified in the BDS.</p> <p>26.2 First, the written notice of withdrawal in the 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.</p> <p>26.3 Next, envelopes marked “Substitution” shall be opened and read out and exchanged with the corresponding Technical Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid opening.</p> <p>26.4 Next, envelopes marked “Modification” shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening.</p> <p>26.5 Next, all other envelopes marked “Technical Bid” shall be opened one at a time. All envelopes marked “Financial Bid” shall remain sealed and kept by the Employer in safe custody</p>
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	<p>until they are opened at a later public opening, following the evaluation of the Technical Bid of the Bidders. On opening the Technical Bid envelopes, the Employer shall read out: the name of the Bidder and whether there is a modification; the presence or absence of a Bid Security; and other details as the Employer, at its discretion, may consider appropriate.</p> <p>26.6 Only Technical Bids that are opened and read out at Bid opening shall be considered further. At the Bid opening the Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with ITB 24.1).</p> <p>26.7 The Employer shall prepare a record of the Technical Bids of public opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.</p>
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F. Evaluation of Bids - General Provisions

<p>27. Confidentiality</p>	<p>27.1 Information relating to the evaluation of the Technical Bid shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding Process until the announcement of evaluation of the Technical Bid in accordance with ITB 33.</p> <p>27.2 Information relating to the evaluation of the Financial Bid and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding Process until the announcement of final evaluation report.</p> <p>27.3 Any effort by a Bidder to influence the Employer in the evaluation of the Bids may result in the rejection of its Bid.</p> <p>27.4 Notwithstanding ITB 27.1 and ITB 27.2, from the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the Bidding Process, it should do so in writing.</p>
<p>28. Clarification of Bids</p>	<p>28.1 To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid including breakdowns of unit rates and lump sum prices. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be</p>

	<p>in writing. However, any clarification shall not affect the prices or the Bid evaluation parameters</p> <p>28.2 The Employer may, at its discretion, ask any Bidder for confirmation/submission of missing information to clarify its Bid. However, the Employer does not have an obligation to request any additional information or clarification with respect to missing or deficient information in a Bid. The Employer may reject any Bid as non-responsive if found materially incomplete, obscure, irregular or omitting any material information required to be submitted in accordance with the Bidding Documents.</p> <p>28.3 If a Bidder does not provide clarifications of its Bid by the date and time set reasonably in the Employer’s request for clarification, the Employer may proceed with the evaluation based on the information submitted in the Bid without waiting for the Bidder’s response.</p>
<p>29. Deviations, Reservations, and Omissions</p>	<p>29.1 During the evaluation of Bids, the following definitions apply:</p> <ul style="list-style-type: none"> (a) “Deviation” is a departure from the requirements specified in the Bidding documents. (b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and (c) “Omission” is the failure to submit part or all of the information or documentation required in the Bidding Documents.

G. Evaluation of Technical Bids

<p>30. Determination of Responsiveness of Technical Parts</p>	<p>30.1 The Employer will examine the Technical Bids submitted by Bidders, to determine whether they are complete, have been properly signed, and are generally in order.</p> <p>30.2 The Employer’s determination of a Technical Bids’ substantial responsiveness is to be based on the contents of the Bid itself. For purposes of this determination, a substantially responsive Bid is one that materially conforms to the requirements of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:</p> <ul style="list-style-type: none"> (a) if accepted, would:
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	<p>(i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or</p> <p>(ii) limit in any substantial way, inconsistent with the Bidding Documents, the Employer’s rights or the Bidder’s obligations under the proposed Contract; or</p> <p>(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.</p> <p>30.3 Provided that a Technical Bid is substantially responsive, the Employer may waive any nonmaterial nonconformity in the Bid.</p> <p>30.4 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements.</p> <p>30.5 The Employer will also determine if the Bids contain departures from the requirements of the Bidding Documents (e.g., documentary evidence, responsiveness of the technical Bid, etc.) in such numbers or of such nature that the Bid cannot reasonably be expected to become responsive within the framework of the single-stage process. In this case, the Bid shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.</p>
<p>31. Evaluation of Bidder’s Eligibility and Qualification</p>	<p>31.1 The Employer shall ascertain to its satisfaction that, on the basis of documentary evidence submitted in accordance with ITB 12.2 (e), and Section III (Evaluation and Qualification Criteria) that the Bidder is eligible and qualified to satisfactorily perform the Contract.</p> <p>31.2 Only Bids that meet the eligibility and qualification criteria as specified in Section III (Evaluation and Qualification Criteria) shall be considered for further evaluation.</p>
<p>32. Evaluation of Technical Bids</p>	<p>32.1 The Employer’s evaluation of Technical Bids will be carried out as specified in Section III (Evaluation and Qualification Criteria).</p> <p>32.2 The Employer will carry out a detailed technical evaluation of each Technical Bid that was determined to be substantially responsive in accordance with ITB 30, in order to determine</p>

	<p>whether the technical aspects of the Bid are responsive to the requirements set forth in the Bidding Documents.</p> <p>32.3 Only Bids that are substantially responsive to the Bidding Documents shall have their envelopes marked “FINANCIAL BID” opened at the second public opening.</p>
<p>33. Notification of Evaluation of Technical Bids</p>	<p>33.1 Following the completion of the evaluation of the Technical Bids, the Employer shall announce the results technical bids’ evaluation report and make the following notifications in accordance with Gilgit Baltistan Public Procurement Rules, 2022:</p> <p>(a) Notify in writing those Bidders whose Bids were considered substantially non-responsive to the requirements in the Bid, advising them of the following information:</p> <ul style="list-style-type: none"> (i) the justification on which their Technical Bids have been considered to be non-responsive; (ii) their envelope marked “Financial Bid” will be returned to them unopened completion of grievance redressal proceedings, if any, in accordance with Rule 51 of the Gilgit-Baltistan Public Procurement Rules, 2022; <p>(b) simultaneously, notify in writing those Bidders whose Bids were considered substantially responsive to the requirements in the Bid, advising them that their Bid has been evaluated as substantially responsive to the Bid; and</p> <p>(c) notify all Bidders the date, time and location of the public opening of the envelopes marked ‘Financial Bid’.</p>

H. Opening of Financial Bids

<p>34. Public Opening of Financial Bids</p>	<p>34.1 The Financial Bids will be opened in public by the Employer in the presence of Bidders, or their designated representatives, and anyone else who chooses to attend. Each envelope marked “Financial Bid” shall be inspected to confirm that it has remained sealed and unopened. These envelopes shall then be opened by the Employer</p> <p>The Employer shall read out the names of each Bidder, the Bid Price, including any discounts and any other details as the Employer may consider appropriate. Only discounts read out at the public opening shall be considered for evaluation. The Letter of Financial Bid</p>
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	<p>and the Schedule of Rates and Prices are to be initialled by representatives of the Employer.</p> <p>34.2 The Employer shall prepare a record of the Financial Bids' opening that shall include, as a minimum:</p> <ul style="list-style-type: none"> (a) the name of the Bidders whose Financial Bids were opened. (b) the Bid Prices, including any discounts. <p>34.3 The Bidders whose envelopes marked "Financial Bid" have been opened, or their representatives who are present, shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.</p>
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I. Evaluation of Financial Bid

<p>35. Nonmaterial Nonconformities</p>	<p>35.1 Provided that a Bid is substantially responsive, and Bids have been invited on single responsibility basis in accordance with ITB 15, the Employer:</p> <ul style="list-style-type: none"> (a) may waive any nonconformities in the Bid; or (b) may request that the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid. <p>35.2 Provided that a Bid is substantially responsive, and Bids have been invited to include any part of the Works to be paid according to work done in accordance with ITB 15, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component by adding the average price of the item or component quoted by substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bidders, the Employer shall use its best estimate.</p>
<p>36. Arithmetic Correction</p>	<p>36.1 If Bids have been invited on single responsibility basis in accordance with ITB 15, the Bidder is deemed to have included all prices in the (lump sum) Total Bid Price. Arithmetical corrections shall therefore not be made, except that where there is a discrepancy between the amount in words and the amount figures, the amount in words shall prevail.</p>

	<p>36.2 If Bids have been invited to include any part of the Works to be paid according to work done in accordance with ITB 15, the Employer shall correct arithmetical errors only for the price for such part of the Works on the following basis:</p> <ul style="list-style-type: none"> (a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Bid Price, the former shall prevail, and the latter will be corrected accordingly. (b) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) above. <p>36.3 A Bidder shall be requested to accept the correction of arithmetical errors. Failure to accept the correction in accordance with ITB 36.1 and ITB 36.2 shall result in the rejection of the Bid and forfeiture of Bid Security in accordance with ITB 19.6(b)(i).</p>
<p>37. Evaluation Process Financial Bids</p>	<p>37.1 To evaluate and compare the Financial Bids, the Employer shall consider the following:</p> <ul style="list-style-type: none"> (a) the Bid Price, excluding provisional sums, if any. (b) price adjustment for correction of arithmetic errors, in accordance with ITB 36; (c) price adjustment due to discounts offered in accordance with ITB 15.4; and (d) price adjustment due to quantifiable nonmaterial nonconformities, in accordance with ITB 35.2. <p>37.2 If price adjustment is allowed, in accordance with ITB 15.3(BDS), the estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.</p>
<p>38. Abnormally Low Bids</p>	<p>38.1 An Abnormally Low Bid is one where the Bid Price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid Price.</p> <p>38.2 In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder, including detailed price analyses of its Bid Price in relation to the subject matter of the contract, scope, proposed</p>

	<p>methodology, schedule, allocation of risks and responsibilities and any other requirements of the Bidding Documents.</p> <p>38.3 After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.</p>
<p>39. Unbalanced or Front-Loaded Bids</p>	<p>39.1 If the Bid that is evaluated as the lowest evaluated cost is, in the Employer’s opinion, seriously unbalanced or front loaded the Employer may require the Bidder to provide written clarifications. Clarifications may include price analyses to demonstrate the consistency of the Bid Prices with the scope of the Works, proposed methodology, schedule and any other requirements of the Bidding Documents.</p> <p>39.2 After the evaluation of the information and price analyses presented by the Bidder, the Employer may:</p> <ul style="list-style-type: none"> (a) accept the Bid, or (b) if appropriate, require that the additional Performance Security be provided, at the expense of the Bidder, to a level to secure the risk of the Employer due to such seriously unbalancing or front loading under the scenario that the successful Bidder defaults under the contract; or (c) reject the Bid.

J. Determination of the Most Advantageous Bid

<p>40. Most Advantageous Bid (MAB)</p>	<p>40.1 The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria, and whose Bid has been determined to be:</p> <ul style="list-style-type: none"> (a) substantially responsive to the requirements of the Bidding Documents; and (b) the lowest evaluated Bid Price.
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K. Award of Contract

<p>41. Award Criteria and Notification of Evaluation of Financial Bids</p>	<p>41.1 Subject to ITB 42.1, the Employer shall award the Contract to the Bidder whose Bid has been determined as the Most Advantageous Bid provided that such Bidder has been determined to be qualified to satisfactorily perform the Contract in accordance with ITB 40 and ITB 40(A).</p> <p>41.2 The Employer shall also announce the results of the Bids evaluation in the form of final evaluation report at least Twelve (12) days prior to award of the Contract in accordance with Gilgit Baltistan Public Procurement Rules, 2022, and redressal</p>
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	<p>of the grievances, if any, in accordance with Gilgit Baltistan Public Procurement Rules, 2022.</p>
<p>42. Employer’s Right to Annul the Bidding Process</p>	<p>42.1 Notwithstanding ITB 41.1, the Employer reserves the right to annul the Bidding Process and reject all Bids, at any time prior to Contract award, without thereby incurring any liability to the affected Bidders or any obligation. In case of annulment, all Bids (unopened Financial Bids, if any) submitted and specifically, Bid securities shall be promptly (but not later than 14 days) returned to the Bidders.</p> <p>The Employer shall upon request communicate to any Bidder who submitted a Bid, the grounds for its rejection of all Bids but is not required to justify those grounds. Rejection of all Bids shall be notified to all Bidders promptly.</p>
<p>43. Notification of Award</p>	<p>43.1 Prior to expiration of the period of Bid validity prescribed by the Employer, the Employer will notify the successful Bidder in writing (“Letter of Acceptance”) that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the “Contract Price”).</p> <p>The Letter of Acceptance will also state the remedies with respect to ITB 38 and ITB 39 if applicable.</p> <p>43.2 No negotiation with the Bidder having submitted most advantageous Bid or any other Bidder shall be permitted, however, Employer may have clarification meetings before issuing Letter of Acceptance to get clarified any item in the Bid evaluation report.</p> <p>43.3 The Letter of Acceptance/notification of award and its acknowledgement/acceptance by the Bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.</p> <p>43.4 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and also return their Bid Securities in accordance with ITB 19.5.</p>
<p>44. Signing of Contract</p>	<p>44.1 Within 7 days or within such period as may be extended by the Employer in writing, provided that the total period does not exceed the Bid validity period from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will notify the successful Bidder to depute its representative with appropriate Power of Attorney to</p>

	<p>sign the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the Parties.</p> <p>44.2 The formal Agreement between the Employer and the successful Bidder shall be executed within 7 days of the receipt of the above stated notification by the successful Bidder from the Employer. or within such period as may be extended by the Employer in writing, provided that the total period does not exceed the Bid validity period</p>
<p>45. Performance Security</p>	<p>45.1 Within fourteen (14) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security in the form of Bank Guarantee and the amount, in accordance with the Conditions of Contract, and additional Performance Security if applicable under ITB 39.2 (b), using the Performance Security Form included in Section VII (Contract Forms) or another form acceptable to the Employer. Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid security. In that event the Employer may award the Contract to the next advantageous Bid.</p>
<p>46. Procurement Related Complaint</p>	<p>46.1 The procedures for making a Procurement-related Complaint are as specified in the BDS.</p>
<p>47. Instructions not Part of Contract</p>	<p>47.1 Bids shall be prepared and submitted in accordance with the Instructions to Bidders which are provided to assist the Bidders in preparing Bids but do not constitute part of the Contract.</p>

SECTION II - BID DATA SHEET (BDS)

A. General

ITB 1.1	<p>The reference number of the Request for Bids is: PD/100MW/SPP/1(1)/2025/ The Employer is: Water and Power Department, Gilgit Baltistan, Pakistan</p> <p>Employer’s Representative: Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com</p> <p>The Works for Distributed Solar Photovoltaic Plants are divided into three (3) Lots corresponding to different geographical regions of Gilgit-Baltistan as follows:</p> <ul style="list-style-type: none"> • Lot I (Gilgit Region) • Lot II (Baltistan Region) • Lot III (Diamer-Astore Region) <p>Each Lot is comprised of a separate set of Bidding Documents. These Bidding Documents relate to Lot -II named as:</p> <p style="text-align: center;">5.70 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT – II)</p> <p>The Bidding Process is: Single Stage, Two-Envelope.</p>
ITB 1.3 (a)	Electronic Procurement System: not Applicable.
ITB 2.1	The name of the Project is: 100 MW_{DC} DISTRIBUTED SOLARIZATION OF GILGIT BALTISTAN
ITB 4.1	Maximum number of members in the JV shall be: Three (03)

B. Contents of Bidding Documents

ITB 7.1	<p>For Clarification of Bid purposes only, the Employer’s address is:</p> <p>Project Director, 100 MW_{DC} Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,</p> <p>Email: pd100mwpsolar@gmail.com</p> <p>Requests for clarification should be received by the Employer no later than:</p> <p>14 Days before deadline for submission of Bids.</p> <p>The Employer’s response shall not be later than seven (07) days before deadline of submission of Bids.</p>
ITB 7.4	A Pre-Bid Meeting shall take place at the following date, time and place:

	<p>Date: December 12, 2025 Time: 1100 hrs. Venue: Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan.</p>
ITB 11.1	<p>The language of the Bid is: English. All correspondence exchange shall be in English language. Language for translation of supporting documents and printed literature is English.</p>

C. Preparation of Bids

ITB 12.3 (e)	The Bidder shall submit with its Bid the following additional documents: None
ITB 15.1	<p>List of Schedule of Rates & Prices is as follows: Schedule No. A1 EPC Works for Rooftop Solar Schedule No. A2 O&M Works and Services Schedule No. A3 Grand Summary Schedule No. A4 Mandatory Spare Parts Schedule No. A5 Recommended Spare Parts</p>
ITB 15.3	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.
ITB 16.3	<p>Insert the following additional Sub-Clause at the end of Clause 16: The exchange rate parity in respect of Seventy percent (70%) of the EPC Price shall be adjusted in accordance with item (g) of Sub-Clause 14.15 of Part A [Contract Data] of Section VI – Particular Conditions of Contract.</p>
ITB 19.1	The amount of the Bid Security shall be: PKR 10 million
ITB 20.1	The Bid shall be valid for a period: 180 days .
ITB 21.1	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Power of Attorney as per Section IV (Bid Forms) .

D. Submission of Bids

ITB 22.1	<p>The following procedures shall apply.</p> <p>(a) The Bidder shall submit the Bid Lot-wise in two separate, sealed envelopes for each Lot (in case, participating more than One Lot). One envelope containing the Technical Bid and the other the Financial Bid. These two envelopes shall be enclosed in a sealed outer envelope and clearly marked “Bid - Original”. in accordance with Rule 39(b) of the Gilgit-Baltistan Public Procurement Rules, 2022 (Single Stage – Two Envelope procedure).</p> <p>(b) In addition to Original Bid, the Bidder shall prepare Three (3) copies of the Bid for each participating Lot(s) independently by following the procedure described below:</p> <p>Copies of the Technical Bid shall be placed in a separate sealed envelope marked “Copies: Technical Bid”. Copies of the Financial Bid shall be placed in a separate sealed envelope marked “Copies:</p>
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	<p>Financial Bid”. The Bidder shall place both of these envelopes in a separate, sealed outer envelope marked “Bid - Copies”. In the event of any discrepancy between the original and the copies, the original shall prevail.</p> <p>The Bidder shall also provide complete searchable PDF version as well as Word, Excel etc., versions of the Technical Bid only on flash drive, provided that in case of discrepancy, the hard copy shall prevail</p>
<p>ITB 23.1</p>	<p>For Bid Submission Purposes only, the Employer’s address is:</p> <p>Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,Email: pd100mwpvssolar@gmail.com</p> <p>Date: December 26, 2025 Time: on or before 1330 hrs.</p>

E. Opening of Technical Bids

<p>ITB 26.1</p>	<p>The Bid Opening shall take place at:</p> <p>Date: December 26, 2025 Time: 1400 hrs. Venue: Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan</p> <p>Add the following additional Sub-Clause 26.1.1 at the end of Sub-Clause 26.1:</p> <p>26.1.1: Technical Bids for all Lots (1 to 3) will be opened simultaneously on the above said date, time and place in accordance with ITB 26 and evaluated first.</p>
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F. Opening of Financial Bids

<p>ITB 34.1</p>	<p>Opening and Evaluation of Financial Bids (Lot-wise Procedure)</p> <p>Upon completion of the technical evaluation for all Lots, announcement of the results, and expiration of the grievance period prescribed under the Gilgit-Baltistan Public Procurement Rules, 2022, the Employer shall open the Financial Bids sequentially, Lot by Lot, commencing with the Lot designated for award first, as identified in these Bidding Documents. The opening of Financial Bids for each Lot shall be conducted in accordance with ITB 34 in the following manner:</p> <p>a) The Date, time, and location for the opening of Financial Bids for a given Lot shall be communicated only to the Bidders who have been declared technically qualified and responsive for that specific Lot.</p>
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	<p>b) The Financial Bids for Lot 1 shall be opened first, in accordance with ITB 34, at the date, time, and location to be notified by the Employer solely to the technically qualified and responsive Bidders for Lot 1. Such Financial Bids shall be evaluated in accordance with the relevant provisions of these Bidding Documents.</p> <p>c) Upon declaration of a Bidder as the lowest evaluated and successful Bidder for a particular Lot, any Financial Bids submitted by that Bidder for the remaining Lots (if any) shall remain unopened and shall be returned to the Bidder.</p> <p>d) Following the award of Lot 1, the Financial Bids for Lot 2 shall be opened in accordance with the procedure set forth above and evaluated solely among the remaining technically qualified and responsive Bidders for Lot 2 (excluding any Bidder already declared successful for Lot 1). The same procedure shall apply to Lot 3 as well.</p>
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K. Award of Contract

<p>ITB 41.1</p>	<p>Each designated Lot shall be awarded sequentially. The Bidder determined to be the lowest evaluated and successful Bidder for a specific Lot, in accordance with ITB Clause 40, shall be awarded the Contract for that Lot. Upon such award, the Financial Bids submitted by the same Bidder for all remaining Lots shall become null and void. These Financial Bids shall remain unopened and shall be returned to the Bidder in their original, sealed condition.</p>
<p>ITB 46.1</p>	<p>The Procurement related complaints will be dealt in accordance with Rule 51 of Gilgit Baltistan Public Procurement Rules, 2022.</p> <p>If a Bidder wishes to make a Procurement-related Complaint, the Bidder shall submit its complaint following these procedures, in writing (by the quickest means available, such as by email), to:</p> <p>Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com</p>

SECTION III - EVALUATION AND QUALIFICATION CRITERIA

This Section contains the criteria that the Employer shall use to evaluate Bids and qualify Bidders. No other factors, methods or criteria shall be used other than specified in this Bidding Documents.

To establish the Bidder's qualification to perform the Contract, the Bidder shall provide the information requested in the corresponding Qualification Forms included in Section IV, Bid Forms. The information provided in the Forms shall be substantiated with valid documentary evidence otherwise the requirement will not be considered as complied. The Employer reserves the right to obtain information regarding performance of the Bidder on their previously awarded contracts/ works and verify the same, provided that such verification is limited to the disclosed qualification and evaluation criteria in this Section and Section IV (Bid Forms).

Wherever a Bidder is required to state a monetary amount, the Bidder should indicate the equivalent PKR using the rate of exchange determined as follows:

- a. for construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amount for that year is to be converted) was originally established; or
- b. value of single contract - Exchange rate prevailing on the date of the contract.

The source of exchange rate shall be:

TT Selling rate as published by the State Bank of Pakistan provided on the following website:

www.sbp.org.pk

Any error in determining the exchange rates in the Bid may be corrected by the Employer.

The values for construction turnover, financial data and value of single contract shall further be escalated @10% per annum up to the deadline for submission of the Bids, as a project-specific adjustment factor, solely for the purpose of meeting the qualification criteria Sub-Factors 3.1, 3.2 and 4.2

Qualification

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
1. Eligibility							
1.1 (a)	Pakistan Engineering Council (PEC) Licensing	Licensing by Pakistan Engineering Council (PEC) in accordance with ITB 4.2	Must meet requirement	N/A	Must meet requirement	N/A	Provisional/Standard PEC License. Foreign firm must submit JV Agreement with Pakistani firm
1.1 (b)	Private Power and Infrastructure Board (the "PPIB")	Registered with the PPIB in accordance with ITB 4.2.	Must meet requirement	N/A	N/A	Must meet requirement	For Local Firms Only
1.2	Pakistani Firm Tax Registration	Requirement of Pakistani firm on Active Taxpayer List (ATL) in accordance with ITB 4.3	Must meet requirement	N/A	Must meet requirement	N/A	Foreign firms must submit proof of registration for income tax in

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
							their home jurisdiction and an undertaking to comply with Pakistani tax laws upon award of contract
1.3	Conflict of Interest	No conflicts of interest in accordance with ITB 4.4	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Bid
1.4	Nationality	Nationality in accordance with ITB 4.6	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI 1.1 and 1.2, with attachments
1.5	Eligibility w.r.t Debarment/ Blacklisting	Not having been debarred/blacklisted in accordance with ITB 4.7	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid
1.6	State-owned Entity of the	Bidder is required to meet the conditions of ITB 4.8	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI 1.1 and 1.2, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
	Employer's Country						
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of Contractor's default since during the last ten (10) years prior to the bid submission deadline	Must meet requirement ¹	N/A	Must meet requirement ²	N/A	Form CON 2
2.2	Suspension Based on Execution of Bid/Bid Securing Declaration by the Employer	Not under suspension based on execution of a Bid/Bid Securing Declaration pursuant to ITB 4.9.	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid

¹ Non-performance, as decided by the Employer, shall include all contracts where (a) non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Non-performance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Non-performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

² This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
2.3	Pending Litigation	Bidder's financial position and prospective long-term profitability still sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON 2
2.4	Litigation History	No consistent history of court/arbitral award decisions against the Bidder ³ during the last ten (10) years prior to the bid submission deadline	Must meet requirement	N/A	Must meet requirement	N/A	Form CON 2
3. Financial Situation and Performance							
3.1	Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN 3.1, with attachments

³ The Bidder shall provide accurate information on the related Form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last ten years. A consistent history of awards against the Bidder or any member of a joint venture may result in rejection of the Bid.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
3.2	Average Annual Turnover	Minimum average annual turnover of Eq. PKR 550 million calculated as total certified payments received for contracts in progress and/or completed within the last three (03) years.	Must meet requirement	Must meet requirement	N/A	Must meet 40% of the requirement	Form FIN 3.2
4. Experience							
4.1	Bidder's Experience ⁴	The bidder must have registered his firm in Securities and Exchange Commission of Pakistan (SECP) on or before January 01, 2023. The Bidder shall have successfully completed projects, in the role of prime contractor or joint venture member, for each category below. For the purposes of this qualification, "single location" means works executed entirely within the same site boundary. Capacities achieved at multiple					

⁴To substantiate the above, Bidder shall submit authenticated user's certificate / Taking-Over / Performance / Defects Liability certificates or other relevant documents.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
		locations, even if under the same contract, shall not be aggregated to meet the requirement.					
		a) Successful execution and completion of at least one single-location solar PV project with capacity $\geq 250 \text{ KW}_{\text{DC}}$ and cumulative PV installation capacity of $\geq 1.5 \text{ MW}_{\text{DC}}$.	Must meet Requirement	Must meet Requirement	NA	NA	Form EXP 4.1
		b) Successful execution and completion of at least one single-location Battery Energy Storage System (BESS) installation of $\geq 100 \text{ kWh}$ and cumulative BESS installation capacity of $\geq 500 \text{ kWh}$.	Must meet Requirement	Must meet Requirement	NA	NA	Form EXP 4.1

5. Proposed Manufacturers

The capabilities of the manufacturers proposed by the Bidder for the following Major Equipment shall be evaluated for acceptability against the minimum criteria specified in Form TECH 6. The Bidder shall submit Manufacturer's Authorization as per format provided in **Section IV (Bid Forms)** from each proposed manufacturer confirming their participation. Failure to propose at least one compliant manufacturer for any Major Equipment Category shall render the Bid non-responsive and subject to rejection.

Sr. No	Name of Major Equipment
1	PV Modules
2	Battery Energy Storage System
3	Hybrid Inverters

6. Key Personnel

The Bidder must demonstrate that it will have a suitably qualified (and in adequate numbers) minimum Key Personnel, as described in the table below.

The Bidder shall provide an organization chart which shall include the names of all Key Personnel. A separate site organisation chart shall clarify the site organization; The Bidder shall complete the relevant Form (Form PER-2) provided in **Section IV (Bid Forms)**.

No.	Position	Minimum Qualification	Total Work Experience [years]	Experience In Similar Work/ Position [years]
1	Project Manager/ Construction Manager	BSc Engineering (Elect/Mech)	15	10
2	Design Team Leader	BSc Engineering (Elect/Electronics)	12	10
3	Quality Control Engineer	BSc Engineering (Civil/Elect/Mech)	10	10
4	Civil / Structure Engineer	BSc Engineering (Civil/Structure)	10	5
5	Electrical Engineer	BSc Engineering (Elect)	10	5
6	PV Engineer	BSc Engineering (Elect)	8	5

SECTION IV - BID FORMS

1. Technical Forms and Schedules (To be Submitted with Technical Bid)

(a) Letter of Technical Bid

(b) Technical Bid Forms

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|------|-------------|--|
| i. | Form TECH 1 | Design Methodology |
| ii. | Form TECH 2 | Schedule of Technical Data |
| iii. | Form TECH 3 | Methods Statement for Key Construction Activity |
| iv. | Form TECH 4 | Mobilization Schedule |
| v. | Form TECH 5 | Contractor's Personnel Detail & Organizational Chart |
| vi. | Form TECH 6 | Subcontractors & Manufacturers |

(c) Qualifications forms

- | | | |
|------|--------------|---|
| i. | Form ELI 1.1 | Bidder Information Form |
| ii. | Form ELI 1.2 | Bidder JV Information Form |
| iii. | Form CON 2 | Historical Contract Non-Performance, Pending
Litigation and Litigation History |
| iv. | Form FIN 3.1 | Financial Situation and Performance |
| v. | Form FIN 3.2 | Average Annual Turnover |
| vi. | Form EXP 4.1 | General Experience |
| vii. | Form EXP 4.2 | Specific Experience |

(d) Form of Bid Security (Bank Guarantee)

2. Financial Forms and Schedules (To be Submitted with Financial Bid)

(a) Letter of Financial Bid

(b) Schedules to Bid

- | | | |
|----|--------------|------------------------------|
| i. | Schedule – A | Schedule of Rates and Prices |
|----|--------------|------------------------------|

Letter of Technical Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

Place this Letter of Bid in the first envelope “TECHNICAL BID”.

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission:

Bidding Documents No: _____

To:

**Project Director,
100 MW Distributed Solarization of Gilgit Baltistan Project,
Water and Power Department Gilgit Baltistan,
Near K.I.U, Gilgit, Pakistan
Telephone No.: +92-5811-922609,
Fax No.: +92-5811-922619, 922185,
Email: pd100mwpsolar@gmail.com**

Sir:

We, the undersigned Bidder, hereby submit our Bid, in two parts, namely:

- (a) the Technical Bid, and
- (b) The Financial Bid.

Having examined the Bidding Documents, including any Addenda issued in accordance with **ITB 8**, we, the undersigned, offer to execute the Works on an EPC/Turnkey basis, in full conformity with the said Bidding Documents and any Addenda.

We undertake, if our Bid is accepted, to commence the Works and achieve Completion within the respective times stated in the Bidding Documents.

We hereby submit as security for due performance of the undertakings and obligations of this Bid Security in the amount of PKR 10 million drawn in the favour of, or made payable to the Employer, Water and Power Department, Gilgit Baltistan, Pakistan and valid for a period of twenty-eight (28) days beyond the period of validity of Bid.

We hereby certify that we,

1. including any subcontractors or manufacturers for any part of the contract, meet the eligibility requirements and have no conflict of interest in accordance with **ITB 4**.
2. We are not participating, as a Bidder in more than one Bid in this Bidding process.
3. We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory

- Authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.;
4. We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption.
 5. We confirm, if our Bid is accepted, that all members of the JV shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the JV shall not be altered without the prior consent of the Employer.
 6. State-owned enterprise or institution: [select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of **ITB 4.8**];

We agree to abide by this Bid, which, in accordance with **ITB 12** and **ITB 13**, consists of this letter (Letter of Technical Bid) and enclosures as required in the Bidding Documents, until [insert day, month and year in accordance with **BDS 20.1**], and it shall remain binding upon us and may be accepted by you at any time on or before this date.

Until the formal final Contract is prepared and executed between us, this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us.

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

Name of the person duly authorized to sign the Bid on behalf of the Bidder:

** [insert complete name of person duly authorized to sign the Bid]

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

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

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

*: In the case of the Bid submitted by a Joint Venture, specify the name of the Joint Venture as Bidder.

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

Letter of Financial Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

Place this Letter of Bid in the second envelope “FINANCIAL BID”.

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission:

Bidding Documents No: _____

To:

**Project Director,
100 MW Distributed Solarization of Gilgit Baltistan Project,
Water and Power Department Gilgit Baltistan,
Near K.I.U, Gilgit, Pakistan,
Telephone No.: +92-5811-922609,
Fax No.: +92-5811-922619, 922185,
Email: pd100mwpsolar@gmail.com**

Dear Sir:

We, the undersigned, hereby submit the second part of our Bid, namely the **Financial Bid**, in accordance with the Instructions to Bidders and the requirements set forth in the Bidding Documents and Addenda

Having examined the Bidding Documents in their entirety, we offer to execute and complete the Works on an **EPC/Turnkey basis** for the following Bid Price, **exclusive of any discounts**,

Bid Price: [insert the Bid Price of in words and figures, indicating the various amounts and the respective currencies];

The discounts offered and the methodology for their application is:

- (i) The discounts offered are: [Specify in detail each discount offered]
- (ii) The exact method of calculations to determine the net price after application of discounts is shown below: [Specify in detail the method that shall be used to apply the discounts];

If our Bid is accepted, we undertake to provide an advance payment security and a Performance Security in the forms, in the amounts, and within the times specified in the Bidding Documents.

Undertakings

1. If our Bid is accepted, we undertake to provide an **Advance Payment Security** and **Performance Security** in the prescribed forms, amounts, and timelines specified in the Bidding Documents.

2. We agree to keep this Bid valid until [insert date as per BDS 20.1], and it shall remain binding upon us unless rejected or expired in accordance with the Bidding Documents.
3. We confirm that:
 - We, including our subcontractors, manufacturers, and suppliers, meet the **eligibility requirements** and are free of any conflict of interest in accordance with ITB 4.
 - Neither we nor any associated party are debarred/blacklisted under the laws of Pakistan or by any foreign or international organization.
 - We have not paid, and will not pay, any commissions, gratuities, or fees in connection with this Bid, **except as disclosed below in compliance with the Integrity Pact:**

Name of Recipient

Address Reason Amount

[Insert, if applicable; otherwise state “None”]

Acknowledgement

We acknowledge that the Employer is not bound to accept the lowest or any Bid it receives.

Until the formal Contract Agreement is executed, this Bid, together with your written acceptance (Letter of Acceptance), shall constitute a binding commitment between us, **subject to submission of the required Performance Security.**

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

Authorized Signatory: [insert complete name]

Title/Designation: [insert title of authorized person]

Signature: [insert signature]

Date: [insert date]

* In the case of a Joint Venture, specify the name of the JV as Bidder.

** The person signing the Bid must hold a valid Power of Attorney (attached with the Bid Schedules).

Schedules to Bid

1. Schedule-A Schedule of Rates and Prices

Schedule-A

Schedule of Rates and Prices

PREAMBLE

1. The Schedule of Prices shall be read in conjunction with the Instructions to Bidders, the Conditions of Contract, and the Employer's Requirements.
2. The Bidder shall submit prices for all items of the Works on an EPC/Turnkey basis, covering the complete scope of Work as described in, or implied from, these Bidding Documents. These include but are not limited to: engineering and design, procurement, manufacture, supply, transport, insurance, storage, installation, construction, civil works, testing, commissioning, documentation, training, provision of mandatory spare parts, obligations during the Defects Notification Period, operation and maintenance services for the durations specified in the Employer's Requirements, insurances, taxes and duties, performance security, and any other obligations necessary to execute and complete the Works and perform the Services in accordance with the Contract and the Employer's Requirements, whether or not specifically mentioned under an individual item.
3. The prices shall be fixed and firm and deemed to be included:
 - a. Contractor's overheads and profit, all applicable duties, taxes, levies, insurances, and other obligations of the Contractor as applicable on the Base Date, except where adjustments are expressly provided for under the Contract.
 - b. All costs of temporary works, site preparation, and construction facilities.
 - c. All obligations during the Defects Notification Period (DNP) including but not limited to rectification of defects, warranty obligations, and related support as per the Contract.
4. Each item in the Schedule of Prices shall be priced. Items unpriced shall be deemed included in other items.
5. The **Contract Price** shall mean the sum of:
 - a. the EPC Price (comprising all Rooftop Solar items, together with Mandatory Spare Parts);
 - b. the O&M Price (for Operation and Maintenance of Rooftop Solar, in accordance with the Contract and the Employer's Requirements);
 - c. the Provisional Sums.
6. **Mandatory Spare Parts:** The Contractor shall supply the Mandatory Spare Parts as defined in the designated Schedule. Their cost shall be included in the EPC Price, and no separate payment shall be made.
7. **Recommended Spare Parts:** The Bidder shall provide in the designated schedule a list of Recommended Spare Parts, including itemized prices. These prices shall not be included in the Grand Summary. The Employer may, at its sole discretion, procure such spares.
8. For the purpose of bid evaluation, the **Total Evaluated Price = EPC Price + O&M Price** shall be considered. For Contract award and execution, the Contract Price shall be the sum of the EPC Price, the O&M Price and the Provisional Sums.
9. A Provisional Sum is included in the Grand Summary for Employer's use at its discretion. The Provisional Sum shall be expended in whole or in part only on the instruction of the Employer's Representative in accordance with Sub-Clause 13.4 of the Conditions of Contract.

10. In case of discrepancy between a unit rate and its extended total, the unit rate shall prevail, subject to the lump-sum nature of the Contract.
11. In the event that the Employer determines that the distribution of prices is significantly unbalanced, either within a category of Works or across categories (including Rooftop Solar, and O&M), the Employer may:
 - a. require the Contractor to provide a detailed justification and itemized breakdown of any item of the Works; and/or
 - b. adjust the valuation and certification of interim payments so as to reflect the actual value of the Works executed.

Schedule No. A1 – EPC Works for Rooftop Solar

Item No.	Description (Design, Supply, Installation, Testing and Commissioning)	Price (PKR)
LOT II		
1	ROOFTOP SOLAR – DISTRICT SKARDU	
a	Distributed Solar PV – Cumulative 3.891 MWp (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
b	Battery Energy Storage System (BESS) – Cumulative ≥2.539 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
c	LV Equipment –switchgear, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
d	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
e	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-01	Subtotal – Rooftop Solar – District Skardu	
2	ROOFTOP SOLAR – DISTRICT GHANCHE	
a	Distributed Solar PV – Cumulative 0.652 MWp (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
b	Battery Energy Storage System (BESS) – Cumulative ≥0.347 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
c	LV Equipment –switchgear, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
d	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
e	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-02	Subtotal – Rooftop Solar – District Ghanche	

3	ROOFTOP SOLAR – DISTRICT SHIGAR	
a	Distributed Solar PV – Cumulative 0.530 MWp (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
b	Battery Energy Storage System (BESS) – Cumulative ≥0.481 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
c	LV Equipment –switchgear, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
d	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
e	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-03	Subtotal – Rooftop Solar – District Shigar	
4	ROOFTOP SOLAR – DISTRICT KHARMANG	
a	Distributed Solar PV – Cumulative 0.368 MWp (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
b	Battery Energy Storage System (BESS) – Cumulative ≥0.225 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
c	LV Equipment –switchgear, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
d	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
e	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-04	Subtotal – Rooftop Solar – District Kharmang	
	Total Price for LOT II (Sum of RS-01 to RS-04) to be carried to Schedule A3 – Grand Summary	

Schedule No. A2 – O&M Works and Services

Item No.	Description	Period	Price (PKR)
LOT II			
1	O&M of Rooftop Solar – District Skardu	36 months	
2	O&M of Rooftop Solar – District Ghanche	36 months	
3	O&M of Rooftop Solar – District Shigar	36 months	
4	O&M of Rooftop Solar – District Kharmang	36 months	
	Total Price For O&M of LOT II (Sum of Sr. 1 to Sr. 4)		

Schedule No. A3 – Grand Summary

Reference	Description	Price (PKR)
EPC Price LOT II	Total Price of EPC Works for LOT II (Sum of RS-01 to RS-04 from Schedule No. A1)	
O&M Price LOT II	Total Price of O&M of Rooftop Solar for LOT II from Schedule No. A2	
PS for LOT II	Provisional Sum (as defined in Preamble)	13,407,900
Total	EPC Price + O&M Price + PS	

Schedule No. A4 – Mandatory Spare Parts

Sr. No.	Item Description	Quantity
1	PV modules	1% of the quantity installed for the Project
2	Inverter(s)	5% of the total of each type of inverter installed (rounded up to nearest whole number) or 1 inverter of each type, whichever is greater. 2% of the total of Wifi / Remote Monitoring Dongles installed for the Project
3	Batteries	1% of the quantity installed for the Project
4	PV Module Mounting structure	5% of the nut/ bolts / Rawal bolts / fasteners / Clamps / Washers etc. installed for the Project
5	Electrical system (LV). i.e. contactors/accessories	2% of the quantity installed for the Project
6	DC and AC cabling	4 mm² : 2% of the total DC Cable length installed for the Project 2% of the total AC Cable length for each size installed for the Project
7	DC & AC Breakers	25 A : 2% of the total DC Breakers installed for the Project 250 A : 2% of the total AC Breakers installed for the Project
8	Grounding Materials (Rods, Earthing Wire, Clamps, Connectors etc.)	2% of the quantity required for the Project.

Note:

- The Bidder shall price the Mandatory Spare Parts for each Rooftop Solar under the relevant EPC Price section of the Schedule of Rates and Prices.
- All spare batteries shall be delivered with a full manufacturer’s warranty period identical to that of the originally installed batteries. Any spare batteries with reduced warranty coverage shall not be counted toward the mandatory requirement.
- The mandatory spare parts listed herein are in addition to, and shall not reduce or replace, the Contractor’s obligations to rectify defects through manufacturer warranties or to replace damaged equipment through insurance claims. The Contractor shall not utilize the mandatory spare parts listed in this Schedule to discharge such warranty or insurance obligations. However, if such spares are used to meet an urgent requirement, the Contractor shall replenish them immediately so that the mandatory spare inventory remains complete throughout the O&M period.
- The Contractor shall maintain the mandatory spare parts in good, unused, and serviceable condition, properly stored and protected against deterioration, until the end of the O&M period. The inventory shall be handed over to the Employer at the end of the O&M period in the same serviceable condition as supplied.
- The condition and completeness of the mandatory spare parts inventory shall form an essential part of the final inspection of the Plant. Satisfactory handover of the inventory shall be a prerequisite for issuance of the Performance Certificate.

Schedule No. A5 – Recommended Spare Parts

Sr. No.	Item Description	Quantity	Unit Rate (PKR)	Total Price (PKR)
1				
2				
3				
4				
5				
	Total Price for Recommended Spare Parts <u>(NOT TO BE CARRIED TO A3 – GRAND SUMMARY)</u>			

Note:

List here above (or append a list in the form above) the prices for the recommended additional spare parts, which are recommended by the Bidder for purchase with the Plant. The recommended spare parts shall include any expendable and wear items for all new components furnished by Contractor. These shall be in addition to those specified and will not be considered for evaluation. Provide description for each recommended additional spare part, recommend a quantity and provide pricing. The cost of such additional recommended spare parts will not be considered in the evaluation of Bids.

It shall be understood that the purchase of any or all of the recommended additional spare parts will be at the option of the Employer. The option will be exercised at the time of Contract award, unless indicated otherwise.

Technical Bid Forms

1. Form TECH 1 Design Methodology
2. Form TECH 2 Schedule of Technical Data
3. Form TECH 3 Method Statement for Key Construction Activities
4. Form TECH 4 Mobilization Schedule
5. Form TECH 5 Contractor's Personnel Detail & Organizational Charts
6. Form TECH 6 Subcontractors & Manufacturers

Form TECH 1

Design Methodology

The Bidder shall provide a Design Philosophy and Operational Methodology for implementing the Rooftop Solarization. The submission shall demonstrate the Bidder's technical approach, and operational planning.

The Design Philosophy shall, at a minimum, cover the following:

1. Explanation of how the Employer's Requirements will be achieved.
2. Configuration, integration with PV and grid, and control.
3. Design approach for foundations and cable trenches.
4. Preventive and corrective O&M strategy, and training plan for local operators.
5. Fire safety, battery hazard management

Form TECH 2

‘A’- Employer’s Specified Data/Parameters

‘B’- Bidder’s Proposed Data/Parameters

‘C’- Remarks Supporting the Proposed Deviation in Column ‘B’

SPECIFIC PLANT DATA PHOTOVOLTAIC MODULES			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Rated Power: ≥ 600 Wp	Yes		
Tolerance: 0 ~ +3%	Yes		
Module Efficiency: ≥ 22%	Yes		
Operating Temperature: -40°C to +85°C	Yes		
Max System Voltage: 1500 V DC	Yes		
Fire Rating: IEC Class C, UL Type 29	Yes		
12-year product, 25 years performance	Yes		
IEC 61215, IEC 61730, IEC 62941, UL 61730	Yes		
Application/ Safety Class II as per IEC 61730	Yes		
Barcode Identification	Yes		
N type, half-cut, Topcon/HPBC	Yes		
≥ 50 mm Diameter Hail Resistant	Yes		

SPECIFIC PLANT DATA HYBRID INVERTER			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Battery Voltage: 24 V or above	Yes		
Battery Compatibility: Lithium-ion (LFP), Lead-acid	Yes		
Maximum Efficiency: ≥96.5%	Yes		
European Weighted Efficiency: ≥96%	Yes		
Grid Modes: Grid-tied, Off-grid, Backup	Yes		
Communication: Wi-Fi, Ethernet, RS485	Yes		
Protection Features: SPD, AFCI, GFDI, Anti-islanding, BMS	Yes		
Enclosure Protection: IP65	Yes		
Operating Temperature Range: -30°C to +60°C	Yes		
Warranty: 10 years	Yes		

SPECIFIC PLANT DATA AMI METER			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			

Country of Origin			
Specifications As Per PEPCO Standards	Yes		

SPECIFIC PLANT DATA FOR BATTERY			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cell Chemistry: Lithium Iron Phosphate (LFP)	Yes		
Depth of Discharge (DoD): ≥ 90%	Yes		
Round-trip Efficiency: ≥ 90%	Yes		
Cycle Life: ≥ 6000 cycles @ 80% DoD	Yes		
Operating Voltage: 24 V or above	Yes		
Maximum Charge/Discharge Rate: ≥ 1 C	Yes		
Ambient Operating Temperature Range: -30°C to +50°C	Yes		
Ambient Charging Temperature: -30°C to +50°C (self-heating for sub-zero charging)	Yes		
Relative Humidity: 0–95% RH (non-condensing)	Yes		
Ingress Protection: IP65	Yes		
Noise Emission: ≤ 65 dB(A)	Yes		
Monitoring: BMS, mobile app, cloud-enabled	Yes		

SPECIFIC PLANT DATA DC CABLES			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cable Type: XLPO, Halogen free	Yes		
Conductor: Copper, ≥99.9% purity	Yes		
Earthing: Copper conductor/strip	Yes		
Flame Retardance	Yes		

SPECIFIC PLANT DATA AC CABLES			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cable Type: XLPE/PVC, UV & Flame Retardant	Yes		
Conductor: Copper, ≥99.9% purity	Yes		
Earthing: Copper conductor/strip	Yes		
Flame Retardance	Yes		

Form TECH 3

Method Statement for Key Construction Activities

The Bidder shall provide detailed method statements for the following key construction activities. Each method statement shall clearly describe:

- The proposed approach and sequence of works.
- The quality control and inspection regime.

The method statements shall demonstrate how the Bidder intends to complete the Works in accordance with the Employer's Requirements and international best practices.

Key Activities

The Bidder shall submit methodology for, but not limited to, the following:

- Submission of a detailed project schedule (using renowned project management software such as MS Project / P6) covering engineering, procurement and construction phases linked with work breakdown structure, milestones, and resources.
- Mobilization plan including logistics, safe transportation, and site establishment.
- Rooftop surveys
- Temporary site facilities, laydown areas, and storage.
- Foundations for PV modules, BESS, inverters, and switchgear.
- Delivery, handling, and storage of PV modules, mounting structures, BESS, and inverters.
- Erection and alignment of module mounting structures.
- Module installation, string wiring, and combiner boxes.

Form TECH 4

Mobilization Schedule

[Insert Mobilization Schedule]

Form TECH 5

Contractor’s Personnel Detail & Organizational Chart s

The Bidder shall provide an organization chart illustrating the proposed management structure and reporting lines for delivery of the Contract. For this organization chart, the Bidder must confirm deployment of atleast 12 no. of teams on site for timely / early completion of the works.

The Bidder shall also provide the names of Experts listed below.

No.	Position	Minimum Qualification	Total Work Experience [years]	Experience In Similar Work/ Position [years]
1	Project Manager/ Construction Manager	BSc Engineering (Elect/Mech)	15	10
2	Design Team Leader	BSc Engineering (Elect/Electronics)	12	10
3	Quality Control Engineer	BSc Engineering (Civil/Elect/Mech)	10	10
4	Civil / Structure Engineer	BSc Engineering (Civil/Structure)	10	5
5	Electrical Engineer	BSc Engineering (Elect)	10	5
6	PV Engineer	BSc Engineering (Elect)	8	5

Form PER-2
Resume and Declaration
Contractor’s Representative and Key Personnel

Name of Bidder

Position [#1]: [title of position]		
Personnel information	Name	Date of Birth
	Address	E-mail
	Professional Qualifications	
	Academic Qualifications	
	Language Proficiency: [language and levels of speaking, reading and writing skills]	
Details	Address of Employer	
	Telephone	Contact (Manager / Personnel Officer)
	Fax	
	Job Title	Years with Present Employer

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

Project	Role	Duration of involvement	Relevant experience
[main project details]	[role and responsibilities on the project]	[time in role]	[describe the experience relevant to this position]

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	Details
Commitment to Duration of Contract	[insert period (start and end dates) for which this Key Personnel is available to work on this contract]
Time Commitment	[insert the number of days/week/months/ that this Key Personnel will be engaged]

I understand that any misrepresentation or omission in this Form may:

- (a) be taken into consideration during Bid evaluation;
- (b) result in my disqualification from participating in the Bid;
- (c) result in my dismissal from the contract.

Name of Key Personnel: [insert name] _____

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Form TECH 6

Subcontractors & Manufacturers

a. Proposed Subcontractors

The following Subcontractors are proposed for carrying out the activity/sub-activity indicated. For any additional subcontractor (that is subsequently approved by the Employer), Bidders are free to propose but not more than three Subcontractors for each activity/sub-activity.

The bidder will submit the completed project of his proposed sub-contractors & Manufacturer.

Activity/Sub-Activity	Proposed Subcontractor's Name and Address	Nationality

b. Proposed Manufacturer

The Bidder shall propose up to three (3) manufacturers for each category of Major Equipment and Other Equipment listed below. The Employer will evaluate the acceptability of proposed manufacturers against the minimum criteria stated.

The Bidder shall provide credentials and supporting documents (such as manufacturer’s company profile, reference lists of similar projects, supply records, completion certificates, and any other relevant evidence) to establish that each proposed manufacturer meets the minimum requirements stated herein.

(I) Major Equipment

Sr. No.	Equipment	Minimum Manufacturer’s Requirement	Proposed Manufacturers
Proposed Manufacturer of Major Equipment			
1.	PV Modules	At least 05 Years of experience in manufacturing and supply of PV modules; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1. 2. 3.
2.	Battery Energy Storage System (BESS)	The proposed manufacturer of BESS shall have a minimum of five (05) years’ experience in the manufacturing and shall have successfully supplied at least 2 GWh of BESS during the last two (02) years Or At least 03 Years experience in manufacturing and supply of BESS; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1. 2. 3.
3.	Hybrid Inverters	The proposed manufacturer of inverters shall have a minimum of five (05) years’ experience in the manufacturing and shall have successfully supplied at least 2 GW of inverters during the last two (02) years Or At least 03 Years experience in manufacturing and supply of Hybrid Inverters; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1. 2. 3.

Note: Each Major Equipment Category listed above must include at least one proposed manufacturer that fully meets the corresponding minimum requirements. Failure to propose at least one compliant manufacturer for any Major Equipment Category shall render the Bid non-responsive and subject to rejection.

(II) Other Equipment

Proposed Manufacturer for Other Equipment			
1	LV/MV Panels	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.
2	LV/MV Cables	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.
3.	Distribution Boxes	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.

Note:

In case any proposed Manufacturer for Other Equipment is determined to be non-compliant with the specified minimum requirements, then the Bidder will be required to propose, without changing its Bid Price, an acceptable substitute manufacturer meeting the criteria for that Equipment prior to award of Contract.

Qualification Forms
Form ELI 1.1
Bidder Information Form

Date: _____
Page __ of __ pages

Bidder's Name:
In case of Joint Venture (JV), name of each member:
Bidder's country of registration:
Bidder's year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
<p>1. Attached are copies of original documents of</p> <ul style="list-style-type: none"><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.6.<input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 4.1.<input type="checkbox"/> Tax Department Registration in accordance with ITB 4.3.<input type="checkbox"/> PEC Registration in accordance with ITB 4.2.<input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.8 documents establishing:<ul style="list-style-type: none">(a) Legal and financial autonomy(b) Operation under commercial law(c) Establishing that the Bidder is not under supervision of the Employer
2. Included are the organizational chart and a list of Board of Directors. All the Bidders shall also provide information on beneficial ownership using the Beneficial Ownership Disclosure Form.

Form ELI 1.2

Bidder's JV Information Form

[To be completed for each member of Bidder's JV]

[Bidder will attach an executed JV Agreement according to PEC format on Stamp paper of worth Rs. 100 duly notarized]

Date: _____
Page __ of __ pages

Bidder's JV Name:
JV Member's name:
JV Member's country of registration:
JV Member's year of constitution/incorporation:
JV Member's legal address in country of constitution:
JV Member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.6. <input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> Tax Department Registration in accordance with ITB 4.3. <input type="checkbox"/> PEC Registration in accordance with ITB 4.2. <input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.8 documents establishing: (a) Legal and financial autonomy (b) Operation under commercial law (c) Establishing that the Bidder is not under supervision of the Employer
2. Included are the organizational chart and a list of Board of Directors. All the Bidders shall also provide information on beneficial ownership using the Beneficial Ownership Disclosure Form.

Form CON 2

Historical Contract Non-Performance, Pending Litigation and Litigation History

[This Form shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]

Bidder's Name: _____

Date: _____

Joint Venture Member's or Subcontractor's Name: _____

Page __ of __ pages

Non-Performed Contracts (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January 2015 as specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract non-performance in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.			
Year	Non-performed portion of Contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
	[Insert amount and percentage]	Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Reason(s) for non-performance: _____	
Pending Litigation (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3.			

Year of Dispute	Amount in Dispute (currency)	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in Dispute: _____ Party who initiated the dispute: ____ Status of dispute: _____	
Litigation History (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4. <input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
Year of Award	Outcome as Percentage of Net Worth	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in Dispute: _____ Party who initiated the dispute: ____ Reason(s) for Litigation and award decision: _____	

Form FIN 3.1

Financial Situation and Performance

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page __ of __ pages

1. Financial Data

Type of Financial information in (currency)	Historic information for previous three (03) years, (amount in currency, currency exchange rate,		
	Year 1	Year 2	Year 3
Statement of Financial Position (Information from Balance Sheet)			
Total Assets (TA)			
Total Liabilities (TL)			
Total Equity/Net Worth (NW)			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital (WC)			
Information from Income Statement			
Total Revenue (TR)			
Profits Before Taxes (PBT)			
Cash Flow Information			
Cash Flow from Operating Activities			

2. Sources of Finance

[The following table shall be filled in for the Bidder and all members combined in case of a Joint Venture]

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

No.	Source of Finance	Amount (Equivalent PKR)	Escalated Amount (Equivalent PKR)
1			
2			
3			

3. Financial documents

The Bidder and its JV members shall provide copies of financial statements for the last three (03) years pursuant to Section III, Evaluation and Qualification Criteria, Sub-factor 3.1. The financial statements shall:

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

Attached are copies of financial statements⁵ for the last three (03) years required above; and complying with the requirements. In case of local Bidder or local partner of a JV, his financial statements must stand authenticated through the Unique Document Identification Number (UDIN).

⁵ If the most recent set of financial statements is for a period earlier than 12 months from the date of Application, the reason for this should be justified sufficiently.

Current Contract Commitments / Works in Progress

Bidders and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Current PKR Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [Eq. PKR / month)]
1					
2					
3					
4					
5					

Form FIN 3.2

Average Annual Turnover

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page ___ of ___ pages

Annual Turnover Data				
Year	Amount Currency	Exchange Rate	Equivalent PKR	Escalated Equivalent PKR
Average Annual Turnover *				

* Total equivalent PKR for all years divided by the total number of years. See Section III, Evaluation and Qualification Criteria, Sub-factor 3.2.

Form EXP 4.1

Bidder's Experience

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page __ of __ pages

Similar Contract No.	Information		
Contract Identification			
Award date			
Completion date			
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			Eq. PKR _____ Escalated Eq. PKR _____
If member in a JV or Subcontractor, specify share in value in total Contract amount and roles and responsibilities	_____ %	_____ [insert total Contract amount in local currency]	Eq. PKR _____ Escalated Eq. PKR _____
	_____ _____ [Insert roles and responsibilities]		
Employer's Name:			
Address: Telephone/fax number E-mail:			

Form EXP 4.1 (cont.)

Bidder's Experience

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2 of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

9. Information about Board of Directors (details shall be provided regarding number of shares in the capital of the company as set opposite respective names)

1	2	3	4	5	6	7	8
Name and surname (In Block Letters)	CNIC No. (in case of foreigner, Passport No)	Father' s / Husband' s Name in Full	Current Nationality	Any other Nationality(ies)	Occupation	Residential address in full or the registered / principal office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)
			Total Number of Shares taken (in figure and words)				

10. Any other information incidental to or relevant to Beneficial Owner(s).

Name & Signature
 (Person authorized to issue notice on behalf of the company)

**Form of Bid Security
(Bank Guarantee)**

Bank Guarantee Executed on _____
(Date)

Expiry on _____
(Date)

Name of Guarantor with Address: _____

Name of Bidder with Address _____

Sum of Guaranteed amount in PKR _____ (Pak Rupees _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Bidder we, the Guarantor above named, are held and firmly bound unto _____ (hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated for _____ (Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum to the Employer, conditioned asunder:

- (1) that the Bid Security shall remain in force for a period twenty-eight (28) days beyond the Bid Validity date i.e., upto _____.
- (2) that in the event of;
 - a) the principal withdraws his Bid during the period of validity of Bid, or
 - b) the principal does not accept the correction of his Bid price, pursuant to sub-clause 36.3 of Instructions to Bidder, or
 - c) failure of the successful Bidder to
 - i. furnish the required Performance Security, in accordance with Clause-45 of Instructions to Bidders, or
 - ii. sign the proposed Contract Agreement, in accordance with Clause-44 of Instructions to Bidder,

then the entire sum be paid immediately to the said Employer as liquidated damages and not as penalty for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within Fourteen (14) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified or its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith unconditionally and irrevocably, pay the Employer the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge to decide, whether the Bidder has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security with in the time stated above, or has defaulted in fulfilling said requirements and the Guarantor shall pay without objection the said upon sum first written demand from the Employer forthwith and without any reference to the Bidder or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

GUARANTOR
(Schedule Bank)

WITNESS:

Signature _____

d) Name _____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

Name, Title &Address

Manufacturer's Authorization

Date: [insert date (as day, month and year) of bid submission]

ICB No.: [insert number of bidding process]

To: [insert complete name of the employer]

WHEREAS

We [insert complete name of the manufacturer or manufacturer's authorized agent], who are official manufacturers or agent authorized by the Manufacturer of [insert type of goods manufactured], having factories at [insert full address of manufacturer's factories], do hereby authorize [insert complete name of the bidder] to submit a bid which includes the supply of the following goods, manufactured by us and to subsequently negotiate and sign the Contract.

Goods to be supplied are:

- 1). ----- [Insert name and/or brief description of the goods]
- 2). -----

We hereby extend our full guarantee and warranty in accordance with the respective Provisions of the Contract, with respect to the goods offered by the above firm.

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

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

Title: [insert title]

Duly authorized to sign this Authorization on behalf of [insert complete name of the manufacturer]

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

-- Note --

The bidder shall require the manufacturer to fill out this form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the manufacturer.

**POWER OF ATTORNEY FOR SIGNING OF BID
POWER OF ATTORNEY**

[shall be on stamp paper of PKR 100]

Know all men by these presents, we _____(name and address of the registered office of the Bidder) do hereby constitute, appoint and authorize Mr. / Ms. _____R/o _____(name and address of residence) who is presently employed with us and holding the position of _____, as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to the bid of the (please state the name and address of the bidder) for Bidding Document No. _____: 5.70 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN, including signing and submission of all documents and providing information / responses to WATER AND POWER DEPARTMENT, GILGIT BALTISTAN, representing us in all matters in connection with our bid for the said Bidding Process.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and agree that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

For
(Signature)
(Name, Title, Email ID and Address)

Accepted
..... (Signature)
(Name, Title, Email ID and Address of the Attorney)

ACKNOWLEDGMENT

Before me, a Notary Public for and in the city of _____, this _____ of _____ 2025 personally came and appeared:

NAME IDENTIFICATION DOCUMENT

Known to me to be the same person/s who executed the foregoing Special Power of Attorney in Favor of _____ and acknowledged to me the same is/are his/her/their free and voluntary act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal, the date and place above written.

NOTARY PUBLIC

PART-II: CONDITIONS OF CONTRACT, STANDARD FORMS AND SCHEDULES

SECTION V - GENERAL CONDITIONS (GC)

Silver Book

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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for EPC/Turnkey Projects (“Silver book”) Second Edition 2017, reprinted 2022 with amendments” published by the Federation Internationale Des Ingenieurs Conseils (FIDIC) and the following “Particular Conditions” which are the amendments and additions to such General Conditions.

An original copy of the above FIDIC publication i.e. “Conditions of Contract for EPC/Turnkey Projects” must be obtained from FIDIC.

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Telephone: +41 22 799 49 01

E-mail: fidic@fidic.org

Website: www.fidic.org

FIDIC Code : ISBN13 : 978-2-88432-083-2

The successful Bidder after award of contract shall provide two (02) copies of above said “General Conditions” for incorporation in the Contract.

SECTION VI - PARTICULAR CONDITIONS

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

Part A - Contract Data

Sr. No.	Data Required	Sub-Clause	Data
1.	Defects Notification Period (DNP)	1.1.24	1,095 days
2.	Employer's Name and Address	1.1.27	Water and Power Department, Gilgit Baltistan, Pakistan 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com
3.	Employer's Representative (s)	1.1.30	Project Director
4.	Time for Completion	1.1.76	195 days for whole of the Works
5.	Agreed methods of electronic transmission:	1.3 (a)(ii)	Official email: pd100mwpsolar@gmail.com
6.	Address of Employer for communications	1.3(d)	100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,
7.	Address of Employer's Representative (s) for communications	1.3(d)	Project Director 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com
8.	Address of Contractor for communications	1.3(d)	(to be added later)
9.	Contract shall be governed by the law of:	1.4	Islamic Republic of Pakistan

10.	Ruling Language	1.4	English
11.	Language for Communications	1.4	English
12.	Number of additional paper copies of Contractor's Documents	1.8	Three (03)
13.	Total liability of the Contractor to the Employer under or in connection with the Contract	1.14	1.15 times of the Contract Price
14.	After the Contract comes into full force and effect, the Contractor shall be given right of access, and possession of all of the Site	2.1	The Employer shall give possession of the relevant part(s) of the Site to the Contractor as per requirements in accordance with the Programme submitted under Sub-Clause 8.3 [Programme], following the issuance of a written notice.
15.	Employer's Financial Arrangements	2.4	The Employer has received funds from the Government of Pakistan through PSDP towards the cost of the Project.
16.	Other Employer's Personnel	3.2	The Employer has appointed NESPAK Consultants to assist the Employer's Representative in the implementation of the contract. NESPAK shall act as the Employer's Delegated Assistant and shall perform such duties and exercise such authorities as are delegated to it under Part-B Special provisions.
17.	Performance Security (as percentages of the Contract Price in Currency/ies) percent: currency:	4.2	The Performance Security shall be maintained at ten percent (10%) of the Contract Price until expiry until issuance of the Performance Certificate.
18.	Maximum allowable	4.4(a)	20%

	accumulated value of work subcontracted (as a percentage of the Contract Price)		
19.	Parts of the Works for which subcontracting is not permitted:	4.4(b)	None
20.	Number of additional paper copies of progress reports	4.20	Eight (8)
21.	Normal working hours on site	6.5	Eight (08) hours per day under normal circumstances
22.	General Design Obligations	5.1 (b)	Clause 4 of Section II of Employer's Requirements is the essential obligation of the Contractor among the overall Employer's Requirements
23.	Number of additional paper copies of programmes	8.3	Six (06), including soft copy of the programme
24.	Delay Damages payable for each day of delay	8.8	0.10% of the EPC Price of the respective Section (as stated in the Schedule of Rates and Prices) for each day of delay beyond the Time for Completion of that Section
25.	Maximum amount of Delay Damages	8.8	10% of the EPC Price stated in the Contract Agreement
26.	Taking Over the Works and Sections	10.1	<p>The Works are divided into Sections as identified in Annexure-1 [List of Sections for the Works] to the Contract Data. Each Section shall be deemed to be completed when:</p> <p>(a) it has been executed and completed in accordance with the Contract, including the successful passing of the Tests on Completion applicable to such Section in accordance with Sub-Clause 9.4 [Tests on Completion]; and</p> <p>(b) a Taking-Over Certificate has been issued by the Employer for such Section in accordance with</p>

			<p>Sub-Clause 10.2 [Taking Over of Parts of the Works].</p> <p>The Contractor may apply for a Taking-Over Certificate for any Section, as defined in Annexure-1, upon fulfilment of the foregoing requirements. Upon issuance of the Taking-Over Certificate for a Section, the Defects Notification Period and the Contractor's obligations for operation and maintenance in respect of that Section shall commence from the date specified in such Taking-Over Certificate.</p> <p>Taking Over may be applied for, and granted, on a progressive basis, provided that a minimum of ten (10) buildings (refer to Annexure-1) within the relevant District have been completed, tested, and are ready for safe and reliable use, together with all associated civil, structural, and electrical works required for those buildings.</p> <p>The taking-over of the particular Section after completion of EPC phase does not absolve the Contractor from any liability as the O&M period has commenced immediately after taking-over.</p>
27.	Percentage rate to be applied to Provisional Sums for overhead charges and profit.	13.4(b)(ii)	10%.
28.	Total amount of Advance Payment: (as a percentage of the EPC Price stated in the Contract Agreement, excluding Provisional Sums)	14.2	20%.
29.	Currency/ies of Advance Payment	14.2	Pakistani Rupee (PKR) in which the Contract Price is payable
30.	Period of Payment of Advance Payment to the Contractor	14.2.2	Within 28 days after fulfilling the conditions prescribed in GCC

31.	Percentage deductions for the repayment of the Advance Payment	14.2.3	20% by following the methodology described in GCC
32.	Period of payment	14.3	One month
33.	Number of additional paper copies of Statements	14.3(b)	Four (04)
34.	Percentage of retention	14.3(iii)	Ten percent (10%) shall be deducted from each Interim Payment Certificate. Deductions shall continue until the cumulative total of Retention Money withheld reaches an amount equal to five percent (5%) of the Contract Price. No further deductions on account of retention shall be made thereafter.
35.	Limit of Retention Money	14.3(iii)	Five percent (5%) of the Contract Price.
36.	Plant and Materials for payment when shipped.	14.5(b)(i)	None
37.	Plant and Materials for payment when delivered to the Site	14.5(c)(i)	As per 'Schedule of Payments'
38.	Minimum amount of Interim Payment Certificates (IPC)	14.6.2	PKR 50 million
39.	Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [Interim Payment]	14.7(b)(i)	28 days
40.	Period for the Employer to make final payment to the Contractor	14.7(c)	56 days
41.	Financing charges for delayed	14.8	Not Applicable

	payment (percentage points above the average bank short-term lending rate as referred to under sub-paragraph (a))		
42.	Number of additional paper copies of draft Final Statement	14.11.1(b)	Four (04)
43.	Currencies for payment of Contract Price	14.15	Pakistani Rupee (PKR) only.
44.	Proportions or amounts of Local and Foreign Currencies are: Local: Foreign:	14.15(a)(i)	Local: 100% Foreign: Nil
45.	Currencies and proportions for payment of Delay Damages	14.15(c)	PKR only
46.	Rates of exchange	14.15(g)	The exchange rate parity in respect of seventy percent (70%) of the EPC Price shall be adjusted one-time at the time of issuance of letter of Acceptance using the following formula: Adjustment in the EPC Price = [(EPC Price * 0.70) * ER(Rev)/ER (B.D) + (EPC Price *0.30)] where: ER(Rev) = The revised TT selling rate of US Dollar as notified by the National Bank of Pakistan (NBP) on the date of issuance of letter of Acceptance. ER (B.D) = The TT selling rate of US Dollar as notified by the National Bank of Pakistan (NBP) on the Base Date of the Contract
47.	Forces of nature, the risks of which are allocated to the Contractor	17.2(d)	Climatic Conditions and Changes, Seasonal Rainfall, Thunderstorm, Flooding, Glacial Outbursts, Snowstorm, Land Sliding and Lightning

48.	<p>Permitted deductible limits:</p> <ul style="list-style-type: none"> i. Insurance required for the Works ii. Insurance required for Goods iii. Insurance required for liability for breach of Professional duty. iv. Insurance required against liability for fitness for purpose (if any is required) v. Insurance required for injury to persons and damage to property vi. Insurance required for injury to employees vii. Other insurances required by Laws and by local practice 	19.1	<ul style="list-style-type: none"> i. Ten percent (10%) of loss amount on each & every loss ii. Nil iii. Nil iv. Nil v. Nil vi. Nil vii. Nil
49.	<p>Periods for submission of insurance:</p> <ul style="list-style-type: none"> (a) Evidence of insurance (b) Relevant policies 	19.1.1 (a) & (b)	<ul style="list-style-type: none"> a) Not Later than Commencement Date. b) Within twenty-eight (28) days from the Commencement Date.
50.	Additional amount to be insured (as a percentage of the replacement	19.2.1(b)	Fifteen percent 15% of the replacement value

	value, if less or more than 15%).		
51.	List of risks arising from Exceptional Events which shall not be excluded from the insurance cover for the Works.	19.2.1(b)(iv)	Nil
52.	<ul style="list-style-type: none"> • Extent of insurance required for Goods • Amount of insurance required for Goods 	19.2.2	<ul style="list-style-type: none"> • From Ex-Works (i.e., works, factory, warehouse, etc.) to delivery at the Site. • Full replacement Value.
53.	Amount of insurance required for liability for breach of professional duty	19.2.3(a)	Full replacement value of the Works to be designed by the Contractor
54.	Insurance required against liability for fitness for purpose	19.2.3(b)	Yes
55.	Period of insurance required for liability for breach of professional duty	19.2.3	Until the date of issuance of Performance Certificate
56.	Amount of insurance required for injury to persons and damage to property.	19.2.4	<p>Injury to Person and Fatal case: In accordance with Workmen Compensation Act; and</p> <p>Damage to Property: PKR Five (05) Million</p> <p>without limit to the number of incidents for both of the above.</p>
57.	Other insurances required by Laws and by local	19.2.6	All insurances as applicable, to the extent of execution of the Project, under Federal and Provincial laws of Islamic Republic of Pakistan

	practice (give details.)		
58.	The language of arbitration shall be: The Place of Arbitration shall be: Rules of Arbitration:	21.6	English Gilgit, Pakistan The Arbitration Act 1940 (Pakistan)

Annexure -1 to Contract Data

List of Sections for the Works

1. The Works are divided into distinct Sections, as set out below.
2. For the Rooftop Solar Districts (RS-01 to RS-04), each individual Rooftop Solar District shall be deemed to constitute one Section.
3. Taking Over of each Section shall be carried out in accordance with the provisions of Sub-Clause 10.1 [Taking Over of the Works and Sections] of the Conditions of Contract.

List of Sections – Rooftop Solar

Section Ref.	Description	Location (District)
RS-01	Rooftop Solar – District Skardu	Skardu
RS-02	Rooftop Solar – District Ghanche	Ghanche
RS-03	Rooftop Solar – District Shigar	Shigar
RS-04	Rooftop Solar – District Kharmang	Kharmang

Note: Detailed Building wise list for above mentioned districts are attached in Employer’s Requirements Section – I i.e. Scope of Work.

Part B - Special Provisions

Following Sub-Clauses are added after Sub-Clause 1.1.80.	
Sub-Clause 1.1.81 EPC Price	“ EPC Price ” means the lump-sum amount quoted by the Contractor for the Engineering, Procurement and Construction (EPC) Works, as set out in the Schedule of Rates and Prices (Schedule A), and subject to adjustments in accordance with the Contract.
Sub-Clause 1.1.82 ES	“ ES ” means environmental and social.”
Sub-Clause 1.1.83 O&M Price	“ O&M Price ” means the lump-sum price quoted separately by the Contractor for the Operation and Maintenance works and services as set out in the Schedule of Rates and Prices, subject to adjustments (if any) in accordance with the Contract.
Sub-Clause 1.1.84 Operation and Maintenance	“ Operation and Maintenance ” means the operation and maintenance of the Works as set out in the Contract and the Employer’s Requirements.”
Sub-Clause 1.2 Interpretation	“and” is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j). Sub-paragraph (k) is added: (k) “The word “Tender” is synonymous with “Bid”, the word “Tender” or “Bidder” with “Bidder” and the words “Tender documents” and “request for bids documents” with “bidding document(s)”, as applicable.”
Sub-Clause 1.5 Priority of Documents	Replace the list of documents from (a) to (i) with the following: a) the Contract Agreement; b) the Letter of Acceptance; c) the Letters of Technical and Financial Bids; d) the Particular Conditions Part A - Contract Data; e) the Particular Conditions Part B - Special Provisions; f) the General Conditions (GC); g) the Employer’s Requirements; h) the Schedule of Rates and Prices; i) the completed Schedules other than the Schedule of Rates and Prices; j) the Bid; k) the JV Agreement (if the Contractor is a JV); l) Code of Conduct for Contractor’s Personnel; m) any other document forming part of the Contract.

<p>Sub-Clause 1.6 Contract Agreement</p>	<p>In the last line of the 1st paragraph the text “shall be borne by the Employer” is substituted by “shall be reimbursed by the Employer to the Contractor”.</p>
<p>Sub-Clause 2.2 Assistance</p>	<p>Following paragraph is added at the end: Provided always that the Contractor shall have the sole responsibility for carrying out his obligations under this Sub-Clause.</p>
<p>Sub-Clause 3.2 Other Employer's Personnel</p>	<p>Following paragraph is added at the end of this Sub-Clause: In addition to providing assistance to the Employer's Representative, (Employer's Delegated Assistant) is delegated to exercise the following specific powers and authorities on behalf of the Employer's Representative:</p> <ul style="list-style-type: none"> (a) Sub-Clause 3.6 [Meetings] - convening and conducting progress meetings; (b) Sub-Clause 4.1 [Contractor's General Obligations] – monitor ongoing construction activities to verify compliance with approved design, specifications, quality standards, and good engineering practices. (c) Sub-Clause 4.4 [Subcontractors] - reviewing and providing consent for Subcontractors; (d) Sub-Clause 5.2 [Contractor's Documents] – review and comment on Contractor's design documents, drawings, specifications, and manuals for conformity with the Employer's Requirements within three (03) working days after the receipt of Contractor's submittals; (e) Sub-Clause 7.3 [Inspection] – witness, verify, and report on the inspection and testing of equipment and material at manufacturer's works and at the Site; (f) Sub-Clause 8.3 [Programme] - reviewing, commenting on, and providing consent to the Programme; (g) Sub-Clause 8.7 [Rate of Progress] - monitoring and reporting on the rate of progress; (h) Sub-Clause 9.1 [Tests on Completion] – witness and verify the Tests on Completion, review results, and provide recommendations to the Employer's Representative regarding Taking-Over; (i) Sub-Clause 10.1 [Taking Over of the Works and Sections] – review the Contractor's application for Taking-Over and advise the Employer's Representative regarding compliance with contractual requirements;

	<p>(j) Sub-Clause 11.9 [Performance Certificate] – review the Contractor’s application for Performance Certificate and advise the Employer’s Representative regarding compliance with contractual requirements;</p> <p>(k) Sub-Clause 14.6 [Interim Payments] - reviewing, certifying, and processing applications for Interim Payment Certificates; and</p> <p>(l) Sub-Clause 14.9 [Release of Retention Money] - determining and certifying the release of Retention Money.</p> <p>The Employer's Representative reserves the right to, at any time and by written notice to the Contractor:</p> <ul style="list-style-type: none"> • delegate additional authorities or powers to the Employer’s Delegated Assistant; or • withdraw or modify any delegated authorities or powers previously granted to the Employer’s Delegated Assistant, <p>as may be necessary for the efficient administration and implementation of the Contract.</p> <p>Any action taken by the Employer’s Delegated Assistant within their delegated authority shall be deemed to have been taken by the Employer's Representative.</p>
<p>Sub-Clause 3.4 Instructions</p>	<p>Following is added at the end:</p> <p>"If the Employer's Representative or a delegated assistant:</p> <p>(a) gives an oral instruction;</p> <p>(b) receives a written confirmation of the instruction, from the Contractor, within two working days after giving the oral instruction; and</p> <p>(c) confirms the instruction within two working days after receiving the confirmation</p> <p>then the Contractor's confirmation shall constitute the written instruction of the Employer's Representative or delegated assistant (as the case may be)."</p>
<p>Sub-Clause 4.2 Performance Security</p>	<p><u>4.2.1 Contractor’s Obligations</u></p> <p>The first paragraph is substituted with the following:</p> <p>“The Contractor shall deliver the Performance Security, in the amount stated in the Contract Data, to the Employer within 14 days after the receipt of the Letter of Acceptance. The Performance Security shall be in the form of bank guarantee</p>

	<p>issued by, at the option of the Bidder, either (a) any scheduled bank in Pakistan with a branch in Gilgit or (b) a bank located outside Pakistan duly counter-guaranteed by a scheduled bank in Pakistan with a branch in Gilgit and shall be in the prescribed form.”</p> <p><u>4.2.2 Claims under the Performance Security</u></p> <p>Following paragraph is added at the end of bullet (e):</p> <p>“(f) failure by the Contractor to duly perform the Operation and Maintenance obligations as defined in the Contract and the Employer’s Requirements.”</p>
<p>Sub-Clause 4.3 Contractor’s Representative</p>	<p>The following sentence is added at the end of the Sub-Clause:</p> <p>“If any of these persons is not fluent in this language the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their delegated powers, functions and/or authority.”</p>
<p>Sub-Clause 4.4 Subcontractors</p>	<p>The following is added at the beginning of the second paragraph:</p> <p>“The Contractor shall require in all subcontracts relating to the Works that Subcontractors execute the Works in accordance with the Contract, including complying with the relevant ES requirements and the SEA/SH Prevention and Response Obligations.</p> <p>All subcontracts relating to the Works shall include a provision stipulating that the Subcontractor accepts that the Employer may disqualify the Subcontractor from being awarded a Government of Pakistan financed contract for a period of two years if the Subcontractor is determined to have failed to comply with its SEA/SH Prevention and Response Obligations.”</p> <p>The following is added at the end of the last paragraph of Sub-Clause 4.4:</p> <ul style="list-style-type: none"> i. “All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under subparagraph (a) of Sub-Clause 15.2.3 [After Termination]. ii. “All subcontracts relating to the Works shall include provisions which entitle the Employer to terminate the subcontract upon termination of the Contract Agreement”

	<p>Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Islamic Republic of Pakistan to be appointed as Subcontractors.” Provided further that the Subcontractor shall not have any claim, cause of action, suit, etc. for compensation, loss or damage against the Employer arising out of or in relation to the Contract Agreement</p> <p>Provided further that the Subcontractor shall be obligated and liable to perform and discharge all the obligations and liabilities owed by the Contractor to the Employer under the Contract Agreement to the extent of the Scope of Works or Services assigned to the Subcontractor.</p> <p>Provided further that the Subcontractor Scope of Works or Services shall not be deemed completed until and unless such Scope of Works or Services is completed to the satisfaction of the Employer under the Contract Agreement.</p>
<p>Sub-Clause 4.5 Nominated Subcontractors</p>	<p>This Sub-Clause is not applicable under this Contract.</p>
<p>Sub-Clause 4.6 Co-operation</p>	<p>On the second-last line of the first paragraph before “Contractor’s”, add “of the”.</p> <p>The following is added after the first paragraph: “The Contractor shall also, as stated in the Employer’s Requirements or as instructed by the Employer, cooperate with and allow appropriate opportunities for the Employer’s Personnel to conduct any environmental and social assessment.”</p>
<p>Sub-Clause 4.8 Health and Safety Obligations</p>	<p>The following are included after deleting “and” at the end of (f) and replacing “.” with “; and” at the end of (g):</p> <ul style="list-style-type: none"> (h) where a health service provider for the Contract is stated in the Employer’s Requirements, provide all reasonable assistance (room, accommodation, water etc.) to enable the service provider to perform its functions; (i) provide health and safety training of Contractor’s Personnel as appropriate and maintain training records; (j) actively engage the Contractor’s Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor’s Personnel, training on occupational safety

	<p>and health, and provision of personal protective equipment without expense to the Contractor's Personnel;</p> <p>(k) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health.</p> <p>(l) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;</p> <p>(m) subject to Sub-Clause 4.6, where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and</p> <p>(n) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment."</p> <p>The second and third paragraphs are replaced with the following:</p> <p>"Subject to Sub-Clause 4.1, the Contractor shall submit to the Employer for Review a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works. The procedures for Review of the health and safety manual and its updates shall be as described in Sub-Clause 5.2 (Contractor's Documents).</p> <p>The health and safety manual shall set out all the health and safety requirements under the Contract,</p> <p>(a) which shall include at a minimum:</p> <p>(i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control</p>
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	<p>measures for chemical, physical and biological substances and agents;</p> <ul style="list-style-type: none"> (ii) details of the training to be provided, records to be kept; (iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning); (iv) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, (v) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labour; (vi) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation and welfare facilities are provided by the Contractor in accordance with Sub-Clause 6.6; and <p>(b) any other requirements stated in the Employer's Requirements."</p> <p>The paragraph starting with: "In addition to the reporting requirement of..." is deleted and is further addressed in Sub-Clause 4.20 of the Special Provisions.</p>
<p>Sub-Clause 4.15 Access Route</p>	<p>The following is added at the end of Sub-Clause 4.15:</p> <p>"The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party</p>

	<p>associated with the use of, if any, Contractor's Equipment on public roads or other public infrastructure.</p> <p>The Contractor shall monitor and use road safety incidents and accidents reports to identify negative safety issues and establish and implement necessary measures to resolve them."</p>
<p>Sub-Clause 4.16 Transport of Goods</p>	<p>The following is added at the end:</p> <p>The Contractor shall duly consider the nature, volume and weight of the Goods for the safe inland transportation up to the Site. After consultation with the Employer, the Contractor shall, at its own risk and cost, use the most appropriate route for transporting the Goods without causing the impediments to the public transport and without causing any delay to the approved Programme of the Works.</p>
<p>Sub-Clause 4.18 Protection of the Environment</p>	<p>The sub-paragraph (b) is deleted, and the following paragraph is added at the end of Sub-Clause:</p> <p>"In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor's operations, the Contractor shall agree with the Employer the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its own cost to the satisfaction of the Employer."</p>
<p>Sub-Clause 4.20 Progress Reports</p>	<p>At the end of sub-paragraph (g) the word "and" is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with "," and the following new sub-paragraphs are added as:</p> <ul style="list-style-type: none"> (i) planned programme for the execution of the Works for next 56 days to enable Employer's Representative to determine its programme of inspection and testing; (j) monthly summary of daily job record indicating weather conditions, deployment of Contractor's Equipment, labour employment, local material procurement and material import, if any; and (k) salient contractual and project information.
<p>Sub-Clause 4.21 Security of the Site</p>	<p>Following is added at the end of the Sub-Clause:</p> <p>"Subject to Sub-Clause 4.1, the Contractor shall submit for the Employer's No-objection a security management plan that sets out the security arrangements for the Site.</p> <p>The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor's</p>

	<p>Personnel, Employer’s Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Employer’s Requirements.</p> <p>The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.</p> <p>In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 4.23 Archaeological and Geological Findings</p>	<p>The first paragraph is replaced with the following:</p> <p>“All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:</p> <ul style="list-style-type: none"> (a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor’s Personnel or other persons from removing or damaging any of these findings; (b) train relevant Contractor’s Personnel on appropriate actions to be taken in the event of such findings; and (c) implement any other action consistent with the requirements of the Employer’s Requirements and relevant Laws.”
<p>The following Sub-Clauses 4.24 to 4.26 are added at the end of Sub-Clause 4.23</p>	
<p>Sub-Clause 4.24 Suppliers (other than Subcontractors)</p>	<p>4.24.1 Forced Labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labour including trafficked persons as described in Sub-Clause 6.21. If forced labour/trafficking cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.2 Child labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labour as described in Sub-Clause 6.22. If child labour cases</p>

	<p>are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.3 Serious Safety Issues</p> <p>The Contractor, including its Subcontractors, shall comply with all applicable safety obligations, including as stated in Sub-Clauses 4.4, 4.8 and 6.7. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to adopt procedures, and mitigation measures adequate to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.4 Obtaining natural resource materials in relation to supplier</p> <p>The Contractor shall obtain natural resource materials from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from riverbeds or beaches.</p> <p>If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats</p>
<p>Sub-Clause 4.25 Code of Conduct</p>	<p>The following is added as Sub-Clause 4.25:</p> <p>“The Code of Conduct for Contractor’s Personnel (ES) signed by the Contractor will apply to Contractor’s Personnel (as defined in Sub-Clause 1.1.14 of the General Conditions), to ensure compliance with the Contractor’s Environmental and Social (ES) obligations under the Contract. The Contractor shall take all necessary measures to ensure that each Contractor’s Personnel is made aware of the Code of Conduct including specific behaviours that are prohibited and understands the consequences of engaging in such prohibited behaviours.</p>

	<p>These measures include providing instructions and documentation that can be understood by the Contractor’s Personnel and seeking to obtain that person’s signature acknowledging receipt of such instructions and/or documentation, as appropriate.</p> <p>The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project-affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor’s Personnel, Employer’s Personnel and the local community.</p> <p>The Contractor’s Management Strategy and Implementation Plans shall include appropriate processes for the Contractor to verify compliance with these obligations”</p>
<p>Sub-Clause 5.4 Technical Standards and Regulations</p>	<p>The following is added as a second paragraph after first paragraph:</p> <p>“If so, stated in the Employer’s Requirements, the Contractor shall:</p> <ul style="list-style-type: none"> (a) take into account climate change considerations in the design of structural elements of the Works and new buildings if any; and (b) apply the concept of universal access to the design and construction of structures and new buildings if any (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances.)
<p>Sub-Clause 6.1 Engagement of Staff and Labour</p>	<p>The following is added at the end of the Sub-Clause</p> <p>Contractor shall employ 30 % of project staff and labour from sources within Pakistan, particularly labour from the towns and villages directly affected”</p>
<p>Sub-Clause 6.5 Working Hours</p>	<p>The following is added at the end of the Sub-Clause</p> <p>“The Contractor shall provide the Contractor’s Personnel annual holiday and sick, maternity and family leave, as required by applicable Laws or as stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 6.6 Facilities for Staff and Labor</p>	<p>The following is added as the last paragraph:</p> <p>“If stated in the Employer’s Requirements, the Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the Contractor’s Personnel. The Contractor shall also provide similar facilities</p>

	<p>for the Employer’s Personnel as stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 6.7 Health and Safety of Personnel</p>	<p>In the second paragraph, replace “The Contractor” with: “Except as otherwise stated in the Employer’s Requirements, the Contractor...”</p> <p>The following paragraph is added at the end of the Sub-Clause: “In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Employer’s Representative may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Employer’s Representative may determine to be reasonably necessary for such purpose. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Employer’s Representative immediately by the quickest available means.”</p>
<p>Sub-Clause 6.8 Contractor’s Superintendence</p>	<p>Insert at the end of sub-paragraph (a) of this Sub-Clause: "Or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"</p> <p>The following text is added at the end of this Sub-Clause: “The Contractor’s authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council. The Contractor’s authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.”</p>
<p>Sub-Clause 6.9 Contractor’s Personnel</p>	<p>The following is included after deleting “or” at the end of (e) and replacing “.” with “; or” at the end of (f): “(g) undertakes behaviour which breaches the Code of Conduct for Contractor’s Personnel (ES).”</p> <p>The last paragraph is deleted and is replaced with the following: If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience. In the case of replacement of the</p>

	<p>Contractor’s Representative, Sub-Clause 4.3 [Contractor’s Representative] shall apply. In the case of replacement of Key Personnel (if any), Sub-Clause 6.12 [Key Personnel] shall apply.</p> <p>Subject to the requirements in Sub-Clause 4.3 [Contractor’s Representative] and 6.12 [Key Personnel], and notwithstanding any requirement from the Employer to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor’s Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above.”</p>
<p>Sub-Clause 6.12 Key Personnel</p>	<p>The following is inserted at the end of the last paragraph:</p> <p>“If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available at its own cost during all working hours in a number deemed sufficient by the Employer.”</p>
<p>The following Sub-Clauses 6.13 to 6.28 have been added after Sub-Clause 6.12.</p>	
<p>Sub-Clause 6.13 Foreign Personnel</p>	<p>The Contractor may bring into the Islamic Republic of Pakistan any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national or government permission required for bringing in the Contractor’s personnel.</p> <p>The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.</p>
<p>Sub-Clause 6.14 Supply of Foodstuffs</p>	<p>The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Employer’s Requirements at reasonable prices for the Contractor’s Personnel for the purposes of or in connection with the Contract</p>
<p>Sub-Clause 6.15 Supply of Water</p>	<p>The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor’s Personnel.</p>

<p>Sub-Clause 6.16 Measures against Insect and Pest Nuisance</p>	<p>The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.</p>
<p>Sub-Clause 6.17 Alcoholic Liquor or Drugs</p>	<p>The Contractor shall not, otherwise than in accordance with the Laws of the Islamic Republic of Pakistan, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.</p>
<p>Sub-Clause 6.18 Arms and Ammunition</p>	<p>The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so</p>
<p>Sub-Clause 6.19 Festivals and Religious Customs</p>	<p>The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs</p>
<p>Sub-Clause 6.20 Funeral Arrangements</p>	<p>The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.</p>
<p>Sub-Clause 6.21 Forced Labour</p>	<p>The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.</p> <p>No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harbouring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.</p>
<p>Sub-Clause 6.22 Child Labour</p>	<p>(a) The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in the Islamic Republic of Pakistan.</p>
<p>Sub-Clause 6.23 Employment Records of Workers</p>	<p>The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Employer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Contractor's Records].</p>

<p>Sub-Clause 6.24 Workers Organization</p>	<p>The Contractor shall comply with the relevant labour laws of Islamic Republic of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.</p>
<p>Sub-Clause 6.25 Non-Discrimination and Equal Opportunity</p>	<p>The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (in accordance with Sub-Clause 6.22).</p>
<p>Sub-Clause 6.26 Training of Contractor's Personnel</p>	<p>The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training referred to in Sub-Clause 4.8.</p> <p>As stated in the Employer's Requirements or as instructed by the Employer's Representative, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be trained on ES aspects of the Contract by the Employer's Personnel.</p> <p>The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.</p>
<p>Sub-Clause 6.27 Compliance by Subcontractors</p>	<p>The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.</p>
<p>Sub-Clause 6.28 Epidemics</p>	<p>In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.</p>

<p>Sub-Clause 7.3 Inspection</p>	<p>The following is added in the first paragraph after “Employer’s Personnel” “(including the consultants, referred in Sub-Clause 3.2, and third parties, such as independent experts)”</p> <p>The following is added as (b) (iv):</p> <p>“(iv) carryout environmental and social audit, and”</p>
<p>Sub-Clause 7.4 Testing by the Contractor</p>	<p>The second paragraph is modified to start as: “Except as otherwise specified in the Contract, the Contractor shall perform all the required tests of all the Equipment and Plant installed under the scope of the Works as specified in the Employer’s Requirements and/or as directed by the Employer’s Representative.”</p>
<p>Sub-Clause 7.7 Ownership of Plant and Materials</p>	<p>The following is added before the first paragraph: “Except as otherwise provided in the Contract,”</p> <p>The following is added at the end of the Sub-Clause: “No Plant and/or Materials that is the property of the Employer shall be removed from the Site. If it becomes necessary to:</p> <ul style="list-style-type: none"> (i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Employer Representative requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or (ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Employer Representative clearly identifying the item(s) of Plant and/or Materials to be replaced and giving details of the due date of delivery to the Site of the replacement item(s). <p>Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure that such an item is not moved except for its delivery to the Site.</p> <p>The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or</p>

	Materials that has become the property of the Employer under this Sub-Clause."
The following Sub-Clauses 7.9 to 7.10 are added after Sub-clause 7.8	
Sub-Clause 7.9 Use of Pakistani Materials and Services	The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.
Sub-Clause 7.10 Factory Acceptance Test	Factory acceptance tests (FATs) shall be witnessed by the Employer's Personnel (including the Employer's Representatives, referred in Sub-Clause 3.2, and third parties, such as independent experts). All cost in connection with witnessing of the factory acceptance tests by the Employer's Personnel shall be borne by the Contractor. These shall include costs of air travel from Pakistan to place of inspection / testing and back, hotel accommodation / boarding / lodging, inland transportation and USD 200 and PKR 10,000 daily allowance per day per person for inspection, testing to be conducted outside and inside Pakistan respectively for each visit of every person to witness these tests.
Sub-Clause 8.1 Commencement of Work	The Commencement Date shall be the date notified by the Employer to the Contractor in writing after: a. The Contract Agreement has been signed and has come into full force and effect in accordance with Sub-Clause 1.6 [Contract Agreement]; and b. The Employer has granted the Contractor reasonable access and possession of the Site necessary for the commencement of the Works. Such notice shall be given not later than twenty-eight (28) days after the Contract Agreement comes into full force and effect. The Employer shall give this notice at least fourteen (14) days before the Commencement Date.
Sub-Clause 8.5 Extension of Time for Completion	Society of Construction Law Delay and Disruption Protocol 2 nd Edition February 2017 governing guideline for determining the EOT and EOT related cost claims. Or PEC Guidelines for EOT
Sub-Clause 11.7 Right of access after Taking Over	In the first paragraph, the text "the date 28 days after" is deleted.
Sub-Clause 11.9 Performance Certificate	The following are included after deleting "and" at the end of (a) and replacing "." with "; and" at the end of (b):

	<p>“(c) upon successful completion of the Operation and Maintenance by the Contractor to the satisfaction of the Employer’s Representative.”</p>
<p>Sub-Clause 12.1 Procedure for Tests after Completion</p>	<p>The 2nd para of this Sub-Clause is modified as follows: The section-wise “Tests after Completion” of the Works shall be carried out upon expiry of the Operation and Maintenance (O&M) Period and prior to the issuance of the Performance Certificate, as defined in Section II (General Project Requirements) of Volume 2 of the Employer’s Requirements.</p>
<p>Sub-Clause 13.6 Adjustments for Changes in Laws</p>	<p>The following is added at the end of the Sub-Clause: “All taxes, duties and other levies payable by the Contractor/Subcontractor under the Contract, as per the Law of Islamic Republic of Pakistan, shall be dealt as per the following: a) Local Direct Taxes It is implied that the Contractor has taken all the risks into account while submitting the rates and prices and the Bid Price. The Employer shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax WHT. Turnover Tax, Super Tax etc) payable by the Contractor and the Contractor’s Personnel. Any change (increase/decrease) in the rate of Direct Taxes i.e., Income Tax/WHT. Turnover Tax. Super Tax etc shall be the liability of the Contractor and the Contract Price shall not be adjusted. b) Local Indirect Taxes If rate of indirect taxes i.e., sales taxes, custom duties, VAT levies, other charges or similar Taxes levied on the Contractor’s invoice which are to be borne by the Employer are increased or decreased, a new tax or duty is introduced, an existing tax or duty is abolished or any change in interpretation or application of any tax or duty occurs after the Base Date during the course of performance of the Contract, an equitable adjustment/ compensation of the Contract Price will be made to the Contractor by the Employer. Notwithstanding the foregoing, the Contractor shall not be entitled to an Extension of Time if the relevant delay has already been taken into account in the determination of a previous Extension of Time and such Cost shall not be separately paid if the same shall already have been taken into</p>

	<p>account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].</p>
<p>Sub-Clause 13.7 Adjustments for Changes in Cost</p>	<p>In the first paragraph, the text “the Particular Conditions” is replaced by “the Contract”.</p>
<p>Sub-Clause 14.1 The Contract Price</p>	<p>The following is added at the end of paragraph (b) the Sub-Clause:</p> <p>“Notwithstanding the provisions of subparagraph (b), the taxation shall be dealt as follows:</p> <p>Foreign Taxation</p> <p>The Contractor shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside Pakistan.</p> <p>Local Taxation</p> <p>All taxes, duties and other levies payable by the Contractor/Subcontractor under the Contract, as per the Law of Pakistan, shall be dealt as per the following:</p> <p><u>a) Local Direct Taxes</u></p> <p>It is implied that the Contractor has taken all the risks into account while submitting the Bid Price. The Employer shall not be responsible for any present or future direct taxes (Income tax/Corporate Tax WHT, Turnover Tax, Super Tax etc.) payable by the Contractor and the Contractor’s Personnel.</p> <p><u>b) Local Indirect Taxes</u></p> <p>All local indirect taxes i.e. sales taxes, custom duties, VAT levies other charges or similar taxes levied on the Contractor’s invoice prevailing at the Base Date as per the Laws of Islamic Republic of Pakistan are included in the Contract Price. The Contractor shall be responsible to provide the evidence to the Employer upto his satisfaction that all the applicable local indirect taxes has been paid by the Contractor, while submitting application for interim payment under Sub-Clause 14.3 [Application for Interim Payment].</p> <p>Nothing in the Contract shall relieve the Contractor from his liability to bear and pay any tax under this Contract as per the law of land.</p> <p>Withholding of Advance Income Tax</p>

	<p>All payments (gross) as payable to the Contractor/ Subcontractor will be subject to Withholding Tax/Advance Tax at prescribed rate at the time of payment. The deduction of advance income tax from the gross payable bills shall be made in accordance with prevalent income tax laws of the Government of Pakistan. These deductions shall be deposited in the Government Treasury by the Employer to the account of the Contractor within prescribed period.</p> <p>The Employer shall within 28 days of making any such deduction provide to the Contractor a certificate of tax deducted and deposited in the Government Treasury.</p> <p>Provincial Sales Tax on Services</p> <p>Subject to the relevant provisions of the Provincial Sales Tax Act on Services, all payments (gross) as payable to the Contractor/Sub-contractor in relation to Works/services will be subject to withholding sales tax at the prevalent rates at the time of payment.</p>
<p>Sub-Clause 14.2 Advance Payment</p>	<p><u>14.2.1 Advance Payment Guarantee</u></p> <p>The entity issuing the Advance Payment Guarantee and its form shall be asunder:</p> <p>The Advance Payment Guarantee shall be in the form of Guarantee issued by (a) a Scheduled Bank in Pakistan with branch in Gilgit or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan with branch in Gilgit.</p> <p>In case of Joint Venture, the Advance Payment Guarantee(s) shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.</p> <p><u>14.2.2 Advance Payment</u></p> <p>The period of advance payment of “14 days” is replaced by “as stated in the Contract Data”.</p>
<p>Sub-Clause 14.4 Schedule of Payments</p>	<p>The entire text of this Sub-Clause is replaced with the following; The Contract Price will be paid according to the Schedule of Payments included in the Contract.</p>
<p>Sub-Clause 14.7 Payment</p>	<p>Following is added at the end of the Sub-Clause after the words “specified in the Contract”: “Or through crossed cheque in Favor of the Contractor or JV partners. The Payment to JV partners may be made at the request of the Joint Ventures in the ratio of their shares specified by them.”</p>

<p>Sub-Clause 14.8 Delayed Payment</p>	<p>In the third line of first paragraph, the words “compounded monthly” are deleted.</p> <p>The text of second paragraph is replaced with the following: “The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data.”</p>
<p>Sub-Clause 15.1 Notice to Correct</p>	<p>“and” is deleted from (b) and “.” is replaced by: “; and” in (c).</p> <p>The following is then added as (d) “(d) specify the time within which the Contractor shall respond to the Notice to Correct.”</p> <p>In the third para, “shall immediately respond” is replaced with: “shall respond within the time specified in (d)”. Further, in the third para., “to comply with the time specified in the Notice to Correct.” is replaced with: “to comply with the time specified in (c).”</p>
<p>Sub-Clause 15.2 Termination for Contractor’s Default</p>	<p><u>15.2.1 Notice</u> Sub-paragraph (h), following is added after the words “corrupt, fraudulent, collusive or coercive practice”: “as defined in Gilgit Baltistan Public Procurement Rules, 2022”</p>
<p>Sub-Clause 15.4 Payment after Termination for Contractor’s Default</p>	<p>The following text is added at the end of this Sub-Clause: “The Employer shall be entitled to sell any of the Contractor’s Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors.”</p>
<p>The following Sub-Clauses 17.7 is added after Sub-Clause 17.6</p>	
<p>Sub-Clause 17.7 Use of Employer’s Accommodation/Facilities</p>	<p>“The Contractor shall take full responsibility for the care of the items of the Employer’s facilities and/or accommodation, if any, as detailed in the Employer’s Requirements, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer.</p> <p>If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor’s risk and cost.”</p>
<p>Sub-Clause 18.1 Exceptional Events</p>	<p>The words “or disorder” are replaced with “, disorder or sabotage” in sub-paragraph (c).</p>

<p>Sub-Clause 19.1 General Requirements</p>	<p>Following text is added at the end of first paragraph: “The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer’s consent.”</p> <p>Following text is added at the end of third paragraph: “The Contractor shall, within the respective periods stated in the Contract Data submit to the Employer Representative a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5.”</p>
<p>The following Sub-Clause 19.2.7 is added after Sub-Clause 19.2.6:</p>	
<p>Sub-Clause 19.2.7 Insurance Company</p>	<p>“The Contractor shall be obliged to place all insurances described in this Clause with any reputable/reliable insurers, acceptable to the Employer, rated by PACRA/VIS of minimum rating AA.</p>
<p>Sub-Clause 20.1 Claims</p>	<p>In sub-paragraph a), and b) the words “any additional payment” are replaced with “payment”.</p>
<p>Sub-Clause 21.6 Arbitration</p>	<p>The word “international” is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following: “The Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;”</p>
<p>The Following new Clauses 23, 24, 25 and 26 are added.</p>	
<p>Clause 23 Integrity Pact</p>	<p>If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to:</p> <ul style="list-style-type: none"> (a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder’s fee or kickback given by the Contractor or any of his Subcontractors, agent or servants; (b) terminate the Contract; and (c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agent or servants. <p>The termination under sub-paragraph (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1</p>

	<p>to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub-paragraph (a) and (c) of this Sub-Clause.</p>
<p>Clause 24 Operation and Maintenance Obligations</p>	<p><u>24.1 General Requirements</u></p> <p>The Contractor shall perform the Operation and Maintenance (“O&M”) obligations in accordance with the Employer’s Requirements (Section V), the Contract, and any revisions agreed in writing between the Parties. The Contractor shall also comply with the approved Operation and Maintenance Manuals. No material modification to O&M methods or arrangements shall be made without the prior written consent of the Employer’s Representative.</p> <p>During the O&M period, the Contractor shall ensure that the Works remain fit for their intended purpose and shall carry out all preventive, corrective, and routine maintenance necessary to achieve this. The Contractor shall deploy adequately qualified and experienced operations and maintenance personnel. The names, qualifications, and experience of such personnel shall be submitted for the Employer’s Representative’s approval prior to engagement.</p> <p><u>24.2 Commencement and Period of Operation and Maintenance</u></p> <p>(a) The O&M obligations shall commence from the date stated in the Taking-Over Certificate issued under Clause 10 [Taking Over of the Works and Sections] of the Conditions of Contract in parallel with the DNP. For this purpose:</p> <ul style="list-style-type: none"> • Each District shall be considered a Section, provided that a minimum of ten (10) buildings have been taken over in that District. <p>(b) Unless otherwise stated in the Employer’s Requirements:</p> <ul style="list-style-type: none"> • O&M period shall be Thirty-Six (36) months for each District. <p>(c) The Contractor shall carry out O&M in full compliance with the Employer’s Requirements, Sub-Clause 5.6 [As-Built Records], and Sub-Clause 5.7 [Operation and Maintenance Manuals].</p> <p>(d) Any proposed modification to approved O&M documents shall be submitted with a written justification to the Employer’s Representative and shall not be implemented until written consent is provided. Such consent shall not relieve the Contractor from any responsibility under the Contract.</p>

	<p><u>24.3 Delivery of Spare Parts</u></p> <p>The Contractor shall supply and maintain on Site (or at such location as designated by the Employer) the mandatory spare parts, consumables, and tools specified in the Employer’s Requirements and Schedule A5. The Contractor shall ensure that such items are new, fit for purpose, and compliant with the Contract.</p> <p>Mandatory spare parts shall be maintained in original condition throughout the O&M period and handed over to the Employer at its completion. These mandatory spare parts are in addition to, and shall not replace, the Contractor’s obligations to rectify defects through manufacturer warranties or replace damaged equipment through insurance claims. If any mandatory spare is utilized to meet an urgent requirement, the Contractor shall immediately replenish it with an equivalent item meeting the Contract requirements.</p> <p><u>24.4 Training</u></p> <p>The Contractor shall conduct training of the Employer’s personnel in accordance with the programme, scope, and schedule specified in the Employer’s Requirements. The Contractor shall provide suitably qualified training staff, all training materials, and practical on-site sessions to enable the Employer’s personnel to operate and maintain the Works after the expiry of the O&M period.</p>
<p>Clause 25</p> <p>Contractor’s Obligations Regarding Performance Guarantees</p>	<p><u>25.1 Performance Guarantees</u></p> <p>The Contractor shall achieve the Performance Guarantees specified in the Schedule C [Schedule of Performance Guarantees] upon completion of the Tests on Completion of the Works.</p> <p>During the O&M Period, the Contractor shall operate and maintain the Works in accordance with the Employer’s Requirements and shall ensure that the Works meet or exceed the operational performance benchmarks stated in Schedule C.</p> <p><u>25.2 Failure to Achieve Performance Guarantees</u></p> <p>Failure by the Contractor to achieve any of the Performance Guarantees, either during the Tests on Completion or during the O&M Period, shall entitle the Employer to recover Performance Damages in the amounts and manner set out in Schedule C, without the need to prove actual loss.</p> <p>The application of Performance Damages shall be without prejudice to the Employer’s other rights under the Contract,</p>

	<p>except that the Employer’s entitlement to compensation for such failure shall be limited to the amounts expressly stated in Schedule C.</p>
<p>Clause 26 Incentives for Early Completion</p>	<p>If the Contractor achieves completion of the Works prior to the Time for Completion stated in the Contract Data, the Contractor shall be entitled to an early completion bonus.</p> <p>The amount of the bonus shall be calculated at 0.085% of the EPC Price (as stated in the Schedule of Rates and Prices) for each calendar day of early completion, subject to a maximum aggregate cap of 5% (five percent) of the EPC Price.</p> <p>The following conditions shall apply to the payment of the bonus under this Clause:</p> <ul style="list-style-type: none"> (a) For the purpose of determining early completion, the Time for Completion stated in the Contract Data shall be considered fixed and shall not be adjusted due to any extension of time granted under the Contract. (b) If the Contractor fails to achieve Taking-Over of all Sections within the Time for Completion, no early completion bonus shall be payable, regardless of whether one or more Sections were completed ahead of time.

SECTION VII - CONTRACT FORMS AND SCHEDULES

1. Form of Letter of Acceptance
2. Form of Contract Agreement
3. Form of Performance Security (Bank Guarantee)
4. Form of Mobilization Advance Bank Guarantee
5. Form of Code of Conduct for Contractor's Personnel (ES) Form
6. Form of Integrity Pact
7. Schedule-A: Schedule of Rates and Prices
8. Schedule-B: Schedule of Payments
9. Schedule-C: Schedule of Performance Guarantees

Form of Letter of Acceptance

[Letterhead paper of the Employer]

Ref:

[Date]

NAME OF CONTRACT: _____

CONTRACT NUMBER: _____

To: [name and address of the Contractor]

Letter of Acceptance

This is to notify you that your Bid dated [date] for execution of the [name of the Contract and identification number, as given in the Contract Data] for the Contract Price [amount in numbers and words] [name of currency], which amount includes the Provisional Sums of [amount in numbers and words] [name of currency], as corrected and modified in accordance with the Instructions to Bidders, is hereby accepted by [Name of the Employer].

You are hereby required to furnish the Performance Security in the form and the amount in accordance with ITB 45.1 within a period of fourteen (14) days after the receipt of Letter of Acceptance.

You shall depute your authorized representative with Power of Attorney to sign the Contract Agreement in the office of the undersigned within seven (07) days from the date of furnishing of acceptable Performance Security in accordance with ITB 45.1.

Please acknowledge receipt and confirm your acceptance of this Letter of Acceptance being sent in duplicate, by affixing your signature and stamp at the space provided below and return one copy thereof as soon as possible but not later than three (3) days from the date of receipt of this Letter of Acceptance.

We acknowledge that this Letter of Acceptance creates a binding Contract between us, and we undertake to fulfil all our obligations and duties in accordance with the terms of this Contract.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of the Employer: _____

Received and Accepted:

For and on behalf of

(the Contractor)

Signature: _____

Name: _____

Designation: _____

Stamp: _____

Date: _____

Form of Contract Agreement

THIS CONTRACT AGREEMENT (herein after called the “Agreement”) is made the _____ day of _____, _____, between _____ of _____ (hereinafter “the Employer”), of the one part, and _____ of _____ (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works, viz., _____ should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of such Works on EPC/Turnkey basis, remedying of any defects therein and performing the operation and maintenance works and services, for the total Contract Price of _____ [currency and amounts in figures] _____ [currency and amounts in words], comprising the following components:

- a. the EPC Price of _____ [currency and amounts in figures] _____ [currency and amounts in words];
- b. the O&M Price of _____ [currency and amounts in figures] _____ [currency and amounts in words];
- c. the Provisional Sums of _____ [currency and amounts in figures] _____ [currency and amounts in words].

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:
 - (a) the Contract Agreement;
 - (b) the Letter of Acceptance;
 - (c) the Letters of Technical and Financial Bids;
 - (d) the Particular Conditions Part A - Contract Data;
 - (e) the Particular Conditions Part B - Special Provisions;
 - (f) the General Conditions (GC)
 - (g) the Employer’s Requirements;
 - (h) the Schedule of Rates and Prices;
 - (i) the completed Schedules other than the Schedule of Rates and Prices;
 - (j) the Bid;
 - (k) the JV Agreement (if the Contractor is a JV);
 - (l) Code of Conduct for Contractor’s Personnel;
 - (m) any other document forming part of the Contract.

The addenda/corrigenda, if any, (excluding part relating to Instructions to Bidders along with Bid Data Sheet) shall be deemed to have been incorporated at the appropriate places in the “Documents forming the Contract”.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and to remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the Parties hereto have caused this Agreement to be on the day, month and year first before written in accordance with their respective laws.

Signature of Contactor

Signature of Employer

(Seal)

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness

Witness

(Name, Title and Address)

(Name, Title and Address)

**Form of Performance Security
(Bank Guarantee)**

Guarantee No. _____

Executed on _____

Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor with address: _____

Name of Contractor with address: _____

Guaranteed Amount (express in words and figures) _____

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Request for Bid including Contract Agreement, GCC, PCC and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Contractor we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the Guaranteed Amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Contractor has accepted the Employer's above said Letter of Acceptance for _____ (Name of Contract) for the _____ (Name of Project).

NOW THEREFORE, if the Contractor shall well and truly perform and fulfil all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfil all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 11, Defects After Taking Over, of Conditions of Contract and Clause 24, Operation and Maintenance Obligations are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____ (the Guarantor), waiving all objections and defense under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Contractor has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall decide whether the Contractor has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above

upon first written demand from the Employer forthwith and without any reference to the Contractor or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Guarantor

(Scheduled Bank in Pakistan / Gilgit)

WITNESS:

1. _____

Corporate Secretary (Seal)

Signature _____
Name _____
Title _____
Corporate Guarantor (Seal)

2. _____

Name, Title & Address

Form of Mobilization Advance Bank Guarantee

Guarantee No. _____ Date _____

WHEREAS _____ (hereinafter called the 'Employer')

has entered into a Contract for _____

(Particulars of Contract)

with _____ (hereinafter called the "Contractor").

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of _____ (_____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____ (hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above-mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____ whichever is earlier.

(Date)

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of _____ (_____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above-mentioned date, the advance payment is not fully adjusted.

Guarantor
(Scheduled Bank)

WITNESS:

Signature _____

1. _____

Name _____

Corporate Secretary (Seal)

Title _____

2. _____

Corporate Guarantor (Seal)

Name, Title & Address

Form of Code of Conduct for Contractor's Personnel (ES) Form

[Note to the Bidder: The minimum content of the Code of Conduct form as set out by the Employer shall not be substantially modified. However, the Bidder may add requirements as appropriate, including to take into account Contract-specific issues/risks.]

Code of Conduct for Contractor's Personnel

We are the Contractor, [enter name of Contractor]. We have signed a contract with Water and Power Department, Gilgit Baltistan, Pakistan for _____ [enter description of the Works]. These Works will be carried out at _____ [enter the Site and other locations where the Works will be carried out]. Our contract requires us to implement measures to address environmental and social risks related to the Works.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, labourers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "**Contractor's Personnel**" and are subject to this Code of Conduct.

This Code of Conduct identifies the behaviour that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behaviour will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

Required Conduct

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
 - a. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
 - b. wearing required personal protective equipment;
 - c. using appropriate measures relating to chemical, physical and biological substances and agents; and
 - d. following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;

6. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract
7. report violations of this Code of Conduct; and
8. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

Raising Concerns

If any person observes behaviour that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [enter name of the Contractor's Social Expert with relevant experience] in writing at this address [_____] or by telephone at [_____] or in person at [_____]; or
2. Call [_____] to reach the Contractor's hotline (if any) and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behaviour prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

Consequences of Violating the Code of Conduct

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor's contact person(s) with relevant experience] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

Form of Integrity Pact

[To be filled and signed by the Bidder]

Contract No. _____

Dated _____

Contract Value: _____

Contract Title: _____

_____ (Name of Bidder) 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 Bidder) 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 Bidder) 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 Bidder) 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 Bidder] 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 times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Bidder] 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 Employer:

Name of Bidder:

Signature:

Signature:

[Seal]

[Seal]

Schedule-B

Schedule of Payments

1. This Schedule of Payment shall be read in conjunction with the Schedule of Prices, the Conditions of Contract, and the Employer's Requirements.
2. Separate Schedules of Payment shall apply to the following phases of the Contract:

a) EPC Works – Rooftop Solar (per District)

Payments shall be made as percentages of the EPC Price of each District (RS-01, RS-02 ... RS-04), as defined in the Schedule A1 and Schedule B1. Percentages shall be applied to the lump-sum EPC Price of each District, irrespective of the number of individual buildings in that District. While Taking-Over Certificates may be issued progressively in accordance with Sub-Clause 10.1 [Taking Over of the Works and Sections] of the Particular Conditions, payments shall remain linked to the achievement of District-wise milestones as set out in this Schedule.

b) Operation and Maintenance (O&M) – Rooftop Solar (per District):

Payments shall be made in respect of the O&M Price quoted for each District, as set out in the Schedule A2 and Schedule B2.

3. The milestone percentages in this Schedule shall aggregate to one hundred percent (100%) of the respective EPC or O&M Price for each Section of Rooftop District, exclusive of the Advance Payment, which shall be recovered in accordance with Sub-Clause 14.2 [Advance Payment]. All milestone payments shall be subject to deductions for Advance Recovery and Retention.
4. An Advance Payment equivalent to twenty percent (20%) of the EPC Price shall be made. It shall be released against submission of an Advance Payment Guarantee in accordance with Sub-Clause 14.2 and shall be recovered from milestone payments as provided therein.
5. Retention Money shall be deducted at the rate as specified in Sub-Clause 14.3, from each gross milestone payment. Retention shall be released in the manner as specified in Sub-Clause 14.9 of the Particular Conditions of the Contract.
6. Payments under each milestone shall only become due following certification by the Employer's Representative confirming that the corresponding milestone has been achieved and shall be subject to the fulfilment of all stated prerequisites and conditions.

B1: EPC Works - Roof Top Solar (per District)

Milestone No.	Milestone Description	Payment (% of EPC Price for that District)	Pre-requisites / Conditions
1	Completion of Site Surveys and Approval of Design (cumulative for district)	10%	Reports and design package approved by Employer's Representative.
2	Delivery of PV, Inverter and BESS Equipment ($\geq 70\%$ of cumulative district capacity delivered at site or Employer's designated store after FAT)	50%	Equipment inspected, delivery certificates countersigned by the Employer's Representative.
3	Completion of Mechanical/Electrical Installation ($\geq 70\%$ cumulative PV capacity installed across district buildings)	10%	Site inspection and certification.
4	TOCs issued for at least 50% of the total PV System Rating for the District.	15%	For each building included: all tests passed, associated civil/structural works finished, Employer's Representative issues TOC.
5	TOCs issued for 100% of the buildings in the District.	15%	For each building included: all tests passed, associated civil/structural works finished, Employer's Representative issues TOC.
	Total excluding Advance Payment	100%	

B2: Operation and Maintenance – Rooftop Solar (per District)

- The O&M Price for each District shall be paid in **Six equal bi-annual instalments** over the 36-month O&M period.
- The first instalment shall become due upon completion of six months of O&M of at least 50% of the buildings in the district, reckoned from the date of issuance of the last Taking-Over Certificate in that District.
- The second instalment shall become due upon completion of twelve months of O&M of 50% buildings in the district and so on. (two invoices for 50% and two invoice for next 50% means four invoices per years and twelve invoices for 03 years till completion of O&M.)
- Each instalment shall be subject to certification by the Employer's Representative confirming satisfactory O&M performance for the relevant period.

Schedule-C

Schedule of Performance Guarantees

1. General

- 1.1 This Schedule shall be read in conjunction with the Conditions of Contract, the Employer's Requirements, and the Schedules of Prices and Payments.
- 1.2 The Contractor guarantees that the Works shall achieve the performance levels defined herein.
- 1.3 Failure to achieve the guaranteed performance levels shall subject the Contractor to the Performance Damages in accordance with this Schedule, without prejudice to the Employer's other rights under the Contract.
- 1.4 The aggregate liability for the Performance Damages under this Schedule shall not exceed ten percent (10%) of the Contract Price, unless otherwise stated in the Particular Conditions.

2. EPC Works – Rooftop Solar

2.1 Guaranteed Performance Parameters:

- (a) For PV systems the Contractor guarantees that the **Actual PV Output (kW)** shall not be less than the **Ideal PV Output (kW)**.
- (b) The installed nameplate capacity shall match the approved capacity.
- (c) The outputs shall be assessed as follows:

$$\text{Actual PV Output} = \sum_{k=1}^n \text{Measured Voltage of string } k \times \text{Measured Current of string } k$$

$$\text{Ideal PV Output} = \sum_{k=1}^n \text{Adjusted Voltage of string } k \times \text{Adjusted Current of string } k$$

Where n = total nos. of strings on a site

2.2 Performance Damages for EPC Works of Rooftop Solar:

If the Actual PV Output is more than **10% lower** than the Ideal PV Output, the Contractor shall provide additional installed capacity equal to:

$$\text{Additional Capacity} = \frac{(\text{Ideal PV Output} - \text{Actual PV Output})}{\text{Ideal PV Output}} \times 2$$

The Contractor shall install the shortfall capacity at the same building. If sufficient space is not available, the shortfall shall be installed at another rooftop within the same district, at the Contractor's cost.

The Contractor shall rectify the shortfall within **30 days**. If rectification is not achieved within this period, then the Contractor shall pay Performance Damages (PD) equal to:

$$\text{PD} = \frac{(\text{Ideal PV Output} - \text{Actual PV Output})}{\text{Ideal PV Output}} \times \frac{(\text{EPC Price of Rooftop Solar in the relevant District}) \times (\text{kWp rating of Building})}{\text{Total kWp in that District}} \times 1.5$$

3. O&M Works and Services – Rooftop Solar

3.1 Guaranteed Performance Parameters:

For rooftop solar systems the Contractor guarantees that installed systems shall maintain performance levels consistent with the approved EPC benchmarks and that no installed capacity shall be out of service for more than the permissible downtime defined in the Employer's Requirements Section V.

3.2 Performance Damages for O&M Works and Services of Rooftop Solar:

During the contractual year of the O&M phase, the onsite Measured Annual Outage (MAO) shall be

$$\text{MAO (kWh)} = \sum_{k=1}^n \text{Duration of Outage of String } k \text{ in no. of days} \times 3.5 \times \text{STC Rating of Outaged String } k$$

Where n = total nos. of outaged strings on a site

Whereas Measured Annual Outage Permissible Limit (MAOPL) shall be

$$\text{MAOPL (kWh)} = 3.5 \times 18.25 \times \text{STC Rating of Installed PV Modules}$$

In case of measured annual outage > measured annual outaged permissible limit, the Contractor shall pay Performance Damages (PD) equal to:

$$\text{PD} = (\text{MAO} - \text{MAOPL}) \times \text{Rs. } 50/\text{kWh}$$



WATER AND POWER DEPARTMENT, GILGIT
BALTISTAN



5.70 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT – II)

**BIDDING DOCUMENTS
ON EPC/TURNKEY BASIS
(SINGLE STAGE TWO ENVELOPE)**

**VOLUME – II
EMPLOYER'S REQUIREMENTS**



November 2025



National Engineering Services Pakistan (Pvt.) Ltd. (NESPAC)

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Tel: +92-42-99090000, Web: www.nespak.com.pk E-mail: power@nespak.com.pk

5.70 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN LOT – II

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LIST OF ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current
ACB	Air Circuit Breaker
AFCI	Arc-Fault Circuit Interrupter
AMI	Advanced Metering Infrastructure
ASTM	American Society for Testing and Materials
BOQ	Bill of Quantities
BESS	Battery Energy Storage System
BMS	Battery Management System
BS	British Standard
DC	Direct Current
DHO	District Health Officer
DMS	Document Management System
DNP	Defects Notification Period
DoD	Depth of Discharge
ECC / CPC	Earth Continuity Conductor / Circuit Protective Conductor
EES	Electrical Energy Storage
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement & Construction
ER	Employer's Requirements
FAT	Factory Acceptance Test(s)
GB	Gilgit-Baltistan
GFDI	Ground-Fault Detection Interruption
GI	Galvanized Iron
HMI	Human-Machine Interface
HRC	High Rupturing Capacity
HSE	Health, Safety & Environment
I&T	Inspection & Testing
IBC	International Building Code
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEE	Initial Environmental Examination
IP	Ingress Protection
ITP	Inspection & Test Plan
KPI	Key Performance Indicator
LAA	Land Acquisition Act
LFP / LPF	Lithium Iron Phosphate
LID	Light-Induced Degradation
LV	Low Voltage
MCCB	Moulded Case Circuit Breaker
MCB	Miniature Circuit Breaker
MPPT	Maximum Power Point Tracking
MPR	Monthly Progress Report
MV	Medium Voltage
NADRA	National Database & Registration Authority
NEC	National Electrical Code

NEQS	National Environmental Quality Standards
O&M	Operation & Maintenance
OHS	Occupational Health & Safety
OEM	Original Equipment Manufacturer
PCAP	Pakistan Clean Air Program
PEPCO	Pakistan Electric Power Company
PID	Potential-Induced Degradation
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PR	Performance Ratio
PT (VT)	Potential (Voltage) Transformer
PV	Photovoltaic
RCC	Reinforced Cement Concrete
RF	Radio Frequency
RMS	Remote Monitoring System
SCADA	Supervisory Control and Data Acquisition
SIL	Safety Integrity Level
SOC	State of Charge
SOH	State of Health
SPD	Surge Protective Device
STC	Standard Test Conditions
TCP/IP	Transmission Control Protocol / Internet Protocol
TOPCon	Tunnel Oxide Passivated Contact
UL	Underwriters Laboratories
UV	Ultraviolet
VCB	Vacuum Circuit Breaker
XLPE	Cross-Linked Polyethylene
XLPO	Cross-Linked Polyolefin
CGI	Corrugated Galvanized Iron
HDPE	High-Density Polyethylene
PVC / UPVC	(Unplasticized) Polyvinyl Chloride
SWG	Standard Wire Gauge
DHQ	District Headquarters Hospital
FG/GPS/BHS/GHS/GMS/BPS	Federal/Government Primary/High/Model/ Boys'/Girls' Schools
KIU	Karakoram International University
LG&RD	Local Government & Rural Development
MI	Military Intelligence
NAB	National Accountability Bureau
PHE	Public Health Engineering
SE	Superintending Engineer
SP	Superintendent of Police
XEN	Executive Engineer

SECTION – I: SCOPE OF WORKS

1. INTRODUCTION

The Government of Gilgit-Baltistan (GB) is implementing a renewable energy initiative involving the installation of Rooftop Solarization with a cumulative capacity of 5.70 MWp across four districts: Skardu, Ghanche, Shigar and Kharmang.

The Project comprises:

- Rooftop Solar PV Systems on selected public-sector buildings across all four districts.

The Project also includes associated Battery Energy Storage Systems (BESS) and all related civil, electrical, and mechanical works required for a complete, operational, and grid-integrated system.

The Contractor shall deliver the Works on an EPC / Turnkey basis, including three (03) year Defects Notification Period (DNP) as well as carry out the post-commissioning Operation & Maintenance (O&M).

These Employer’s Requirements (ER) form an integral part of the Contract and shall be read in conjunction with the Conditions of Contract (CoC), the Schedule of Prices, and all other documents forming the Contract.

The purpose of these Employer’s Requirements is to define the scope, standards, and performance expectations of the Works, while allowing the Contractor flexibility in detailed design and execution, provided that the Contractor complies with the requirements set out herein.

The Contractor shall be fully responsible for the engineering, procurement, manufacturing, supply, construction, installation, testing, and commissioning of all equipment and systems to deliver a fully operational facility that meets the performance requirements of the Employer.

The Employer’s Requirements are organized in the following parts:

Section I – Introduction and Scope of Works

Section II – General Project Requirements

Section III – DC Systems

Section IV – AC Systems

Section V – Civil & Structure Works

Section VI – Operation and Maintenance Requirements

Annexure I – Drawings

This Section I provides overall description of the Project and also stipulate general and specific scope of the Works.

2. GENERAL SCOPE OF WORKS

The Contractor shall be responsible for the design, engineering, procurement, construction, installation, testing, commissioning, training, and handover of the complete Works. The scope shall include, but not be limited to, the following:

2.1 Site Preparation and Development

- Clearing, grading, compaction, slope stability, and drainage of project areas.
- Site leveling and stabilization to suit foundations and structures.

- Temporary construction facilities, storage yards, utilities, and construction power/water arrangements.

2.2 Civil Works

- Foundations for PV modules, inverters, and BESS units (where ever Required).
- Civil structures designed by local codes and international standards (ASTM, ACI, ISO), suitable for seismic, wind, and snow load conditions.

2.3 Solar PV and Mechanical Works

- Design, supply, and installation of PV modules, mounting structures, and auxiliaries.
- Rooftop mounting systems including ballast or non-penetrative types.
- Earthing and lightning protection.

2.4 Electrical Works

- AC systems: inverters, switchgear and protection.
- DC cabling, AC cabling, protection devices, synchronization, and control equipment.
- Modifications in existing LV systems for integration with solar plants where required.
- Rewiring for Fans, Lights and other serviceable loads as listed under Table-01.

2.5 Battery Energy Storage Systems (BESS)

- Supply, installation, testing, and commissioning of BESS integrated with PV and grid.
- BESS charge/discharge control and protection.

2.6 Centralized and De-Centralized Monitoring

- Remote monitoring system for PV and BESS.
- Centralized monitoring system at location designated by the Employer.

2.7 Testing, Commissioning, and Handover

- Factory Acceptance Tests
- Material Delivery Verification
- Submission of commissioning reports for Employer’s review under Sub-Clause 5.2 of CoC.
- Delivery of as-built drawings, O&M manuals, test certificates, spare parts, and warranties.

2.8 Operation & Maintenance (O&M)

- Three (03) years of O&M services post-commissioning, including preventive and corrective maintenance, system monitoring, and reporting for Rooftop Solar.
- Training of Employer’s personnel: detailed technical training before completion of O&M, covering PV operations, troubleshooting, preventive maintenance, and reporting.
- Provision of all O&M tools, consumables, and software necessary for smooth operation.

2.9 Compliance and Standards

- All works and equipment shall comply with IEC, IEEE, ISO, NEC, ASTM, and Pakistan Grid Code requirements.

- Implementation Health, and Safety Management Plan during construction and commissioning.
- Health, and safety protection including fire systems.

2.10 Permits and Approvals

- The Contractor shall obtain all necessary approvals, inspections, and permits from authorities, in coordination with the Employer.

3. SPECIFIC SCOPE OF WORKS

The following briefly provides an overview of specific Works involved in the Project. This Scope of Works shall be read together with the Technical Specifications, Drawings, and Schedule of Prices. In case of conflict or omission, the more stringent or technically superior requirement shall apply. No part of the Works shall be excluded on the grounds that it is not expressly mentioned in this Scope if it is included in the Technical Specifications and Drawings or is necessary for safe and reliable operation of the Project.

3.1 Rooftop Solar PV

The details of rooftop installations are provided in **Table 1 – Rooftop Solar PV Installations**, including building names, PV and BESS capacities, and specific requirements, if any.

The Contractor shall be responsible for the design, supply, installation, and commissioning of hybrid rooftop solar PV systems with dedicated Hybrid Inverter and battery backup on selected government and public sector buildings, including but not limited to hospitals, schools, and administrative facilities as defined in technical specifications.

The works shall include structural surveys, supply and installation of PV modules, battery storage, charge controllers, inverters, mounting frames, cabling, protection devices, and energy management systems, all in compliance with IEC and IEE standards. In case Genset is available at Site, the system shall synchronize with the same.

Systems shall be designed for safe, reliable, and autonomous operation, with appropriate protection against overcharge, deep discharge, and islanding, supported by centralized and remote monitoring capabilities. The Contractor shall provide complete as-built documentation, user manuals, training for building staff, and post-commissioning services including defect liability and preventive maintenance to ensure sustainable long-term operation.

Table 1 – Rooftop Solar

RS-01: District Skardu 78 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.295921N, 75.569609E	Skardu	Baltistan Hydroelectric Workshop	22	29	14	Parking Shed	5	200	10'	0	-
2	35.336240N, 75.558686E	Skardu	Boys High School Ranga	6	8	5	Roof Mounted CGI Sheet	0	221	4"	1	3.21
3	35.285872N, 75.645236E	Skardu	DD Livestock and Dairy Development	11	15	7	Roof Mounted	10	199	6"	1	4.79
4	35.462948N, 75.434584E	Skardu	Excise Sordas	10	14	7	Roof Mounted	10	224	6"	1	4.86
5	35.300653N, 75.557857E	Skardu	Govt Boys High School	16	21	10	Roof Mounted CGI Sheet	0	213	4"	1	6.50
6	35.308488N, 75.611287E	Skardu	Govt Girls Middle School Eidgah	10	13	6	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	220	6" & 4"	1	3.93
7	35°17'52.6"N 75°36'26.7"E	Skardu	Regional Vaccine	16	22	5	Parking Shed	5	180	10'	0	-
8	35°18'25.2"N 75°37'07.2"E	Skardu	SDPO Office	25	33	10	Roof Mounted	10	225	6"	1	6.61

¹ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
9	35°17'10.6"N 75°39'45.1"E	Skardu	Shafqat Public School and College Jail Ghat	18	24	12	Roof Mounted	10	184	6"	1	7.50
10	35°17'54.6"N 75°38'14.8"E	Skardu	Vetnery Hospital Shaheen Polo	8	10	5	Roof Mounted	10	192	6"	1	3.36
11	35°18'25.2"N 75°37'07.2"E	Skardu	Women Police Station	10	13	6	Parking Shed	5	225	10'	1	4.00
12	35°18'51.8"N 75°32'15.0"E	Skardu	Inter Boys Degree College	30	39	15	Roof Mounted	10	238	6"	1	9.57
13	35°16'40.4"N 75°37'45.0"E	Skardu	Boys Haji Gam School	10	13	6	Roof Mounted CGI Sheet	0	250	4"	1	3.93
14	35°17'24.7"N 75°39'29.7"E	Skardu	RHQ	91	119	91	Roof Elevated	5	214	6'	0	-
15	35°20'56.7"N 75°30'47.4"E	Skardu	Cadet College	10	13	5	Roof Mounted CGI Sheet	0	132	4"	1	3.29
16	35°19'43.3"N 75°31'45.6"E	Skardu	Civil Aviation Airport	504	656	279	Ground Mounted	15	154	6" & 6"	0	-
17	35°17'25.8"N 75°39'25.8"E	Skardu	DD Office Education	33	44	9	Roof Mounted	10	217	6"	0	-
18	35°17'43.8"N 75°38'18.7"E	Skardu	Degree College for Women (Admin Block)	16	21	10	Roof Mounted	10	190	6"	1	6.79
19	35°17'25.2"N 75°39'25.5"E	Skardu	Education Department Works Division	6	8	2	Roof Mounted	10	218	6"	1	1.09
20	35°17'00.2"N 75°37'37.2"E	Skardu	Boys Middle School Shinghanigond	10	13	6	Parking Shed	5	178	10'	1	4.03
21	35°17'01.1"N 75°38'25.3"E	Skardu	Model KG School Satellite Town	15	20	10	Roof Mounted	0	209	4"	1	6.43

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
22	35°19'20.3"N 75°31'57.9"E	Skardu	Police Station	23	30	13	Parking Shed	5	152	10'	1	9.04
23	35°18'47.8"N 75°32'09.9"E	Skardu	Special educational complex	30	39	17	Parking Shed	5	150	10'	1	10.36
24	35°17'49.7"N 75°36'35.1"E	Skardu	Additional Session Judge Court	14	19	5	Roof Mounted	10	187	6"	1	3.07
25	35°18'01.0"N 75°36'28.0"E	Skardu	Chief Court	53	69	25	Roof Mounted & Roof Elevated	10 & 5	199	6" & 6'	1	16.43
26	35°17'44.8"N 75°37'02.2"E	Skardu	Boys Primary School New Ranga	4	6	2	Roof Mounted CGI Sheet	0	88	4"	1	1.18
27	35.298016, 75.605762	Skardu	Govt. Girls Primary School Astana	10	13	6	Roof Mounted	10	190	6"	1	4.07
28	35.286695,75.617378	Skardu	Govt. Girls Primary School Khusmara	7	10	6	Roof Mounted	10	131	6"	1	3.93
29	35.295784,75.617370	Skardu	Govt. Girls Primary School New Ranga	4	6	3	Roof Mounted	10	166	6"	1	1.86
30	35.296849,75.588288	Skardu	Madina Community Center	18	23	12	Roof Mounted CGI Sheet	0	180	4"	0	-
31	35.294787,75.593288	Skardu	NATCO Public Waiting Room Bus Stand	23	30	22	Roof Mounted	10	187	6"	0	-
32	35.297158,75.609627	Skardu	Senior Civil Judge Court and Civil Judge Court	32	41	8	Roof Mounted	10	187	6"	1	5.07

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
33	35.297400,75.609904	Skardu	Session Court	36	47	10	Parking Shed	5	185	10'	1	6.25
34	35.297542,75.636730	Skardu	City Police Station Skardu	23	30	6	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	212	6" & 4"	1	4.00
35	35.303314,75.624369	Skardu	Govt Degree College (Boys Hostel)	50	65	45	Roof Mounted	10	204	6"	0	-
36	35.295006,75.607169	Skardu	Govt Primary School for Boys Astana	5	7	4	Roof Mounted CGI Sheet	0	182	4"	1	2.61
37	35.279713, 75.640410	Skardu	Assistant Director (DMA)	9	12	6	Roof Mounted	10	210	6"	1	4.11
38	35.302386, 75.611833	Skardu	AD Tourism Office Maqponsar Skardu	26	34	9	Parking Shed	5	188	10'	1	5.18
39	35.323958, 75.653985	Skardu	Baltistan University	379	494	100	Roof Elevated	5	180	6'	1	53.61
40	35.278639, 75.628797	Skardu	Civil Dispensary Hasan Colony	10	14	10	Roof Mounted CGI Sheet	0	0	4"	0	-
41	35.284904, 75.645073	Skardu	Conservative Forest Office	10	14	3	Roof Mounted	10	212	6"	1	1.79
42	35.294522,75.650212	Skardu	ADC Office Skardu	26	35	8	Roof Elevated	5	202	6'	0	-
43	35.2944417,75.650052	Skardu	DC & AC Office Skardu	49	64	12	Roof Mounted & Roof Elevated &	10 & 5 & 5	202	6" & 6' & 10'	1	7.61

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							Parking Shed					
44	35.292563,75.653827	Skardu	DD Agriculture Skardu	20	27	8	Parking Shed	5	205	10'	1	4.21
45	35.293228,75.634959	Skardu	DD Fisheries Office Skardu	5	7	3	Roof Mounted	10	157	6"	1	1.46
46	35.284904,75.645073	Skardu	DFO Forest	10	14	3	Roof Mounted	10	212	6"	0	-
47	35.269616,75.636679	Skardu	DFO wildlife	20	26	5	Parking Shed	5	176	10'	0	-
48	35.298462,75.638321	Skardu	DHO Office	55	72	17	Roof Elevated	5	169	6'	0	-
49	35.298418,75.638189	Skardu	District Vaccine Store Skardu	13	18	13	Roof Elevated	5	169	6'	0	-
50	35.290095,75.660108	Skardu	Dialysis Center RHQ Skardu	204	266	200	Roof Mounted	10	190	6"	0	-
51	35.294035,75.651726	Skardu	DIG Office Skardu	40	52	10	Roof Mounted	10	203	6"	1	6.71
52	35.2931487, 75.6535921	Skardu	Director agriculture skardu	28	37	11	Parking Shed	5	199	10'	1	6.93
53	35.295435,75.632683	Skardu	Govt. Girls Primary School Suka Maidan Skardu	14	19	9	Roof Mounted	10	184	6"	1	5.86
54	35.292941,75.649999	Skardu	Nadra Office Skardu	30	40	10	Roof Mounted	10	203	6"	0	-
55	35.2905615, 75.659634	Skardu	Pathology Lab RHQ	31	41	10	Roof Mounted	10	190	6"	0	-
56	35.297643, 75.730582	Skardu	Police Station Hussain Abad	24	32	6	Roof Mounted	10	180	6"	1	3.96

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
57	35.272717, 75.637372	Skardu	Public School Skardu (Admin - AQ Khan Block)	35	46	22	Roof Mounted	10	182	6"	0	-
58	35.274306, 75.639639	Skardu	Public School Skardu (Arfa Karim Block)	8	11	5	Roof Mounted	10	182	6"	1	1.79
59	35.274194, 75.638861	Skardu	Public School Skardu (Artisum-SAIL)	16	21	10	Roof Mounted	10	182	6"	0	-
60	35.273333, 75.639667	Skardu	Public School Skardu (Fatima Jinnah Block)	25	33	25	Roof Mounted	10	182	6"	0	-
61	35.2733758, 75.6377388	Skardu	Public School Skardu (Sheikh Ghulam Muhammad Block)	32	42	20	Roof Mounted	10	182	6"	0	-
62	35.289854, 75.658038	Skardu	Radiology Department RHQ	180	235	180	Roof Elevated	5	221	6'	0	-
63	35.302396, 75.613505	Skardu	Rescue Office Skardu	118	154	110	Roof Elevated	5	196	6'	0	-
64	35.361872, 75.595364	Skardu	Girls High School Khuwardo (Skardu)	8	11	5	Ground Mounted	15	169	6"	1	3.32
65	35.294468, 75.651349	Skardu	Police Control Room, DSP HQ Skardu	34	45	9	Parking Shed	5	206	10'	1	6.21
66	35.294468, 75.651349	Skardu	SSP Office Skardu	58	76	15	Parking Shed	5	206	10'	1	10.11
67	35.290065, 75.659030	Skardu	Surgical Unit RHQ Skardu	179	233	178	Roof Elevated	5	282	6'	0	-
68	35.29467995, 75.650599	Skardu	Treasury Office Skardu	41	54	10	Roof Elevated	5	204.3	6'	1	6.63
69	35.3025349, 75.612393	Skardu	Veterinary Dispensary	8	10	7	Roof Mounted	10	180	6"	0	-

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
			Maqpoon Sar Skardu									
70	35.281565,75.640940	Skardu	XEN C&W (PHE & BR) Office Skardu	32	42	8	Roof Elevated & Parking Shed	5 & 5	210	6' & 10'	1	5.00
71	35.266695, 75.637834	Skardu	Satpara Dam Complex (administration Block - Satpara Office)	64	84	17	Roof Mounted	10	174	6"	1	11.71
72	35.267056, 75.638306	Skardu	Satpara Dam Complex (administration Block - HARPO Hydropower)	64	84	20	Roof Mounted CGI Sheet	0	262 & 82	4"	1	13.64
73	35.5974171,75.2246853	Skardu	30 Bed Hospital Dhumodas Rohndu (Civil Hospital)	58	76	28	Roof Mounted CGI Sheet	0	206	4"	1	16.43
74	35.601180, 75.214395	Skardu	AC Office Rohndu	5	7	2	Roof Mounted CGI Sheet	0	156 & 333	4"	1	0.23
75	35.604322, 75.212500	Skardu	Model School Thowar Rohndu	5	7	3	Roof Mounted	10	146	6"	0	-
76	35.593964, 75.231218	Skardu	Billing Office Building	6	8	4	Roof Mounted	10	188	6"	1	2.17
77	35.306498N, 75.571450E	Skardu	250 Bed Hospital	704	916	704	Roof Elevated	5	233	6'	0	-
78	1-35.266797, 75.637753	Skardu	Satpara Dam Complex	264	357	300	Roof Elevated	5	174	6'	0	-

RS-02: District Ghanche 42 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.170456,76.319575	Ghanche	DD Wildlife Office	4	6	1	Roof Mounted CGI Sheet	0	182	4"	1	0.57
2	35.169763,76.332505	Ghanche	Chief Office District Council Khaplu	12	17	4	Roof Mounted	10	201	6"	1	2.68
3	35.232385,75.940717	Ghanche	10 Bed Hospital Keris	32	44	30	Roof Mounted & Ground Mounted & Roof Mounted CGI Sheet	10 & 15 & 0	180 & 199	6" & 6"	0	-
4	35.170659,76.319949	Ghanche	DD Agriculture Complex	1	2	1	Ground Mounted	15	180	6"	1	0.64
5	35.157598,76.340601	Ghanche	DD Animal Hubandry	10	14	4	Roof Mounted	10	156 & 153	6"	1	2.50
6	35.149010,76.324597	Ghanche	FAP Gharbuchung Khaplu	4	6	4	Roof Mounted CGI Sheet	0	198	4"	1	2.79
7	35.161006,76.337603	Ghanche	DD Agriculture Residence/Office Khaplu	10	14	6	Roof Mounted CGI Sheet	0	138	4"	1	4.07
8	35.167756,76.329273	Ghanche	FAP & MCH Khaplo Paiz	9	13	5	Roof Mounted	0	180	4"	1	3.32

² PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
9	35.163689,76.336767	Ghanche	Officer Hostel Edu Department Khaplu	9	12	3	Roof Mounted CGI Sheet	0	192	4"	1	1.89
10	35.167757,76.348406	Ghanche	SDO Chorbhat/Water & Power Office Divisional	17	23	4	Roof Elevated	5	180	6'	1	3.14
11	35.163797,76.336776	Ghanche	MI Divisional Office Khaplu	8	11	3	Roof Mounted CGI Sheet	0	189	4"	1	2.04
12	35.162173,76.336675	Ghanche	Khaplu Public School & College	22	30	7	Roof Mounted CGI Sheet	0	214	4"	1	4.29
13	34.932697,76.626416	Ghanche	30 Beds Hospital Siksa Ghanche	29	40	25	Roof Elevated	5	230	6'	0	-
14	34.933277,76.626032	Ghanche	AC Office Chorbet	19	26	5	Roof Mounted CGI Sheet	0	180	4"	1	3.00
15	35.165891,76.335006	Ghanche	Municipal Committee Office Khaplu	17	23	4	Roof Elevated	5	209	6'	0	-
16	35.163848,76.338396	Ghanche	Municipal Public Library Khaplu	20	27	5	Roof Elevated	5	217	6'	1	3.46
17	35.164019,76.336721	Ghanche	Engineering Cell DDE Office Khaplu	7	10	2.5	Roof Elevated	5	189	6'	1	1.64
18	35.163428,76.335545	Ghanche	DHO Office Khaplu	21	29	7	Roof Mounted	0	201	4"	1	4.43

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
19	35.163686,76.336742	Ghanche	ISI Divisional office & residency Khaplu	15	21	5.4	Roof Mounted CGI Sheet	0	189	4"	1	3.71
20	35.166437,76.334938	Ghanche	MI Divisional Office & Residency Khaplu Ghanche	10	14	3.5	Roof Elevated	5	205	6'	1	2.32
21	35.166911,76.334715	Ghanche	Session Court Khaplu Ghanche	20	27	6	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	207	6" & 4"	1	3.75
22	35.168621,76.334918	Ghanche	SE C&W Camp Office Khaplu	4	6	2	Roof Mounted	10	204 & 200	6"	1	1.14
23	35.16917824, 76.3352613	Ghanche	SP Office & Police Station Khaplu	35	48	15	Roof Mounted	10	191	6"	1	10.00
24	35.160251,76.338621	Ghanche	FAP Askari Gond Khaplu Ganchae	3	5	2	Roof Mounted	10	232	6"	1	1.43
25	35.157697,76.341002	Ghanche	Government Technical College Khaplu Ganchae	20	27	11	Roof Elevated	5	180	6'	1	7.43
26	35.167757,76.348406	Ghanche	Water and Power Divisional Office Khaplu	15	21	4	Roof Elevated	5	201	6'	1	2.43
27	35.170619,76.321671	Ghanche	C&W Divisional Office Kraming Khaplu	23	32	9	Roof Elevated	5	178	6'	0	-
28	35.170704,76.321033	Ghanche	District Population & Welfare Office Khaplu	4	6	1	Roof Mounted	0	176	4"	1	0.61

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
29	35.170715,76.321299	Ghanche	DD Water Management & Irrigation Khaplu	5	7	2	Roof Mounted CGI Sheet	0	179	4"	1	1.29
30	35.170739,76.320134	Ghanche	DD Fisheries Kraming Khaplu	13	18	4	Roof Mounted CGI Sheet	0	180	4"	0	-
31	35.170505,76.319380	Ghanche	DD Forest Office Khaplu	6	9	2	Roof Mounted CGI Sheet	0	180	4"	1	1.32
32	35.170311, 76.329674	Ghanche	AC Office Khaplu	5	7	2	Roof Elevated	5	190	6'	1	1.18
33	35.167708, 76.350942	Ghanche	ETO Office Khaplu	12	17	4	Roof Elevated	5	180	6'	1	1.93
34	35.170072, 76.330231	Ghanche	DD LG&RD Khaplu	6	9	3	Roof Mounted	10	186	6"	1	1.86
35	35.169884, 76.331588	Ghanche	CSO Civil Supply Office/House Khaplu	8	11	4	Roof Mounted	10	180	6"	0	-
36	35.209986, 76.483532 35.210032, 76.482933	Ghanche	10 Bed Hospital Thagas & MD Residency Thagas	35	48	30	Roof Mounted CGI Sheet	0	200 & 207	4"	1	13.57
37	35.211110, 76.481585	Ghanche	AC office Mashabrum & AC Residency	30	41	12	Roof Mounted CGI Sheet	0	216	4"	1	8.36
38	35.195491, 76.283743	Ghanche	Govt Girls High School Barah	8	11	3	Roof Elevated	5	210	6'	1	1.25

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
39	35.250406, 76.200994	Ghanche	30 Bed Civil Hospital Daghoni chogogroung	39	53	35	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	199	6" & 4"	0	-
40	35.247865, 76.185822	Ghanche	AC Office Daghoni	15	21	4	Roof Elevated	5	221	6'	1	2.32
41	35.247035, 76.195445	Ghanche	SDO Office Daghoni	7	10	3	Roof Elevated	5	180	6'	1	1.96
42	35.173606, 76.075744	Ghanche	10 Bed Hospital Ghuwari	64	87	60	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	144	6" & 4"	1	27.50

RS-03: District Shigar 35 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.409892, 75.742450	Shigar	30Bed Hospital, Shigar	71	93	140	Roof Elevated	5	148	5	0	-
2	35.425684, 75.739062	Shigar	AC Office Shigar	9	12	4	Roof Elevated	5	194	5	0	-
3	35.525815, 75.647171	Shigar	ACD Alchori Shigar	6	8	3	Roof Mounted CGI Sheet	0	158.9	0	1	0.36
4	35.481348, 75.701828	Shigar	ACD Churka Shigar	7	10	4	Roof Mounted CGI Sheet	0	152	0	0	-
5	35.715258, 75.517093	Shigar	ACD Dasoo Shigar	14	19	8	Roof Mounted CGI Sheet	0	260	0	0	-
6	35.440716, 75.730731	Shigar	AGPR Office Shigar	16	21	10	Roof Elevated	5	155.6	5	0	-
7	35.423946, 75.737057	Shigar	Billing Office W&P Shigar	4	6	1.5	Roof Mounted	10	181	10	0	-
8	35.6704747, 75.4505208	Shigar	Boys Government High School Tissar	15	20	8	Roof Mounted CGI Sheet	0	143	0	0	-
9	35.420323, 75.712242	Shigar	Boys Inter College Shigar	10	13	10	Roof Mounted	10	155.3	10	1	4.29
10	35.425394, 75.738824	Shigar	City Police Station Shigar	14	19	10	Roof Mounted	10	193	10	0	-

³ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
11	35.426200, 75.739710	Shigar	Civil Court Shigar	8	11	6	Roof Mounted CGI Sheet	0	160	0	0	-
12	35.430753, 75.736395	Shigar	DC Office Shigar	10	13	6	Roof Mounted CGI Sheet	0	184.7	0	1	1.07
13	35.423851, 75.735606	Shigar	DDE Office Shigar	7	9	4	Roof Mounted CGI Sheet	0	190	0	1	1.07
14	35.437312, 75.732532	Shigar	DFO (District Forest Office) Shigar	12	15	8	Parking Shed	5	180	5	0	-
15	35.424493, 75.734627	Shigar	Digital Library Girls High School Shigar	1	2	1	Roof Mounted	10	189	10	1	0.71
16	35.419288, 75.738963	Shigar	Digital Public Library Shigar	2	3	2	Roof Mounted	10	180	10	1	1.43
17	35.423565, 75.737212	Shigar	EE C&W Works Shigar	14	18	9	Roof Elevated	5	187.6	5	0	-
18	35.426358, 75.739084	Shigar	EE W&P Shigar	7	9	5	Roof Mounted	10	168	10	1	0.71
19	35.5196108, 75.5955019	Shigar	EPI Center Wazirpur Shigar	5	7	5	Roof Mounted CGI Sheet	0	134	0	0	-
20	35.438507, 75.731968	Shigar	Food Department Shigar	4	6	3	Roof Mounted	10	180	10	0	-
21	35.425340, 75.738440	Shigar	Govt. Boys Middle School Murkunjah Shigar	1	2	1	Roof Mounted CGI Sheet	0	180	0	1	0.71

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
22	35.715988, 75.516985	Shigar	Govt. Boys School Dasoo Shigar	5	7	3	Roof Mounted	10	214	10	1	2.14
23	35.474873, 75.706593	Shigar	Govt. Girls High School Churka	13	17	7	Roof Mounted	10	164.4	10	0	-
24	35.661083, 75.495953	Shigar	Govt. High School Haiderabad, Shigar	6	8	3	Roof Mounted CGI Sheet	0	147	0	1	2.14
25	35.420728, 75.724177	Shigar	Govt. Middle School Kiahong Shigar	1	2	1	Roof Mounted	10	180	10	0	-
26	35.426369, 75.739174	Shigar	LGRD (Local Development and Rural Development Office) Shigar	14	19	5	Roof Mounted CGI Sheet	0	249	0	0	-
27	35.426645, 75.738983	Shigar	Live Stock Office Shigar	13	17	9	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	168	10 & 0	1	5.00
28	35.5744707, 75.5486573	Shigar	PS Gulabpur Shigar	6	8	3	Roof Mounted CGI Sheet	0	214.6	0	0	-
29	35.574283, 75.547760	Shigar	RHC GULABPUR	70	91	40	Parking Shed	5	216	5	1	5.36
30	35.424174, 75.736606	Shigar	RHC Shigar	16	21	11	Roof Mounted	10	180	10	0	-
31	35.425763, 75.739331	Shigar	SDPO Office Shigar	8	11	4	Roof Mounted CGI Sheet	0	180	0	0	-
32	35.431378, 75.736275	Shigar	SP Office Shigar	14	18	9	Roof Mounted	10	188.7	10	1	2.86

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ³	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
33	35.426207, 75.739893	Shigar	Tehsil Dar Office Shigar	9	12	4	Roof Mounted	10	170.4	10	0	-
34	35.422206, 75.716805	Shigar	Tourism Office Shigar	5	7	3	Roof Mounted CGI Sheet	0	158.9	0	0	-
35	35.671667, 75.450000	Shigar	10 Beds hospital Tissar	115	150	130	Roof Elevated	5	227	5	0	-

RS-04: District Kharmang 20 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.034087, 76.075199	Kharmang	Civil Court office	10	12	4	Ground Mounted & Roof Mounted CGI Sheet	15 & 1	146	6" & 6"	1	1.96
2	34.741013, 76.173049	Kharmang	Civil Hospital olding Kharmang	50	60	40	Roof Elevated	5	168	6'	1	17.32
3	35.035094, 76.074545	Kharmang	Civil Hospital Tolti Kharmang	21	26	20	Roof Mounted CGI Sheet	0	139	4"	0	-
4	35.090717, 76.023575	Kharmang	DC office Ghorl Kharmang	49	59	31	Parking Shed & Roof Mounted CGI Sheet	5 & 1	192	10' & 4"	0	-
5	35.091668, 76.003690	Kharmang	DHO office Kharmang	1	2	1	Roof Mounted CGI Sheet	0	180	4"	1	0.18
6	35.0912509, 76.0252896	Kharmang	DHQ Hospital Kharmang	126	152	60	Roof Mounted	10	184	6"	1	33.93
7	35.091394, 75.987143	Kharmang	Girls High School Ghasing	2	3	1	Parking Shed	5	197	10'	1	0.61
8	35.0915892, 76.0173681	Kharmang	Girls Middle School Ghaori Kharmang	5	6	4	Parking Shed	5	190	10'	1	2.43

⁴ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
9	35.0920264, 76.0396613	Kharmang	High School Hilalabad Kharmong	3	4	1	Parking Shed	5	180	10'	1	0.33
10	35.028956, 76.115120	Kharmang	NADRA office Morkon Tolti Kharmang	10	12	5	Parking Shed	5	223	10'	0	-
11	35.090377, 75.999807	Kharmang	Sharba Foundation IT Lab Kharmang	9	11	6	Parking Shed	5	180	10'	1	4.11
12	35.156623,75.938002	Kharmang	EE & SDO office W&P Division Kharmang	3	4	1	Ground Mounted	15	180	6"	1	0.29
13	35.155378, 75.942119	Kharmang	EE & SDO office C&W Kharmang	3	4	1	Ground Mounted	15	180	6"	0	-
14	35.154547,75.942678	Kharmang	Civil Hospital Mehdiabad, Kharmong	20	24	20	Ground Mounted & Roof Mounted CGI Sheet	15 & 1	153	6" & 6"	0	-
15	35.1567395,75.9390254	Kharmang	Darul Yatam public school and college mehdiabad, kharmong	25	30	15	Parking Shed	5	212	10'	1	8.21
16	35.155265,75.942518	Kharmang	DD Education office mehdiabad, kharmong	16	19	5	Ground Mounted	15	152	6"	0	-
17	35.145261,75.955656	Kharmang	Govt Girls Middle School Serling, Kharmang	5	7	3	Roof Mounted CGI Sheet	0	219	4"	1	1.96

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ⁴	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
18	35.138945,75.960936	Kharmang	Govt model middle school mehdiabad Kharmang	5	7	3	Parking Shed	5	150	10'	1	1.678571429
19	35.128203,75.974441	Kharmang	Govt Primary School Panda Mehdiabad Kharmang	2	3	3	Roof Mounted	10	161	6"	1	1.892857143
20	35.029626, 76.092982	Kharmang	Govt Girls High School Tolti Kharmang	3	4	1	Parking Shed	5	156	10'	1	0.178571429

SECTION – II: GENERAL PROJECT REQUIREMENTS

1. INTRODUCTION

This Part of the Employer’s Requirements sets out the general obligations of the Contractor in relation to the execution of the Works. It shall be read in conjunction with the Contract, Technical Specifications, Drawings, and other parts of the Employer’s Requirements.

The Contractor shall be responsible for the complete design, engineering, procurement, construction, installation, testing, commissioning, training, operation and maintenance (O&M), and handover of the Works. The requirements in this Part establish the minimum standards to be achieved. In the event of any conflict, the more stringent or technically superior requirement shall prevail.

2. SITE CONDITIONS

The Project sites are located in various districts of Gilgit-Baltistan, characterized by mountainous terrain, high seismicity, and diverse climatic conditions. The Contractor shall take full account of these conditions in planning, design, procurement, construction, testing, commissioning, and maintenance of the Works.

Key site considerations include:

- **Topography and Access:** Sites are generally in hilly and mountainous areas with limited access roads, steep gradients, and restricted working space. The Contractor shall arrange safe and efficient transport and erection of equipment under these conditions.
- **Seismic Conditions:** Gilgit-Baltistan is classified as a high seismic risk zone. All structures and foundations shall be designed to relevant international codes (e.g., IBC/Eurocode/UBC) and Pakistani standards for seismic resilience.
- **Temperature:** The region experiences wide variations, with summer highs up to +45 °C and winter lows down to –30 °C, depending on site altitude and location. Equipment shall be designed for continuous operation within these extremes.
- **Wind Conditions:** Maximum wind speeds can reach 100 mph. PV structures shall be designed to withstand these loads, including gusts.
- **Rainfall and Snowfall:** Annual precipitation is moderate but may include heavy rain and snow, particularly in winter. Roof loading shall be designed accordingly.
- **Altitude:** Several sites exceed 2,800 m above sea level. Equipment shall be rated and de-rated as necessary for reliable high-altitude performance.
- **Corrosion:** Site specific conditions shall be taken into account.

The Contractor shall confirm and supplement this information by carrying out detailed site-specific investigations at its own cost. No claim for additional payment or extension of time shall be made due to difficulties arising from these conditions.

3. DRAWINGS AND DESIGN RESPONSIBILITIES

3.1 Bid Drawings

- The drawings provided in Volume II, Annexure 1 are issued as Bid Drawings for reference only. These reflect only the Employer’s preliminary design concept based on available information.
- The Contractor shall conduct all required site surveys, and meteorological assessments (including rain & hailstorm risks) and shall develop detailed designs accordingly to achieve the required capacity.
- Bid Drawings shall not be used for construction. The Contractor bears full responsibility for preparing and submitting construction drawings based on proposed equipment and verified site conditions.
- Final as-built drawings shall be submitted at completion as part of the Project Handover documentation.

3.2 Contractor’s Design

- The Contractor shall prepare in accordance with Sub-Clause 5.2 of CoC and submit detailed design reports, drawings, calculations, and method statements in accordance with the Contract.
- Submissions shall include, at minimum: design assumptions, methodologies, calculations, test reports, geotechnical data, construction method statements, quality assurance plans, and equipment manufacturer drawings.
- Permanent Works shall not commence until relevant design submissions have been reviewed by the Employer’s Representative or his Delegated Assistant under the provisions of the Contract.
- All drawings, reports, and data prepared by the Contractor shall become the property of the Employer.

Wherever applicable, the solution shall incorporate mechanical structure design considerations, taking into account factors such as wind, snow, thermal expansion, flooding, seismic activity, and corrosion.

4. QUALITY MANAGEMENT SYSTEM

The Contractor shall implement a Quality Management System in accordance with Sub-Clause 4.9 of the Conditions of Contract.

4.1 Quality Assurance and Control

- The Contractor shall prepare a comprehensive Quality Assurance and Quality Control (QA/QC) Plan based on ISO 9001 principles.
- The Plan shall include: quality policy, organization, responsibilities, inspection and testing procedures, NCR/DR management, internal audits, and document control.

- The outline QA/QC Plan shall be submitted within 15 days of the Commencement Date. The detailed Plan shall follow within another 15 days and shall be updated throughout the Project.
- A dedicated QA Manager shall be appointed on Site with authority and responsibility for implementing the Plan.

5. USE OF SITE

5.1 Boundary of the Site

The Project sites are indicated in the Part-I (Table-01) of the Employer’s Requirements, including coordinates. The Contractor shall arrange, at his own cost, any additional land required for temporary facilities such as camps, workshops, offices, and storage areas. Quarries, borrow pits, disposal areas, and any other external areas used by the Contractor shall not be considered part of the Site.

5.2 Setting Out of Site Installations

All setting out shall be carried out strictly in accordance with approved drawings. Any discrepancy between drawings and actual site conditions (topography, geology, etc.) shall be reported immediately to the Employer’s Representative or his Delegated Assistant, and alternative proposals submitted for approval.

5.3 Storage Areas

The Contractor shall establish and maintain temporary storage areas at the Site and any off-site location. These shall include drainage, sumps, oil traps, separators, and containment for chemicals and oils. Secure, ventilated warehouses for PV modules, inverters, and auxiliaries shall be constructed or rented by the Contractor, in consultation with the Employer’s Representative or his Delegated Assistant.

6. TEMPORARY WORKS AND FACILITIES

The Contractor shall arrange temporary land and design, construct, operate, and maintain all temporary works and facilities necessary for execution of the Works at its own cost.

6.1 Camps and Offices

- The Contractor shall establish its own camps, offices, workshops, and storage facilities to support Project execution.
- Temporary camps shall include adequate boundary walls, fencing, lighting, access control, and utilities.
- Accommodation, catering, and welfare facilities for Contractor’s staff shall comply with health and safety standards.

6.2 Removal and Restoration

- Upon completion, all temporary facilities not handed over to the Employer shall be dismantled and removed by the Contractor.
- The Contractor shall restore the affected areas to an acceptable condition to the Employer’s satisfaction.

7. CONTRACTOR’S RESPONSIBILITIES

7.1 General

- The Contractor may propose changes to layout, methodology, or design, subject to Employer’s approval, provided that the Contract requirements, Time for Completion, and Contract Price remain unaffected.
- All designs shall consider site-specific risks such as seismicity and hailstorms.

7.2 Procurement

- The Contractor shall procure all labor, materials, equipment, and services in his own name, warranting that all supplied items are new, reliable, and consistent with best international practice.

7.3 Standardization of Equipment

- SI units shall be used for all documentation and instrumentation.
- Parts and components shall be standardized across the buildings to maximize interchangeability.
- All indicators and labels shall be in English and SI units.

7.4 Testing and Material Delivery Verification Program

- The Contractor shall provide competent staff and facilities for material and PV testing.
- Factory acceptance tests (FAT), material delivery verifications, and other standard tests shall be performed in accordance with specifications, with certificates submitted to the Employer’s Representative or his Delegated Assistant.
- Employer’s participation in tests shall not relieve Contractor of responsibility.

7.5 Health, Safety, and Security

- The Contractor shall comply with national HSE laws, prepare a full HSE plan, and conduct regular training under Sub-Clause 4.8 of the Conditions of the Contract.
- PPE (helmets, safety shoes, insulated gloves etc.) shall be supplied for all Contractor staff.
- First Aid: Fully equipped first-aid Kits shall be provided at each under construction site.
- Emergency: Proof of arrangements with local hospitals for evacuation and treatment shall be provided.

7.6 Noise

- Noise measurement and limits shall comply with ISO and IEC standards applicable to PV Solar Systems.

7.7 Utilities and Site Services

- The Contractor shall protect all existing utilities and, if damaged, shall restore them at his own cost.

- Relocation of utilities shall be coordinated with the concerned authorities, without interruption of service.

8. GENERAL CONSTRUCTION REQUIREMENTS

8.1 General

- The Contractor shall be fully responsible for the specification, quality, and performance of all materials incorporated in the Works.
- Local materials may be used where they meet the Employer’s Requirements and approved standards.

8.2 Standards and Service Life

- All materials and workmanship shall comply with relevant International (IEC, ISO, IEEE, ASTM) or National Standards. Where alternatives are proposed, the Contractor shall demonstrate equivalence to the satisfaction of the Employer’s Representative or his Delegated Assistant.
- Minimum service life requirements:
 - 25 years: PV modules; 10 years: Inverters; 10 years: BESS (excluding replaceable components).

8.3 Commissioning Plan Development

The development of a comprehensive commissioning plan is fundamental to the successful execution of all testing and acceptance activities. This plan serves as the roadmap for all commissioning activities and must be developed with meticulous attention to detail, incorporating lessons learned from similar projects and site-specific considerations that may impact testing procedures or safety requirements.

The commissioning plan must demonstrate a thorough understanding of the system design, potential risks, and mitigation strategies. It should provide clear guidance for all testing personnel and establish protocols for handling unexpected situations or test failures. The plan must be submitted well in advance to allow for thorough review and any necessary modifications before commencement of testing activities.

Commissioning Plan Requirements:

- Submit detailed plan minimum 15 days before commissioning commencement
- Include comprehensive methodology and detailed sequence of all tests
- Provide thorough risk analysis with identified mitigation strategies
- Develop contingency plans for equipment failures or adverse conditions
- Specify all instrumentation requirements with valid calibration certificates
- Define clear acceptance criteria for each individual test
- Include weather contingency plans for outdoor testing activities

8.4 Tolerances

- Construction tolerances shall conform to international practice for solar PV and associated works, subject to Employer’s Representative’s or his Delegated Assistant’s approval.

8.5 Protection of Works

- All completed Works shall be protected against damage from construction activities and weather.
- Safety signage, fire protection, and hazard prevention measures shall be implemented throughout.

9. HEALTH, SAFETY, AND ENVIRONMENT

9.1 Occupational Health and Safety

- Contractor shall maintain a certified OHS management system aligned with national laws and ISO 45001.
- Work permits shall be issued for all hazardous activities.
- Monthly safety meetings shall be conducted, and incident investigations reported.

9.2 Emergency and Medical Services

- Fully equipped first aid stations shall be provided at each site.
- Contractor shall maintain agreements with approved hospitals for emergency treatment.

9.3 PPE

- PPE (helmets, harnesses, safety shoes, raincoats, jackets, etc.) shall be supplied to all workers, Consultants, and Employer staff, and replaced at least every four (4) months.

9.4 Regulatory Requirements and Applicable Standards

- The GB Environmental Protection Act, 2014 should be followed which was enacted in 2014 by repealing the Pakistan Environmental Protection Act.
- Other project related national environmental laws, regulations, policies and guidelines are as follows:
 - National Conservation Strategy (NCS), 1992.
 - National Environment Policy, 2005.
 - Pakistan Labor Policy, 2010.
 - Pak-EPA (Review of IEE and EIA Regulations, 2000).
 - Pakistan EIA Procedures.
 - National Environmental Quality Standards (NEQS).
 - Land Acquisition Act (LAA), 1894.
 - Cutting of Trees (Prohibition) Act, 1975.
 - Antiquities Act, 1975.
 - The Forest Act 1927, and the Forest (Amended Act) 2010.
 - The Explosion Act 1884.
 - GB Wildlife Preservation Act 1975.

- GB Fisheries Act 1975.
- Pakistan Penal Code, 1860.
- Pakistan Clean Air Program (PCAP); and
- Guidelines for Public Consultation.

10. CONTRACTOR’S DOCUMENTS

10.1 General

- Notwithstanding the time periods listed in the construction schedule by the Contractor shall submit all documents as early as reasonably practical to mitigate any possibility of delays arising from review by the Employer’s Representative or his Delegated Assistant or by third parties.
- It is intended that Employer’s Representative or his Delegated Assistant shall have a review and comment opportunity for each construction document, for each submittal or re-submittal.
- Prior to the Commencement Date, the Contractor shall prepare and submit a “Design Management Plan” outlining the procedures to be used for control of design activities, schedule for design, coordination of the main Project design with the activities of subcontractors, design quality control procedures, authorizations for review and approval of design, description of design documents such as design criteria, and design reports, and other information necessary to demonstrate that the Contractor can effectively manage the design of the Works.
- All specifications, drawings, reports, design calculations and other essential data are subject to the Employer’s Representative’s or his Delegated Assistant’s review. Comments shall be given in writing by the Employer’s Representative or his Delegated Assistant within twenty-one (21) days after receiving such documents, unless otherwise stipulated. Any work carried out prior to such approval shall be at the Contractor’s own risk and expense. The number of drawings and documents to be submitted for information or approval shall be limited to the required minimum for the purposes of the Employer’s Representative or his Delegated Assistant. The exact number and mode of distribution for drawings and documents will be agreed upon between the Contractor and Employer’s Representative or his Delegated Assistant at the work Commencement Date.
- The Contractor shall submit a drawing schedule, which will be subject for the review by the Employer’s Representative or his Delegated Assistant. The drawing schedule shall be consistent with the Contractor’s integrated project schedule. The drawing schedule shall show design phase, structure, drawing number, titles, status, schedule dates and other relevant information. At four (04) week intervals, the Contractor shall submit copies of the revised drawing schedule showing the actual status of the drawings, i.e. preliminary, reviewed by Employer’s Representative or his Delegated Assistant, approved for construction by Contractor, for information only, or as-built, and the date for completion of each phase of the drawings.
- The Contractor shall submit a document control schedule, which will be subject to the review by the Employer’s Representative or his Delegated Assistant. The document control schedule shall be consistent with the Contractor’s integrated project schedule. The document control schedule shall show the number, titles, status, schedule dates and other relevant information. At four-week intervals, the Contractor shall submit copies of the revised document control schedule showing the actual status of the documents, i.e.

preliminary, reviewed by Employer’s Representative or his Delegated Assistant, approved for construction by Contractor, for information only, or as-built, and the date for completion of each phase of documentation.

- The sequence in which documents are submitted shall follow a logical progression such that all information is available to the Employer’s Representative or his Delegated Assistant to facilitate review of each submittal when it is received. The program for detailed design shall allow the required time for review by the Employer’s Representative or his Delegated Assistant.

10.2 Contractor’s Design Documents

- Design Documents means documents of a technical nature provided by the Contractor under the Contract. Design Documents shall include but not be limited to:
 - a. Calculations, analyses and designs.
 - b. Site investigation plans, reports, memoranda
 - c. Construction and manufacturing drawings.
 - d. Type Test Reports
 - e. Any other analysis report and calculations if considered to be necessary by Employer’s Representative or his Delegated Assistant
 - f. Design briefs and design reports.
 - g. Technical specifications and performance curves
 - h. Parts and components list.
- The Contractor shall provide all necessary Design Documents and any other document or information (unless restricted by confidentiality requirements) as may be relevant to the performance, operation and maintenance of the Project and Employer’s operating and maintenance activities and transfer obligations and to satisfy Employer’s requirements.

10.3 Required Documentation

- As-built drawings reflecting actual installation configurations and any field modifications
- Complete component serial number records and warranty certificate compilation
- Operation and maintenance manuals for all major system components
- Safety data sheets (SDS) for all hazardous materials used in the installation
- Commissioning test certificates and calibration records for all testing equipment

10.4 Documents’ Submission and Approval Procedure

- All drawings and documents shall be submitted through the Documents Management System (DMS) for review by the Employer’s representative or his delegated Assistant under Sub-Clause 5.2 of CoC.
- In parallel, the Contractor shall provide four (4) hard copies of each drawing/document to the Employer’s Representative or his Delegated Assistant
- The date of receipt of hard copies by the Employer’s Representative or his Delegated Assistant shall be considered the official date of submission for review.
- The Employer’s Representative shall return comments and approvals through the DMS in accordance with the review period specified under Sub-Clause 5.2 of the CoC.

- In general, electronic copies of design submittals shall be in: -
 - i. MS Word format for all text and reports
 - ii. PDF as well as CAD formats for drawings
 - iii. MS Excel for all calculations
- The Employer’s Representative or his Delegated Assistant will review submittals only for conformance with the design concept of the Project and for compliance with the contract. The contractor shall make any and all corrections required.
- After Employer’s Representative or his Delegated Assistant has performed his review of submittals, he will return one print to the Contractor with one of the following notations:
 - i. Rejected. (R)
 - ii. Revise and resubmit. (RC)
 - iii. Approved Except as Noted.
 - iv. Approved. (A)
- When submittals are returned marked with either (i) or (ii), the Contractor shall make such revisions and/or corrections and resubmit the drawings or other material in the same manner as specified.
- When drawings and submittals are returned with authorization to proceed with the work, Contractor shall provide the number of prints or copies of drawings as is required for field distribution.

10.5 Document Management System (DMS)

- The Contractor shall establish, operate, and maintain a secure, computer-based Document Management System (DMS) for the entire duration of the Contract, including the Defects Notification Period.
- The DMS shall:
 - Track identification, revision, status, and location of all Project Documents at all stages.
 - Provide online access via standard internet browsers without requiring special client software.
 - Allow up to thirty (30) concurrent users worldwide, with password-protected access rights tailored to roles (creation, review, comment, approval, etc.).
 - Support structured workflows for design review, approvals, quality records, correspondence, planning, progress measurement, testing, commissioning, and reporting.
- The DMS shall include all Contractor, Subcontractor, and Vendor documents and correspondence (except financial correspondence, which will be exchanged directly).
- All costs for establishing, licensing, maintaining, and operating the DMS, including user accounts and storage, shall be borne by the Contractor.

10.6 Final Documentation

- At the end of the Contract, including the Defects Notification Period, the Contractor shall provide:

- Electronic sets shall be provided on hard drives or equivalent media, in open and editable formats (MS Word, Excel, AutoCAD, etc.) along with PDF versions for record.
- All as-built drawings, O&M manuals, test reports, and certificates in both hard and soft copy.

11. INSPECTION AND TESTING

11.1 General

This section contains the general requirements for inspection and testing (I&T) of material, parts, equipment and workmanship of the Plant during manufacture, assembling, installation, commissioning and upon completion to demonstrate compliance with the specification, codes and standards to ensure overall reliability of the Plant operation and performance.

The whole of the Works supplied under this Contract shall be subject to visual, dimensional, material, non-destructive, functional, and performance inspection and tests by the Employer’s Representative or his Delegated Assistant during manufacture, construction, installation and commissioning, at the manufacturers’ works and/or on site.

The Contractor shall prove that its material and/or equipment complies with the requirements of the Contract.

Employer’s participation in factory acceptance tests (FATs) or material delivery verification shall not relieve the Contractor of its responsibility to demonstrate compliance

11.2 Calibration and Equipment Standards

The accuracy and reliability of all test results depend fundamentally on the proper calibration and maintenance of testing equipment. All instrumentation used in commissioning activities must meet stringent accuracy requirements and maintain valid calibration certificates traceable to national or international standards. This ensures the integrity of all test data and provides confidence in the commissioning results.

Equipment calibration records must be maintained throughout the commissioning process and made available for review by all stakeholders. Any equipment found to be out of calibration must be immediately removed from service and either re-calibrated or replaced before testing can continue.

Equipment and Calibration Requirements

- All test instruments must have valid calibration certificates within 12 months of use
- Calibration records must be traceable to recognized national or international standards
- Backup equipment must be available for critical measures to prevent delays
- Daily functional checks of equipment before commencement of testing activities
- Secure storage and handling procedures to prevent equipment damage or degradation

11.3 Expenses

All shop and field-testing certifications, reporting, and assuring of engineering quality verification and documentation of the Works in accordance with the technical specifications and the Contractor’s testing programme shall be performed by the Contractor at its expense. If tests

indicate non-compliance with the terms of the Contract, the Contractor shall, at its own expense, make all necessary repairs and perform additional test(s) required to indicate compliance with the terms of the Contract.

11.4 Inspection and Test Program (ITP)

The Contractor shall establish, document and implement a Quality Control Program in accordance with the requirements of the ISO standards.

Implementation of this program shall cover all fabrication, installation, and commissioning activities on and off the Project site.

Inspection and test plans shall be prepared for all major items of equipment, plant and systems defining the Quality Control and inspection activities to be performed to ensure that the design, manufacture, construction, installation, commissioning and completion of the Plant complies with the contract. ITPs shall be submitted defining relevant inspection and test points for all stages of manufacturing, construction, installation, commissioning and completion.

Inspection and Test Plans shall be submitted for the Employer’s Representative or his Delegated Assistant for review in accordance with Sub-Clause 5.2 of CoC. If any operation in ITP requires change, the Contractor shall revise the plan and resubmit for approval as above.

11.5 Factory Acceptance Tests

The Employer’s Personnel (including the Employer’s Representative, Delegated Assistant to the Employer’s Representative or other independent experts), at their discretion, will participate in all or in a selected number of Factory Acceptance Tests (FATs) at manufacturers’ premises. All cost in connection with witnessing the FATs by the Employer’s Personnel shall be borne by the Contractor as per provision of the Contract.

If the Employer’s Personnel do not attend, then the Contractor shall perform the test and submit a certified copy of the results to the Employer’s Representative or his Delegated Assistant.

The Contractor or sub-contractors, as applicable, shall provide labor, materials, water, air, electric power, fuel, shop, apparatus and all necessary equipment for the performance of the said acceptance tests. If the equipment passes the tests, the Employer’s Personnel shall give the Contractor a certificate testifying to this.

All these test documents have to be submitted to the Employer’s Representative or his Delegated Assistant in due time before the tests are performed. Test procedures for FATs shall be submitted not later than 30 days prior to the scheduled tests. The Contractor should notify the Employer’s Representative or his Delegated Assistant well before the FAT dates, giving due consideration to time required by the Employer’s Personnel for their internal approvals as well as the time required by relevant embassies in processing the visa applications.

Factory acceptance tests shall be witnessed by the Employer’s Personnel (including the Employer’s Representative, Assistant to the Employer’s Representative or other independent experts). All costs in connection with witnessing of the factory acceptance tests by the Employer’s Personnel shall be borne by the Contractor. These shall include the costs of air travel from Pakistan to place of inspection/testing and back, visa processing, hotel accommodation/boarding/lodging (as per actual), inland transportation and daily allowance @ US Dollars 200 per day per person for inspection/testing to be conducted outside Pakistan including

two days of travel time and Rs. 10,000 per day per person [besides other costs of travelling and lodging etc. (as above) for inspection/testing to be conducted inside Pakistan for each visit of every person to witness these tests. A minimum of 06 trips and 50-man days are expected for FAT outside Pakistan.

The Factory Acceptance Tests (FATs), of equipment not limited to, shall cover PV modules, inverters, Battery Energy Storage Systems (BESS), AC and DC cables, LV panels, distribution boxes, earthing and lightning protection equipment and module mounting structures.

Sampling for FATs shall be performed in line with ISO 2859 series.

As a minimum the following tests shall be made part of FATs:

1. PV Modules

- Visual Inspection
- Performance at STC
- Performance at low Irradiance
- Thermal Cycling Test
- Humidity Freeze Test
- Static Mechanical Load Test
- Hail test

2. Hybrid Inverters

- Visual Inspection
- Maximum Charge Power
- Maximum Discharge Power
- Voltage test (Dielectric Strength Test)
- Back-feed Test under Normal Conditions
- Back-feed Test under Single Fault Condition

3. Battery Energy Storage System & Battery Management System

- Visual Inspection
- Drop Test
- Control of Voltage
- Control of Current
- Temperature Control

4. PV Module Mounting Structure

- Sections and Plates
 - Visual examination
 - Verification of dimensions and weights
 - Tensile tests
 - Bend tests
 - Galvanizing tests
- Nuts and Bolts
 - Verification of dimensions
 - Visual inspection
 - Proof load tests
 - Ultimate tensile strength tests
 - Galvanizing tests

5. Cables

- Thickness of Insulation

- DC Resistance Test
- Insulation Resistance
- High Voltage Test A.C
- Diameter of Cables
- Standard Formation

6. LV Panels

- Visual Inspections
- Functional Test
- Earthing and Grounding Continuity Test
- Insulation Resistance Test
- Polarity Test

Inspection sheets with subject, attendance, result and comments shall be signed by all parties and distributed immediately after the tests.

11.6 Material Delivery Verification

The equipment to be supplied under the Contract shall be verified at site prior to initiation of construction / installation activities.

Material delivery verification procedures for each site shall be submitted not later than one week prior to the scheduled verification, including all necessary drawings and documents, excerpts of applicable standards, etc. for Employer’s Representative’s or his Delegated Assistant’s approval.

11.7 Tests on Completion

All Tests on Completion required to be carried out under Clause 9 shall conform to international standards, OEM guidelines, and local grid requirements, with full documentation to support QA/QC, warranty claims, and future maintenance.

Commissioning Tests

Commissioning tests shall include visual inspection for mechanical integrity, installation quality, labeling, and cable terminations; insulation resistance testing of all AC and DC cables; and verification of earthing and bonding systems. Functional checks shall cover inverters, energy storage systems, monitoring systems, protection devices, communication networks, and alarms.

Commissioning tests shall validate PV array IV curves, inverter performance, anti-islanding protection, and grid compliance. The storage system shall be tested through charge/discharge cycles to verify SOC and SOH, while genset synchronization shall be evaluated under load for stable integration. Functional tests of lighting, emergency systems, and auxiliary circuits shall ensure full operational readiness.

Commissioning Tests (IEC Standards Compliant) shall include:

- Polarity Test
- String open circuit voltage test
- String circuit current test (short circuit or operational)
- Functional tests
- Insulation resistance of the DC circuits
- String I-V Curve Test
- IR Inspection

- Continuity of earthing and/or equipotential bonding conductors, where fitted

Commissioning Tests (IEC Standards Compliant) for BESS shall include:

1. Cold checks (before operation): insulation, voltage, earthing, safety protection against touch; general functionality, display and interface
2. Operational checks (under operation):
 - Check monitoring parameters: SOC, SOH, cell voltages, cell imbalances, current, and temperature, as well as general functionality and plausibility of monitoring system
 - Check remote monitoring and control as well as integration with SCADA or EMS (whichever the case).
 - Verification of currents and voltages Behavior under operational conditions
 - No overheating of components under operation
 - Functionality of cooling system (if applicable)

Three days (03) days remote monitoring data under operation shall be analyzed by Employer’s Representative or his Delegated Assistant in order to determine the health of the Battery Energy Storage System, and the system shall be accepted if the data conforms with the manufacturer's data sheet and approved system design. In case of any documented deviation from the given specifications (after considering measurement uncertainty), further tests such as Round-Trip Efficiency (RTE), Charge / Discharge and Capacity test shall be carried out at the cost of the Contractor prior to site Taking Over.

11.8 Tests After Completion of O&M Period

Upon completion of O&M period, the Contractor shall perform the tests listed under commissioning tests. In case the PV system corrected output is found to be lower or degraded by more than 3% beyond the commissioning tests results, the Contractor shall, at its own cost, make up for the shortfall in capacity

For the BESS, degradation shall not exceed the limits specified in the manufacturer’s data sheet and the approved system design.

These tests represent the ultimate validation of system performance and reliability after an extended operational period and granted only after the system has demonstrated sustained performance meeting all specifications throughout the three years of operational period

12. ADDITIONAL DOCUMENTATION AND REPORTING REQUIREMENTS

12.1 Erection and Testing Manuals

Detailed erection and testing procedures (method statements), including instructions on handling, installation, and storage of all equipment, shall be submitted at least 28 days before the start of erection.

12.2 Operation and Maintenance Manuals

At least 28 days prior to scheduled commissioning, the Contractor shall provide detailed O&M manuals with drawings and schematics covering all civil, mechanical, and electrical works and equipment. Manuals shall include specifications, data sheets, vendor data, and shop drawings.

12.3 As-Built Drawings

The Contractor shall provide six (6) sets of detailed as-built drawings for the entire Project, covering PV, civil, mechanical, and electrical general arrangements. Drawings shall be based on approved shop drawings and verified field information. Drawings shall be delivered in hard copy and electronic formats, including AutoCAD.

12.4 Commissioning and Testing Reports

Within 28 days after the expiry of the Time for Completion, the Contractor shall issue a Commissioning Report to the Employer’s Representative or his Delegated Assistant, including copies of all test records.

12.5 Insurance and Construction Consents

At least 15 days prior to commencement of construction, the Contractor shall submit evidence that all required insurances under Clause 18 of CoC, permits, and consents have been obtained.

12.6 Photographic Records

The Contractor shall take digital and drone-based photographs of ongoing works. These records shall be included in MPRs and provided on a USB or other approved digital medium approved by the Employer’s Representative or his delegated Assistant.

12.7 Drawings for Construction

The Contractor shall provide six (6) printed copies and one (1) electronic copy of all “Issued for Construction” drawings. All such documents shall also be uploaded to the DMS in accordance with Sub-Clause 10.4.

12.8 Programme of the Works

Prior to the Commencement Date, the Contractor shall submit a Programme of the Works under Sub-Clause 8.3 covering all the activities of the Works but shall not be limited to engineering, procurement, transport, construction, testing and commissioning activities, etc.,. The schedule shall be prepared using Primavera (or another software acceptable to the Employer’s Representative or his Delegated Assistant) based on Critical Path Method (CPM). Monthly Progress Reports shall include such Programme or revised Programme depicting the actual progress of the Works against the Initial accepted Programme of the Works. The Contractor shall not make any amendment/deviation in the Initial Programme of the Works accepted under Sub-Clause 8.3 without the consent of the Employer’s Representative or his Delegated Assistant. The Employer’s Representative or his Delegated Assistant may require the Contractor to revise the initial programme, if found impractical or non-compliant.

13. PROJECT MEETINGS

Monthly project management meetings shall be held at site to review the MPRs. The Contractor shall present his report at each meeting. Weekly site management meetings shall also be held with the Employer’s Representative or his Delegated Assistant to review day-to-day progress and site procedures.

13.1 Monthly Progress Reports (MPRs)

The Contractor shall submit Monthly Progress Reports in a format acceptable to the Employer’s Representative or his Delegated Assistant, including financial status, updated drawings, and photographic evidence. Reports shall include progress photographs, drone aerial images, and stage-sequence progress videos.

13.2 Fortnightly Progress Meetings

Fortnightly meetings shall be held with the Employer’s Representative or his Delegated Assistant to review progress and resolve bottlenecks. The Contractor shall submit the next fortnightly work plan for review under Sub-Clause 5.2 of CoC, alongside reporting on the previous fortnight’s progress

SECTION – III: DC SYSTEMS

Technical Specifications under this section focus on Solar PV Modules to Inverters, DC cables and BESS. However, wherever applicable the same shall be applied for other parts of the Solar systems as well.

1. SOLAR PV MODULES

The PV modules shall be mono crystalline N type, half-cut, Topcon / HPBC or Mono PERC with a rated power of 600 Wp or higher and positive tolerance of 0 to +3%. They must maintain $\geq 95\%$ efficiency at 200 W/m^2 and have a module efficiency of at least 22%. Every PV Module shall be Hail resistant to at least of 50mm Dia or higher for the given tilt with power output equivalent or greater than its nominal power at STC conditions. The module Temperature Coefficient at Pmax shall be $-0.37\% / ^\circ\text{C}$ or lesser.

Modules will withstand impact from hail of $\geq 50 \text{ mm}$ Dia for the given tilt, mechanical loading of $\geq 5400 \text{ Pa}$ front / $\geq 2400 \text{ Pa}$ rear and $\geq 4 \text{ mm}^2$ UV-resistant cables.

1.1 Manufacturer and Material Requirements

Tier 1 PV module manufacturers, as defined by Bloomberg New Energy Finance (BNEF) for Q2 or Q3 of year 2025, shall be acceptable. Each module shall have IP 68 rated Junction Boxes which shall be dust and vermin proof having copper bus bar terminals, EPDM rubber gasket, EVA encapsulant, three reverse blocking diodes and IEC 62790 compliant.

1.2 Certifications:

The PV Module must be Type Tested based on IEC standard 61215 (Terrestrial PV Modules- Design qualification and type approval) and IEC 61730 (Photovoltaic module safety qualification) based insulation of Safety Class II. Modules must be resistant to Potential Induced Degradation (PID). The module shall be S.R.O 604 compliant issued by Government of Pakistan.

1.3 Minimum Specifications Table

No.	Parameter	Specification
1	Rated Power	$\geq 600 \text{ Wp}$
2	Tolerance	$0 \sim +3\%$
3	Module Efficiency	$\geq 22\%$
4	Operating Temperature	-40°C to $+85^\circ\text{C}$
5	System Voltage	1500 V DC
6	Fire Rating	IEC Class C, UL Type 29
7	Warranty	12-year product, 25 years performance
8	Certifications	IEC 61215, IEC 61730, IEC 62941
9	Protection Class	Class II
10	Encapsulant	Ethylene Vinyl Acetate (EVA) or better

1.4 Warranty and Performance

The PV modules shall include a 25-year performance warranty, guaranteeing at least 85% of initial power output for year 25, with a maximum 0.5% annual degradation after the first year. A

minimum 12-year product warranty covering materials and workmanship is also required. Light induced degradation (LID) should not be more than 2%.

2. HYBRID INVERTERS

Hybrid inverters for RTS applications shall be designed for single-phase or three-phase operation, supporting both grid-tied and off-grid modes with seamless transition. These inverters must be compatible with lithium-ion and lead-acid battery technologies, enabling efficient energy storage and backup power functionality. The hybrid inverter must support a wide DC input voltage range to accommodate different PV array configurations and should include a built-in MPPT charger for optimal solar energy utilization.

The inverter must provide intelligent energy management, allowing users to prioritize solar, battery, or grid power according to programmable settings. Remote monitoring and control via Wi-Fi or Ethernet shall be standard, with mobile app support for real-time performance tracking. The inverter must include comprehensive protection features such as anti-islanding, overvoltage, overcurrent, short-circuit, and ground fault protection, as well as battery management functions including overcharge and deep discharge protection.

All hybrid inverters must be compatible with energy management systems and support remote monitoring. Full compliance documentation, test reports, and pre-shipment inspection certificates shall be provided at delivery.

2.1 Manufacturer and Material Requirements

Hybrid inverters must be supplied by reputable manufacturers with proven deployment in residential and commercial installations, certified and compliant with international standards.

2.2 Certifications:

The hybrid inverter must be certified to the following standards:

- IEC 62109-1/2: Safety of power converters
- IEC 61683: Efficiency of power converters
- IEC 61000-6-2/4: EMC immunity and emission
- UL 1741: Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources or equivalent

2.3 Minimum Specifications Table

Parameter	Requirement
Rated Power Output (Min.)	As Specified for each Site
Maximum DC Input Voltage	Compliant with PV Array
Output Voltage & Frequency	Compatible with Point of Interconnection
Power Export Limit Function	Inverter Should have Power Export Limiting Feature
MPPT Voltage Range	Compliant with PV Array
Number of MPPTs	Multiple except for 6 kW or less Inverter
Battery Voltage	24 V or higher (model dependent)
Battery Compatibility	Lithium-ion (LPF), Lead-acid

Parameter	Requirement
Maximum Efficiency	≥96.5%
European Weighted Efficiency	≥96%
Grid Modes	Grid-tied, Off-grid, Backup, Parallel
Communication Mode	Wi-Fi / 4G, Ethernet, RS485
Communication Protocols	Modbus-RTU, Modbus-TCP
Protection Features	SPD, AFCI, GFDI, Anti-islanding, BMS
Ingress Protection	IP65
Operating Temperature Range	-30°C to +60°C
Warranty	10 years

2.4 Warranty and Performance

Hybrid inverters shall include a minimum 10-year standard product warranty. Installation, commissioning, and O&M manuals must be provided in English.

3. BATTERY ENERGY STORAGE SYSTEM (BESS)

BESS shall be designed for ease of installation, user-friendly operation, and integration with PV arrays and inverter. The system features a modular design, enabling capacity expansion if required.

In order to ensure that the hybrid inverter remains operational for extended time during solar hours in the event of load shedding, the Contractor, in consultation with the Client, shall define the load that can be supported by the battery during islanded operation, ensuring the continued operation of the inverter. A joint proforma, duly signed by both the Contractor and the Employer, shall document the load details for the building owner’s awareness to ensure proper operational practices during load shedding.

3.1 Manufacturer and Material Requirements

LiFePO4 batteries of requisite capacity shall be used for the project, which shall be compliant with relevant IEC, IEEE, BS, EU and other international standards.

The Battery energy system and all its components shall meet the following international standards:

- IEC 62619 for lithium battery pack safety
- UL 9540/UL 9540A for fire safety and thermal runaway resistance
- IEC 61000-6-1/2/3/4 for EMC immunity and emissions
- UN38.3 for transport safety certification of lithium battery or equivalent

3.2 Minimum Specifications Table

Parameter	Requirement
Rated Energy Capacity	As Specified for each Site
Cell Chemistry	Lithium Iron Phosphate (LFP)
Depth of Discharge (DoD)	≥ 90%

Parameter	Requirement
Round-trip Efficiency	≥ 90%
Cycle Life	≥ 6,000 cycles @ 80% DoD
Operating Voltage Range	24V and above (model and design dependent)
Maximum Charge/Discharge Rate	≥1 C
Ambient Operating Temperature Range	-30°C to +50°C
Ambient Charging Temperature	-30°C to +50°C (self-heating for sub-zero charging)
Relative Humidity	0–95% RH (non-condensing)
Ingress Protection (Self or Enclosure)	≥ IP65
Noise Emission	≤ 65 dB(A)
Monitoring	BMS, mobile app, cloud-enabled
Safety Integrity Level	SIL-2 or Higher

3.1 Warranty & Performance

The system shall include a minimum 10 – year product warranty and a performance warranty ensuring at least 70% of initial capacity after 10 years or 6000 cycles @ 80% DoD.

3.2 Protection and Safety Requirements

LiFePO4 batteries shall be compliant with relevant IEC, IEEE, BS, EU and other international standards. The Battery backup should be equipped with comprehensive protection features, including Type II DC/AC surge protection, insulation resistance monitoring, and residual current detection. It should also provide cell-level temperature monitoring, emergency stop functionality, and integrated fire suppression for BESS systems. All safety measures shall comply with international standards and industry’s best practices.

3.3 Monitoring & Control

The battery system shall feature an advanced monitoring interface for real-time tracking of SOC, SOH, cell voltages, cell imbalances, current, and temperature. It should support remote monitoring and control via standard communication protocols and integrate with the site SCADA or EMS. The system shall enable charge/discharge scheduling ensuring safe and efficient operation across varying grid and load conditions.

3.4 Documentation & Services

The supplier shall provide complete documentation, including installation, operation, and maintenance manuals in English, along with factory test and type-test certificates. SCADA integration guides, remote monitoring manuals, on-site training, and commissioning support shall be included to ensure smooth deployment. The system must be compatible with energy management platforms and support future expansion and upgrades as required.

4. DC CABLE, EQUIPOTENTIAL BONDING AND DC EARTHING

Copper cables with purity of 99.9% or more with XLPO insulation and rated at 1500 V shall be used for string formation, equipotential bonding and earthing. Cables shall be low smoke Halogen free along with compliance with IEC and British standards. Minimum size for DC cables will be 4 mm². For DC cables, voltage drop shall be less than 1% at STC. Separate DC and AC

earthing each with 5 ohm or lesser resistance shall be achieved using the earthing arrangement.

6 mm² earth wires for equipotential bonding shall be used. In case same earthing is used for PV module equipotential bonding and lightning protection, the minimum cable size shall be 16mm². Relevant building codes and electricity acts shall be complied with.

4.1 Minimum Specifications Table

Parameter	Requirement
Cable Type	XLPO insulated, Halogen Free
Voltage Rating	1500 V DC
Conductor	Copper, ≥99.9% purity
Earthing Type	Rod / Bore type

5. LIGHTNING PROTECTION SYSTEM

Lightning protection system capable to withstand lightning currents of 100 kA with earthing resistance of 10 ohms or less shall be provided.

Lightning protection system include 5 spike on copper ball, copper tape, copper nail, copper staple, sand mortar, copper plate (600 x 600 x 3mm) and Bare conductor with complete erection of accessories as per project specified requirements.

6. CENTRALIZED AND REMOTE MONITORING SYSTEMS

The system shall integrate seamlessly with all plant devices via industry-standard communication protocols, incorporating robust cybersecurity for secure remote access and data integrity. Intuitive HMI dashboards shall provide clear visualization for operators for all roof top systems. The SCADA platform shall be designed in accordance with approved design requirements, supporting real-time data acquisition, command execution, and system optimization including fault detection, alarms and rectification time.

Online and real-time monitoring shall be provided with the following parameters along with the remote power on / off control.

- Energy generation (kWh)
- Power production (kW)
- String-level monitoring of Voltage and Current
- Storage and monitoring data for at least 5 years
- 4 x 55” TV Screens (For Centralized Monitoring)
- Server and accessories

6.1 Minimum Specifications Table

Parameter	Requirement
Communication Protocols	Modbus TCP/IP, IEC 104, IEC 61850
Connectivity	Ethernet, fiber optics, 4G/LTE (optional)
Data Logging	Historical trending, KPI reporting, alarms

Parameter	Requirement
Visualization	Web-based HMI, intuitive dashboards
Control Capability	Remote start/stop, parameter adjustments
Access Management	Multi-user with secure authentication
Cybersecurity	Encryption, firewall protection, role-based access
Integration	Inverters, BESS, Meters
Expandability	Modular for future device integrations
Operating Temperature	-30°C to +60°C
Warranty	≥ 5 years

SECTION – IV: AC SYSTEMS

Technical Specifications under this section focus on the AC network from Inverter to LV panels, however, wherever applicable the same shall be applied for DC Cables, Earthing, Breakers, Distribution Boxes as well.

1. LOW VOLTAGE (LV) DISTRIBUTION BOARDS

1.1.General

The Low Voltage Distribution Boards shall be sheet steel fabricated. These shall be suitable for surface mounting, semi-recessed or recessed in wall mounting. The Low Voltage Distribution Boards shall be totally enclosed, dust and damp proof. The Low Voltage Distribution Boards shall be complete in all respects with material and accessories, factory assembled, tested and finished according to the Specifications and to the normal requirements.

1.2.Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

BS 4752-1	-	Triple Molded Case Circuit Breaker
IEC 947	-	Single and Triple Miniature Circuit Breaker
IEC 947	-	Low Voltage Switch gear and Control gear
IEC 439	-	Factory Built Assemblies of LV Switch gear
IEC 4752		Switch gear and control gear for Voltages
BS 88	-	HRC Fuses
IEC 73	-	Colors for indicator lights and push buttons
IEC 446	-	Identification of insulated/bare conductors

1.3.Components

The Low-Tension Distribution Board shall be provided with components for the satisfactory operation of the electrical system.

Typical component specifications are given below:

1.3.1. Bus Bars

The bus bars shall be made of high conductivity electrolytic copper and shall be completely isolated and mechanically braced for the specified fault level. The phase identification of bus bars shall be by colors applied on bus bars and these shall be red, yellow and blue for phase and white for neutral. The earth bus bar shall be green.

1.3.2. Molded Case Circuit Breaker (MCCB)

The MCCB shall be of molded case type, provided with fixed magnetic short-circuit and fixed thermal overload protections.

1.3.3. Miniature Circuit Breaker (MCB)

The MCBs shall be appropriate current ratings as required. They shall be provided with fixed magnetic short-circuit and fixed thermal overload protections.

1.3.4. Push Buttons

Push buttons shall be momentary make break contact type (normally open/normally close).

1.3.5. AC voltmeters

The AC voltmeters shall be of digital type, suitable for flush mounting on switchboards, and shall provide a clear display for accurate measurement of voltage.

1.3.6. Ammeters

The AC voltmeters shall be of digital type, suitable for flush mounting on switchboards, and shall provide a clear display for accurate measurement of current.

1.3.7. Voltmeter Selector Switch

The voltmeter selector switch shall be complete with front plate, grip handle, and RY-YB-BR-OFF-RN positions.

1.3.8. Current Transformers

The current transformers shall be of air-cooled, ring-type construction and shall be suitable for the intended application. They shall be provided with adequate burden and accuracy class to ensure reliable measurement and protection functions.

1.3.9. Air Break Magnetic Contactors

The contactors shall be air break, suitable for the type of duty to be performed. Contactor shall be provided operating coil and auxiliary contacts wired up to terminals. The number of working auxiliary contacts shall be provided according to the system requirements.

1.3.10. Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, auxiliary transformer and shall have rosettes of suitable color.

1.3.11. Line up Terminals

Line up terminals wherever provided for control of lighting, power and control circuits shall be suitable for voltage and size of conductors. The line-up terminals shall be suitable for channel mounting. All necessary accessories shall be provided.

1.4. Installation

The actual location shall be determined at site, keeping in view the site conditions and in coordination with other equipment.

Low Voltage distribution board for recessed mounting in wall shall be installed such that the door shall finish flush with the surface of wall. The recess mounted distribution board shall be installed before the plastering of walls. The DB shall be protected to avoid any damage due to the civil work.

All loose parts dispatched separately with the DB shall be installed as per manufacturer instructions and all adjustments or setting shall be made, as required. All screws, nuts and bolts used for fixing the distribution board shall be galvanized. The distribution boards installation shall include connecting all incoming and outgoing cables. The cable entry in the boards shall be provided from top or bottom as required.

The distribution board body shall be connected to earth as per instructions described in section "Earthing" of these Specifications. The switchboard shall be tested and commissioned in the presence of the Employer’s Delegated Assistant.

2. LOW VOLTAGE CABLE

2.1.General

The work under this section consists of supplying, installing, testing and commissioning of all material and services of Low Voltage cables and the accessories.

The Contractor shall discuss the electrical layout with the Employer’s Delegated Assistant and coordinate at site with other services for exact route, location and position of the electrical lines.

The cable shall be suitable for nominal service voltage, have an insulated Conductor, shielded and sheathed. It shall be suitable for indoor and outdoor use in the transmission and distribution of electrical energy.

2.2.Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials within the scope of this section:

- BS 6360 - Conductors for insulated cables
- IEC 228 - Conductors for insulated cables
- BS 6500 - Insulated flexible cords
- BS 5467 - XLPE insulated cables

2.3.Material

2.3.1. Phase Identification

All cables shall have phase identification colors on insulation of each core. The color code for three phase circuits shall be;

- Red, Yellow and Blue for phase conductors.
- Black for neutral conductor.
- Green for earth conductor. Where XLPE insulated cable is installed.

Single phase circuits shall have insulation of;

- Red color for phase/line
 - Black color for neutral
 - Green color for earth conductor.
- All DC circuits shall have insulation of;
- Red color for positive conductor
 - Black color for negative conductor
 - Green color for earth conductor.

2.3.2. Cable Accessories

All accessories shall be provided for the complete cabling. These shall include but not limited to items such as saddles, clamps, fixing channels, connectors, cable joints (where necessary and as approved by the Employer’s Delegated Assistant), clips, lugs, tapes, solder, identification tags, bushes, glands, etc.

2.4. Installation

2.4.1. Cables in flexible/rigid pipes on surface

All cables for on surface pipes shall be installed through the pipes without the use of lubricants. The flexible/rigid pipes shall be fixed to wall/ceiling surface by means of cable clamps using Rawal plays and galvanized screws.

2.4.2. Underground Cable

The cables to be installed directly underground shall be laid in trench in single ties. The depth of cable underground, shall be three feet minimum, measured from the top of the largest cable to the general ground level. The burial depth may be increased as required due to site conditions or when crossing other service pipes and roads. Burial depth less than three feet and more than five feet shall require Employer's Delegated Assistant 's approval.

When cables crossroad, paved area, other services or other cables, they shall be laid in protective pipes of required size. Cables entering the buildings shall also be laid in protective pipes. The protective pipe ends, after installation of cables shall be plugged watertight by means of bituminized resin or equivalent method as approved by the Employer's Delegated Assistant. A minimum clearance of ten inches vertically and 20 inches horizontally shall be maintained between cables and other services.

Cable identification tags of corrosion resistant material shall be tied to cables with bronze wire at a maximum of 65 feet interval along the cable length for identification of cable and circuit. Above ground cable markers of 8 SWG (4 mm) sheet steel and 200 mm² shall be erected at 100 feet intervals along the straight trench, and at each bend and joint box for indication of presence of underground cable. For more than three feet wide trenches, cable markers shall be provided at both edges of the trench. The cable marker shall be finished in Gray heavy enamel paint over two base coats of anti-rust red oxide paint, with the necessary instructions indicated in approved colors.

The Contractor shall furnish samples of cable marker for approval of Employer's Delegated Assistant before installation. The marker shall be welded to an angle iron fixed to the ground on a cement concrete base or as directed by the Employer's Delegated Assistant. The earth continuity conductor shall be laid in the trench with the cables. The Contractor shall submit to the Employer's Delegated Assistant for approval, schedule of cable markers showing location of marker and instructions on each.

Before laying of cables in the trench, the bed of the trench shall be leveled and filled with a four-inch-thick layer of fine sand (1/32-inch diameter maximum particles size). The sand layer shall be leveled and the cables placed thereon; the cables shall be covered with a layer of fine sand four-inch thick measured above the top of the largest cable.

The cable protective bricks placed above the top of sand cover shall be of Class - C cement concrete, minimum two-inch thick and 12 inches x 12 inches square or as approved by the Employer's Delegated Assistant. The bricks shall be placed over the sand layer end to end to cover the entire length and breadth of the cable trench, after the concrete bricks are placed, the remainder of the trench shall be backfilled with earth in layer 16 inches thick. Each layer shall be thoroughly tamped and compacted.

Sufficient slack shall be left in cables for which purpose the cut lengths of cables shall also about 3% more in the measured lengths between terminations. At underground joint box, ample slack shall be left to prevent straining of cable joints due to settlement of the cable trench.

The cut lengths of cables wherever stated are only as a guide. The cable shall not be bent to a radius less than that recommended by the cable manufacturers.

Pipes/ pipes/ ducts for electrical, PSD & ITS etc. cables shall be properly sealed with the water proofing material “Plastic Polyurethane Foam” as per relevant ASTM standard to avoid rainwater entry to the pipes. The contractor shall also provide the technical data of the sealant material before the execution of the work.

3. CABLE TRAYS

3.1. General

The Contractor shall discuss the layout with the Employer’s Delegated Assistant and coordinate at Site with other services for exact route, location and position of the cable trays for electrical lines.

3.2. Applicable Standards/Codes

Latest editions of the following standards / codes shall be applicable for the materials in scope of this Section:

BS 729 - Hot dip galvanized coating on iron and steel articles

3.3. Materials

- The whole of the tray work, trays, fittings, supports shall be of mild steel hot dipped galvanized. The thickness of the protective sheath on any element shall not be less than 55 microns.
- Cable trays shall be constructed from mild steel hot dip galvanized and of minimum thickness of 1.5mm.
- Insert elements, bolts, screws, pins, etc., shall be mild steel cadmium plated.
- Tray work shall have oval perforations. Ladder type trays shall be used for vertical runs as approved by the Employer’s Delegated Assistant.
- All trays (straight and fittings) shall be welded construction and be a heavy duty returned-flanged, perforated type, unless specified otherwise. The minimum thickness of heavy duty returned flanged cable trays shall be 1.5mm.
- Tray components shall be accurately rolled or formed to close tolerances and all edges rounded. Flanges shall have full round smooth edges.
- Ladder racks shall be of similar construction. The rungs shall be spaced at maximum 300 mm. The system shall allow for installing additional rungs and for replacement of rungs.
- For all trays, flanges shall be a minimum of 50 mm deep, unless otherwise specified.
- Cable trays and accessories installed in hazardous and extremely corrosive environments shall be heavy duty grade stainless steel.

3.4. Installation

- Drilling, machining or cutting shall not be carried out after application of protective coat, unless previously agreed by the Employer’s Delegated Assistant. If cutting or drilling is necessary, edges shall be cleaned up and painted with zinc-based paint before erection.
- Installation of vertical runs of tray along the line of vertical expansion joints in structure of the facility shall not be allowed.
- Cables shall be fixed to the trays by means of PVC covered saddles or straps secured with brass or cadmium plated bolts, nuts and washers.

- 20% spare capacity shall be maintained once all cables have been installed on trays. Double banking of cables shall not be permitted space between adjacent cables shall be not less than the radius of the bigger cable.

The Contractor shall calculate the size of the tray and submit to the Employer’s Delegated Assistant for approval.

The Contractor shall check the minimum size as specified is large enough for his requirements and provide 20% spare capacity for future use.

3.5. Erection

Cable trays arranged one above the other shall have spacing in relation to their width not exceeding a ratio of 1:2 with a minimum distance of 150 mm.

3.5.1. Supports

Install fixings and supports:

- (a) at 3 meter centers
- (b) 50 mm from bends, tees, intersections and risers
- (c) as close as practicable to joints
- (d) each side of expansion joints.
- (e) Supports shall be selected from the following types, to suit the site conditions:
- (f) M12 steel threaded drop rods fixed to ceilings complete with GI channels or brackets
- (g) wall support brackets cantilever arms
- (h) steel channels

The cable trays shall be fixed in accordance with site conditions and manufacturer’s recommendations. Join cable tray and accessories with hardware per manufacturer’s recommendations. Avoid mid-span joints.

The Contractor shall submit, as required, all calculations relating to tray work and tray supports demonstrating acceptable mechanical stresses and sag. Cable trays installed on roofs shall be supported using GI brackets or concrete blocks. Removable cable tray cover shall be fitted.

3.6. Earthing Of Cable Tray

Cable trays and accessories shall be electrically and mechanically continuous throughout their length.

The entire cable tray system shall be bonded and 12 mm x 2.5 mm tinned copper links shall be bolted across each joint in the system by means of bronze nut and bolts, complete with flat and spring washers.

All cable trays shall be provided with earth continuity copper tape along the whole route of cable trays which shall be bonded to the main earthing system of the facility. The earth continuity copper tape shall be fixed on cable tray by means of PVC covered saddles or by other means approved by the Employer’s Delegated Assistant.

4. PIPES

4.1. General

The work under this section consists of supplying, installing, and commissioning of all material and services of the pipes.

The Contractor shall discuss the layout with the Employer’s Delegated Assistant and coordinate at Site with other services for exact route, location and position of the pipes for electrical lines.

The Contractor shall ensure exact location and route of pipes as per site requirements and as directed by the Employer’s Delegated Assistant.

4.2. Applicable Standard/Codes

Latest editions of the following standards / codes shall be applicable for the materials in scope of this Section:

- BS 6099 - PVC pipes and accessories.
- BS 3595 - PVC pipes & accessories.
- BS 4346 - Cement Solvent for jointing

4.3. PVC Pipe and Accessories

The PVC pipe shall be rigid. All pipes shall be minimum Class D (Working pressure - 12 bar). The buried PVC pipe should be able to withstand the external load acting upon it by continuous movement of heavy duty vehicles such as trucks. Cranes, forklift, etc. Where pipe change direction, manufactured smooth bends shall be used. Bending of pipes by heating or otherwise will be allowed in special cases only. Bending of pipes by heating shall be carried out by first filling the pipe with sand inside and then immediately removing the sand. The use of sharp 90-degree bends and tees will not be allowed. The bends shall conform to same specifications as given for PVC pipes. for joining of pipe all precautions and procedures recommended by manufacturer shall be followed.

4.4. Installation

4.4.1. PVC Pipe

Rigid PVC pipes shall be installed under roads and paved areas, at crossing with other services. The depth of the pipe shall vary according to the conditions at site, and approval of Employer’s Delegated Assistant shall be obtained prior to installation. In general the pipes shall be installed underground at the following depths measured from the top of the pipe:

- a) Under roads and paved surface 900 mm below the finished surface
- b) When crossing other services 250-mm vertical clearance. for the crossing length.
500 mm horizontal clearance with CC protective cover.

The trench of required dimensions shall be excavated and the bottom of trench cleaned and levelled. A Four-inch-thick bed of fine sand shall be provided over which the PVC pipes installed after proper alignment. Where two or more pipes are installed in the same trench the clearance between pipes shall not be less than Two inches. After laying of pipe the trench shall be backfilled with clean-screened earth in layer of Four inches. Each layer shall be properly compacted.

Where underground cables enter connection terminal boxes the PVC pipe shall be installed on surface by means of PVC clamps at a maximum interval of 18 inches.

After installation, the ends of the pipe shall be plugged with material impervious to water and chemicals. All joints shall be sealed adequately to prevent entry of foreign elements.

The installation of pipes shall be completed in all respects including its fixing at terminations,

before cabling work is started. All sharp edges and burrs shall be removed by using reamer or any approved device. The pipe shall be thorough cleaned of dirt and dust from inside. the pipes shall be installed in proper co-ordination with other works.

5. EARTHING

5.1. General

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories of the complete earthing system

The Contractor shall discuss the electrical layout with the Employer’s Delegated Assistant and Coordinate at Site with other services for exact route, location and position of the electrical lines and equipment.

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

5.2. Applicable Standards/Codes

The latest editions of following standards/codes shall be applicable for the materials in scope of this section: -

- BS 951 - Earthing Clamps
- CP 1013 - Earthing
- BS 2874 - Nuts, bolts, washers, screws & rivets fixing.
- BS 1433 - Hard drawn bare copper conductor for earthing.

5.3. Material

5.3.1. Earth Electrode (Rod Type)

The earth electrode shall comprise ten feet long, 5/8 inch dia. copper deposited steel rod having flat head at drive end and pointed conical tip at the driven end. The tip shall be hardened to facilitate driving. At the top of the rod, a clamp for bolted connections shall be provided suitable for connection to the down conductor.

5.3.2. Earth Electrode (Bore Type)

The earth electrode shall comprise of Tinned copper earth spike. At the top of the pipe, a clamp for bolted connections shall be provided suitable for connection to the down conductor.

5.3.3. Earthing Lead

The earthing lead shall connect the earth electrode to earth connecting point and on the metallic part. It shall be round hard drawn bare electrolytic copper.

5.3.4. Earth Continuity Conductor

Earth continuity conductor (ECC) shall be hard drawn bare copper wire or single core XLPE insulated copper conductor cable of sizes.

The specifications for single core XLPE insulated or PVC/PVC cables used as ECC shall be same as those in relevant sections of Technical Specifications.

5.3.5. Earth Connecting Point

Earth connecting points shall comprise tinned copper bar, rectangular in shape, having dimensions of 350 x 50 x 6 mm. At least, six terminals for connection shall be arranged on the bar, which can be increased or decreased as required by the Employer’s Delegated Assistant.

The terminals shall have brass or tinned copper bolts, nuts and washers for protection against corrosion. Two holes shall be provided off Centre of the copper bar for fixing to the wall by means of 10 mm dia. nut and bolt/ Rawal bolt and shall be insulated by means of rubber gaskets/washers/ insulators.

5.4. Installation

5.4.1. General

The earthing system shall have earth resistance, including the resistance of soil, earth leads and ECC shall not be greater than five (05) ohms.

At all connections of earth continuity conductor to high mast or any other metallic body, proper size copper or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or terminations shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket.

5.4.2. Earth Electrode (Bore Type)

The earth electrode/spike shall be placed after bore at site. The bore shall be made up to permanent water level of 80 feet which ever is less. The earth electrode shall be connected to the earthing conductor of suitable size. The earthing conductors shall be laid in a perforated GI pipe of suitable size.

In case the soil conditions at site permit, the earth electrodes may be installed by hammering the electrode in soil, until the top of the rod is about 12 inches below the proposed ground level. If hammering down is not possible due to site conditions, a pit shall be first excavated in bare ground up to the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 20 inches, each layer tamped and compacted. The inspection chamber shall have a cover supported on angle iron frame. The cover shall be approved by the Employer’s Delegated Assistant and shall finish flush with the ground level.

5.4.3. Earth Electrode (Rod Type)

In case the soil conditions at site permit, the earth electrodes may be installed by hammering the electrode in soil, until the top of the rod is about 12 inches below the proposed ground level. If hammering down is not possible due to site conditions, a pit shall be first excavated in bare ground up to the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 20 inches, each layer tamped and compacted.

5.4.4. Earth Continuity Conductor

The body of all switchboards shall also be connected to earth by specified size of ECC. All other metal work shall also be connected to earth by specified size of ECC.

At any joint or terminations, the ECC shall be connected using proper accessories. No connection shall be made by twisting of earth conductors.

5.4.5. Earth Connecting Point

The earth connecting point shall be fixed on wall surface by means of brass screws.

6. LOW VOLTAGE SWITCHBOARDS

6.1. General

The work under this section consists of design, manufacturing, fabricating, supplying, installing, testing, and commissioning of all material and services of the complete LV (LV) switchboard for indoor installation.

The Contractor shall discuss the electrical equipment and power & control cables layout with the Employer’s Delegated Assistant and coordinate at site with other services for exact locations and positions of the electrical lines and equipment.

6.2. Low Voltage Switchboard

The LV switchboard shall be sheet steel fabricated. The LV switchboard shall be totally enclosed, dust and damp proof. The LV switchboard shall be complete in all respects with material and accessories, factory assembled, tested and finished. The enclosures of LV switchboards and Bus Tie Duct shall be provided with rubber gasket and a lockable hinged door with cam fastener.

6.3. Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

- IEC 947 - Triple pole Air Circuit Breakers
- BS 4752-1 - Triple pole Molded Case Circuit Breaker
- VDE 0641 - Single and Triple pole Miniature Circuit IEC 947 Breaker.
- IEC 947 - LV Switch gear and Control gear
- IEC 439 - Factory Built Assemblies of LV Switchgear
- IEC 4752 - Switch gear and control gear for Voltages up to and including 1 kV
- BS 88 - HRC Fuses
- IEC 73 - Colors for indicator lights and push buttons.
- IEC 446 - Identification of insulated/bare conductors

6.4. Components

The LV switchboard shall be provided with components as specified in these specifications.

Typical component specifications are given below: -

6.4.1. Bus Bars

The bus bars shall be made of high conductivity electrolytic copper and shall be completely isolated and mechanically braced for the specified fault level. The phase identification of bus bars shall be by colors applied on bus bars and these shall be red, yellow and blue for phases and white for neutral. The earth bus bar shall be green.

6.4.2. Moulded Case Circuit Breaker (MCCB)

The MCCB shall be molded case. The MCCBs shall have fixed Magnetic Short circuit and fixed Thermal Overload protections. All incoming circuit breakers shall be MCCBs.

6.4.3. Air Circuit Breaker (ACB)

Air Circuit Breaker (ACB) shall be of withdrawable metal-clad, flush mounted. Horizontal draw-out isolation and air break type suitable for installation on cubicle type of switchboard. They shall be three or four poles as specified. They shall consist of quick-make, quick-break, mechanically and electrically trip free mechanism to give double break in all poles simultaneously. The closing mechanism shall be of stored energy type, either manually or electrically charged.

6.4.4. Miniature Circuit Breaker (MCB)

These shall have fixed magnetic short circuit and fixed thermal overload protections. The miniature circuit breakers shall have a short circuit breaking capacity as per international standards. These Circuit Breakers shall be suitable for working on lighting and power circuits.

6.4.5. Air Break Magnetic Contactors

The contactors shall be of air-break type, suitable for the duty required. The main contacts shall be silver-tipped, butt-type with double break per pole. Each contactor shall be provided with an AC operating coil and shall have a minimum of two normally open (NO) and two normally closed (NC) auxiliary contacts wired up to terminals. Additional auxiliary contacts shall be provided as required to meet the system requirements.

6.4.6. Push Buttons

Push buttons shall be momentary make break contact type (normally open/normally close). These shall be suitable for flush mounting on switchboard, plastic faceplate etc. Push buttons shall have round/square head. These shall be of red color for 'ON' and green color for 'OFF' operations.

6.4.7. AC voltmeters

AC voltmeters shall be digital type and shall be suitable for flush mounting on front door of the switchboards.

6.4.8. Ammeters

AC ammeters shall be digital type and shall be suitable for flush mounting on front door of the switchboards.

6.4.9. Voltmeter Selector Switch

The voltmeter selector switch shall be complete with front plate, grip handle, and RY-YB-BR-OFF-RN positions.

6.4.10. Ammeter Selector Switch

The ampere meter selector switch shall be complete with front plate, grip handle, and R-Y-B-OFF positions.

6.4.11. Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, neon lamp and shall have rosettes of suitable color.

6.4.12. Current Transformers

Air-cooled, ring type current transformers shall be provided having transformation ratio. The current transformers shall be of suitable burden having accuracy class.

6.4.13. Line up Terminals

Line up terminals wherever provided for control of lighting, power and control circuits shall be suitable for voltage and size of conductors. The line-up terminals shall be suitable for channel mounting. All necessary accessories such as end-plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

6.5. Installation

The location shall be determined at site, keeping in view the site conditions and in coordination with other equipment.

LV switchboard for floor mounting shall be installed on already prepared CC cable trenches. The LV switchboards shall be protected to avoid any damage due to civil work.

All loose parts dispatched separately with the switchboard shall be installed as per manufacturer instructions and all adjustments or setting shall be made as required. All screws, nuts and bolts used for fixing the switchboard shall be Galvanized.

7. AMI Meters

AMI meters to be deployed at RTS should comply with relevant WAPDA/PEPCO specifications and applicable IEC standards for metering accuracy, performance, safety, and data communication. The meters shall support two-way communication, remote reading, load profiling, tamper detection, and remote connect/disconnect functionality. They should include integrated GSM/GPRS or RF communication modules, enable secure data exchange with the head-end system, and maintain event logging with timestamps. The meters must also be capable of accurately measuring and recording both import and export energy. In addition, they shall meet electrical, mechanical, and environmental endurance requirements to ensure reliable and accurate operation under local site conditions.

SECTION – V: CIVIL & STRUCTURE WORKS

1. Civil Works:

1.1 Design Standard and Code

For material and civil design, The Contractor shall conform to the applicable requirements of the latest revisions of following standards and publications, in principle.

ASTM	American Society for Testing and Materials
ACI	American Concrete Institute
ISO	International Standard Organization
ASCE/SEI - 7	Minimum Design Loads for Buildings and Other Structures
UBC	Uniform Building Code
PBC	Pakistan Building Code
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C150	Standard Specification for Portland Cement
ASTM C260	Standard Specification for Air Entraining Admixtures for Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C989	Standard Specification for Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D1586	Standard Penetration Test
ASTM D2937	Standard Test Method for Density of Soil in Place by the Drive - Cylinder Method

1.2 Design Conditions

The design values to be used in this Project are as follows:

(a) Minimum Seismic Design

Structures and portions thereof shall, as a minimum, be designed and constructed to resist the effects of seismic ground motions per Zone 3 (0.32g) as provided in Pakistan Building Code.

(b) Design Wind Pressure

Wind Pressure $P_w = C \times q$

Where, $q = \frac{1}{2} \times \rho V^2$

$\rho =$ Air density/acc. (0.125 kg sec²/m⁴)

V= Wind velocity (45 m/sec)

C = Shape factor

(For Circular equipment = 0.85)

(For Angular equipment = 1.2)

1.3 Design Of Foundations

1.3.1 Foundations

All foundations shall be designed with top level 200mm above natural surface level (NSL)/ Finish Floor Level (FFL) unless specified otherwise. Appropriate slope shall be provided at the top of each foundation to prevent accumulation of rainwater.

The loads for design of foundation shall be taken from the foundation reactions calculated in the design of respective solar panels after applying appropriate load factors. The Contractor shall submit design calculations and load analysis for design of footings, retaining/protection walls, building works and other allied works for Employer's Representative or his delegated Assistant's review under Sub-Clause 5.2 of CoC..

The uplift coming at each support member of PV mounting structure shall be solely encountered by the requisite foundation pad weight or as approved by the Employer's Representative or his delegated Assistant. However, on existing CGI sheets The Contractor shall ensure the anchoring arrangement/details for the PV mounted structure and get the approval from the Employer's representative or his delegated Assistant.

All the PV mounting structure should be galvanized with relevant standard as approved by the Employer's representative or his delegated Assistant.

Protective coatings shall also be applied on foundations in contact with the soil and cost of protective coatings shall be deemed included in the price of the respective civil work/foundation.

1.4 Earth Work

1.4.1 Levelling of Site

The Contractor shall level the Site as required and to the extent considered necessary by the Employer's Representative or his delegated Assistant.

1.4.2 Excavation

- Excavation under this section shall consist of the dewatering, removal, hauling, dumping, and satisfactory disposal of all materials from required excavations for levelling the site area and construction of Civil Works. Excavation in rock/gravel strata by means of drilling, blasting, chemicals etc. shall also be done by The Contractor wherever required for which no additional cost will be permissible by The Contractor.
- Any and all excess excavation for the convenience of The Contractor or over-excavation performed by The Contractor for any purpose or reason, except as may be ordered in writing by the Employer's Representative or his delegated Assistant, and whether or not due to the fault of The Contractor, shall be at the expense of The Contractor.

1.4.3 Filling and Back-Filling

- Except as noted otherwise in the Specifications or the drawings, all the materials for filling and back-filling shall comply with the following requirements:

- Material shall not include any harmful materials, such as fertile soil or pieces of wood, slurry, mud, organic and other unsuitable material. The Contractor shall submit test reports of chemical properties (sulphate, chloride, etc.), organic content and pH value for the material which shall subject to approval by the Employer’s Representative or his delegated Assistant.
- Material shall not be of an extreme swelling nature.
- The gradation of the general fill/borrow fill material shall conform to the following limits or as approved by the Employer’s Representative or his delegated Assistant:

Material Size, U.S. Sieve Series	Percent Finer Than, by Weight
No. 10	100
No. 50	70 – 95
No. 100	25 – 75
No. 200	0 – 15

- The compaction shall be made in the field by raming machines or other mechanical means as approved by the Employer’s Representative or his delegated Assistant. The layer of compacted earth filling shall not be more than 15 cm per lift, and it shall be graded as horizontally as possible, and shall be sufficiently compacted to produce not less than 95% of laboratory maximum dry density as determined by ASTM Designation D1557 “Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort”. Field dry density shall be measured according to ASTM D-1556 - Standard Test Method for Density and Unit Weight of Soil in Place by Sand - Cone Method or ASTM D-2937 “Standard Test Method for Density of Soil in Place by the Drive - Cylinder Method” or other methods as approved by the Employer’s Representative or his delegated Assistant.
- Unless otherwise specified the base of all ground floors shall be constructed in accordance with the following specification.
- Sand filling shall be done in layers not more than 4 inch (100mm.) thick and shall be rammed after saturation to such an extent that 100mm (4 inch.) Layer is reduced to about 75mm (3 inch.) after compaction.
- Density achieved should correspond to 95% of the compaction obtained by ASTM 1557 at optimum moisture content.
- The base shall be perfectly level. Sand shall conform in all respects to the specifications for fine aggregate except for its grading, i.e. it shall pass through sieve No.16 and not more than 30% shall pass through sieve No. 100.

1.5 Concrete

1.5.1 Materials

The Contractor shall furnish all materials for use in concrete, including but not limited to cement, sand, coarse aggregate, water, reinforcing bars, admixture (including ground slag) and concrete curing compound. Air-entraining agent and curing compound shall be accepted on manufacturer's certification of compliance with specification requirements. However, the Employer's Representative or his delegated Assistant reserves the right to require submission of and to perform tests on samples of the agent and/or compound prior to shipment and use in the Work at the cost of Contractor.

Cement

Cement shall meet the requirements of ASTM C150 and shall meet the false-set limitations specified therein. The cement shall be free from lumps and damaged cement when used in concrete. Adequate provisions shall be made to prevent absorption of moisture when cement is stored. Cement Type-I shall be used. No extra payment shall be made to The Contractor in case, if sulphate resistant cement is used.

Cement Mill Test Certificates, when requested, shall be provided for each shipment of cement. Under no circumstances shall the source of cement be changed without prior written approval of the Employer's Representative or his delegated Assistant.

Sand and Coarse Aggregate

Sand and coarse aggregate shall be furnished from any approved source. The sand particles shall be clean, hard, dense, durable, uncoated rock fragments that will pass a screen having 6.5mm square openings. The sand shall be well graded from fine to coarse and shall be free from injurious amounts of dirt, organic matter, and other deleterious substances.

The coarse aggregate shall consist of clean, hard, dense, durable, suitable graded, uncoated rock fragments, shall be free from injurious amounts of flakes and elongated pieces, organic matter, or other deleterious substances. The maximum size of crushed coarse aggregate shall be 38mm/19mm or as directed by the Employer's Representative or his delegated Assistant. The grading of these sizes shall conform to ASTM C33. Lean Bed should be prepared underneath for dumping of Coarse Aggregate & Fine Aggregate to avoid mixing of soil and loose particles in the dump at site.

The Contractor shall submit, for testing and approval, representative samples of the sand and coarse aggregate proposed for use in the concrete work. All aggregates shall conform to the requirements of ASTM C33 including Petro-graphic test. During construction The Contractor shall also arrange testing of sand and coarse aggregate if directed by the Employer's Representative or his delegated Assistant to determine compliance with Specifications. The cost of all laboratory testing of these samples shall be borne by The Contractor.

Following tests shall be performed on sand and coarse aggregate to be used in construction:

- Gradation Analysis
- Sodium Sulphate Soundness
- Water Absorption
- Fineness Modulus (for sand)

- Sulphate and Chloride
- Los Angeles Abrasion (for coarse aggregate)
- Alkali-Silica or Potential Reactivity
- Petro-graphic Examination for suitability with OPC and SRC
- Flakiness and Elongation Indices (for coarse aggregates)

Fine Aggregate for Plastering shall conform to the requirements of ASTM C897.

Water

Water used for mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or reinforcement and shall meet the requirements shown in Table below. A complete chemical analysis of water shall be submitted prior to the start of construction work and shall be required for each new water source being chosen. The cost of all laboratory tests of the samples shall be borne by The Contractor. No change in water source shall be permitted without prior approval by the Employer’s Representative or his delegated Assistant..

Total Dissolved Solids (TDS)	800 ppm (max)
Magnesium, Chlorides and Sulphates	300 ppm (max)
pH Value	6.5 – 8.0

Reinforcing Bars

Reinforcing bars shall be deformed bars conforming to ASTM Designation A615, Grade 60. Representative steel bar samples shall be collected from the site and tested in the laboratory approved by the Employer’s Representative. The testing shall be witnessed by the Employer’s Representative or his delegated Assistant.. The cost of all laboratory tests and travelling of Employer’s Representative or his delegated Assistant shall be arranged/borne by The Contractor. Negative variation in weight [mass] up to maximum 2.0% of reinforcement bar(s) from the applicable weight [mass] per unit length prescribed in Table 1 of ASTM A615 will be allowed for bar(s) placement. Contractor will have to make adjustments in bar spacing/number of bars to accommodate the excessive negative variation in weight [mass] if greater than 2.0%. Contractor will not be allowed for bar(s) adjustment in case of overweight [excessive mass] of any deformed bar.

Admixtures and Ground Slag

Admixtures to be used in concrete shall be subject to prior approval of the Employer’s Representative or his delegated Assistant, and shall meet the following requirements:

- (i) Chemical Admixtures
 - Air-entraining admixtures shall conform to the requirements of ASTM C260, "Standard Specification for Air-Entraining Admixtures for Concrete.
 - Water reducing or retarding admixtures (normal plasticizers) shall conform to the requirements of ASTM C494, "Standard Specification for Chemical

Admixtures for Concrete”, Type A or D, respectively.

- High range water reducing or retarding admixtures (super plasticizers) shall conform to the requirements of ASTM C494, Type F or G, respectively.
- Only one of the admixture Type A, D, F or G, shall be added at a time.
- Chloride bearing admixtures shall not be permitted.
- Super Plasticizers shall be checked for their compatibility with pozzolanic materials in blended cement concrete.

(ii) Ground Granulated Blast-Furnace Slag

In area where high sulphate and chloride contents are present in soil/water, finely ground granulated blast-furnace slag can be used as cementitious material in concrete by replacing SRC maximum up to 30%. The properties of ground granulated blast-furnace slag should conform to the requirements of ASTM C989.

The cost of all laboratory testing of these samples shall be borne by The Contractor. Contractor will not be paid extra cost for the procurement of ground granulated blast-furnace slag to the construction site.

Air-Entraining Admixture and Cold Weather Concreting

It is mandatory that in all the concrete works air-entraining admixture conforming to ASTM C 260 shall be used. Guide to Cold Weather Concreting (ACI 306R) specifying concrete producers through the selection processes that identify methods for cold weather concreting will have to be opted. The objectives of cold weather concreting practices are to: a) prevent damage to concrete due to freezing at early ages; b) ensure that the concrete develops the recommended strength for safe removal of forms; c) maintain curing conditions that foster normal strength development; d) limit rapid temperature changes; and e) provide protection consistent with intended serviceability of the structure. Concrete placed during cold weather will develop sufficient strength and durability to satisfy intended service requirements when it is properly proportioned, produced, placed, and protected. Contractor will not be paid for the admixtures and precautionary measures to safeguard the concrete (prior, during and after).

1.5.2 Composition

- (a) The Contractor shall determine the proportions of water, sand, coarse aggregate, cement and admixture (if required) needed to provide concrete, meeting the requirements of these Specifications and shall be approved by the Employer’s Representative or his delegated Assistant. Concrete ($210\text{kg}/\text{cm}^2$) which contains 25mm or 19mm maximum size aggregate shall have a cement content of not less than 380 kg per cubic meter. The net water-cement ratio by weight shall not exceed 0.5. Surface water contained in the aggregate shall be included as part of the mixing water in determining the water content. Reinforced concrete design will be checked in accordance with the ACI Code.
- (b) The Contractor will take minimum three test cylinders (152mm x 305mm) from the same batch and the average compressive strength at 28 days shall exceed $210\text{ kg}/\text{cm}^2$ (3000 psi) or $140\text{ kg}/\text{cm}^2$ (2000 psi) and no individual test value should fall more than $35\text{ kg}/\text{cm}^2$ (500 psi) from the minimum specified value.

The compressive strength of the concrete will be determined by the Employer’s Representative or his delegated Assistant. through the medium of test cylinders (152mm

x 305mm) made and tested in accordance with ASTM C39. The Contractor shall furnish all necessary sampling equipment such as slump cones, test cylinders, etc. at the site. This equipment is to be approved by the Employer’s Representative or his delegated Assistant. Or nominated person by Employer’s Representative. The cost of the material lab tests shall be borne by The Contractor.

The use of calcium chloride in concrete will not be permitted.

(c) The slump of concrete shall not exceed 75mm for Conventional Foundations and 150mm for piling.

1.5.3 Batching and Mixing

Unless specifically approved by the Employer’s Representative or his delegated Assistant., all concrete used on the Project shall be machine mixed. Hand mixing shall only be used when authorized by the Employer’s Representative and shall be performed under his directions.

1.5.4 Conveying and Placing of Concrete

Unless otherwise mentioned on the drawings or approved by the Employer’s Representative or his delegated Assistant., all concrete placed will be monolithic.

Forms shall be sufficiently tight to prevent loss of mortar from the concrete and shall be maintained rigidly in position until the concrete has hardened sufficiently to prevent damage by form removal. All surfaces of foundations upon or against which concrete is to be placed shall be free from standing water, mud and debris.

Concrete shall be vibrated (internal vibrators having a minimum frequency of 8,000 vibrations per minute) until it has been consolidated to the maximum practicable density, free from rock pockets of coarse aggregate, closes snugly against all surfaces of forms and embedded materials. Standby vibrators shall be available during concrete placement.

Exposed unformed surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonably smooth wood float or steel-trowel finish as directed.

The height of the end of buckets and hoppers shall be at most 1.0m above the level of placement.

1.5.5 Protection and Curing

The Contractor shall protect all concrete against injury until final acceptance.

The concrete, after being placed, shall be cured with water at least for fourteen (14) days or as directed by the Employer’s Representative or his delegated Assistant. Until it gains sufficient strength to a degree that works can be done without impairing it. Immediately after form removal, the surfaces should be kept continuously wet by water.

Bituminous Emulsion Waterproof & Protective Coating will be applied below ± 0.00 level to all structure elements. A minimum of two applications shall be required, and the applications shall be 100 percent effective. Surfaces to be treated shall not be coated with curing compound. No extra payment will be made to The Contractor for treating concrete surfaces with bituminous compound.

1.5.6 Repair of Concrete

Any concrete that is damaged or defective from any cause; that is honey-combed, fractured or otherwise defective, and concrete damaged because of excessive surface depressions or any imperfections and irregularities on concrete surfaces, shall be removed, replaced and corrected to bring the surfaces to the prescribed lines. The removal and replacement of damaged or

defective concrete, and the correction of surface imperfections and irregularities shall be made with concrete dry pack, or mortar (Portland cement-sand mortar), or at the option of The Contractor, with epoxy-bonded concrete, or epoxy-bonded epoxy mortar, where and as applicable for the type of repair involved. All repairs should be completed within 24 hours after removal of forms, and as directed by the Employer’s Representative or his nominated person.

1.6 Steel Structures

This Section comprises the Standards and Specifications pertaining to the fundamental requirements of design, manufacture, testing, inspection, supply and erection of structural steel including galvanized anchor bolts, base plates, stiffeners, rafters, post, purlins etc. for supporting the solar panels.

All drawings and statements shall be in English language and Metric System of measurements shall be used.

Design, manufacturing, testing, inspection, supply, erection, installation, commissioning and guaranteeing of all steel support structures required or specified or implied herein are included in the scope of the Contract. The material and fabrication shall be the best of their respective kinds and to a standard not less than specified herein.

All steel material shall be hot dip galvanized. The Contractor shall ensure proper fitting and alignment of offered structures.

The Contractor shall be responsible for submitting all detail designs and drawings as required or specified herein based on information provided in the Contract Documents and as directed by the Employer’s Representative or his delegated Assistant.

The Contractor shall submit the Finite Element Model (FEM) along with the calculations for each structural component for review and approval from the Employer’s Representative or his delegated Assistant.

The Contractor shall prepare as-built drawings/documentation and submit to the Employer’s Representative or his delegated Assistant.

The minimum thickness of the structural steel element shall not be less than 2.5mm.

1.6.1 Structural Loadings

Loading and design shall be in accordance with the requirements of the latest ASCE Manual and ASCE Standard 10 based on the information hereof.

1.6.2 Wind Loads

Structures shall be designed for (i) wind acting at 90 degrees to the surfaces (ii) wind acting at 135 degrees (45 degrees) to the surfaces. Wind pressure corresponding to 160 km/hr wind velocity acting horizontally in any direction at 25°C everyday temperature shall be used and as per the latest guidelines provided by the ASCE or PBC.

1.6.3 Snow Loads

Structures shall be designed against snow loadings as per ASCE 7-22.

1.6.4 Vertical Loads

Equipment weights and dead loads together with estimated construction/maintenance loads as required.

1.6.5 Loading Due to Thermal Forces

Thermal stresses caused by a temperature variation as indicated in special provisions shall be taken and expansion joints shall be provided at the appropriate locations.

1.6.6 Earthquake Intensity

Horizontal earthquake acceleration of an intensity of minimum 0.32g acting in any direction shall be considered for the design of ground structures acting in any direction irrespective of their height and flexibility. The above value shall be considered as the Peak Ground Acceleration (PGA).

All the joints and base mounted fastening of free-standing electrical equipment such as circuit breakers, dis-connectors/isolators, instrument transformers, line traps, bus bars, surge arresters and post insulators shall be designed to resist the effects of an acceleration intensity minimum 0.32g in any direction.

1.6.7 Slenderness Ratio (L/r)

Determination of L/r ratio and allowable compressive stress shall be followed as:

The maximum L/r ratio of a member shall not exceed to the following limits:

For main compression member	150
For secondary members carrying calculated stresses	200
For redundant members without calculated stresses	250

1.6.8 Materials

All materials shall be of the highest grade free from defects and imperfections of recent manufacture, unused and of the classification and grades designated, conforming to the requirements of the latest revision of the relevant Standards cited herein. All structural steel sections, plates and its connection bolts, nuts, washers shall be hot dip galvanized after fabrication.

1.6.9 Structural Steel

All structural steel shall be supplied in accordance of minimum Grade A50 for Parking Shed and steel structure for roof/ground mounted and roof/ground elevated shall be supplied in accordance with minimum Grade A36.

1.6.10 Bolts and Nuts

All steel structure connection bolts and nuts shall be of steel and shall conform to the requirements of ISO 898-1 (minimum 6.8 property class), ISO 898-2 (minimum 6.8 property class), DIN 7990 and DIN 555. All steel structure connection bolts, nuts, washers shall be of minimum 12 mm size.

All connections shall be bolted type and shall be designed for 100%-member capability. 5% surplus of bolts, nuts, washers and check nuts shall also be supplied. A connecting bolt shall contain one nut, one washer and one check nut.

1.6.11 Steel Fabrication

Holes

All holes shall be clean-cut without torn or ragged edges. All burrs resulting from reaming or drilling shall be removed. All holes shall be cylindrical/elliptical and perpendicular to the member. The diameter of the finished hole shall be 1.5 mm greater than the nominal diameter of the bolt.

Welding

Welding shall be performed in accordance with the latest edition of "Code for Arc and Gas Welding in Building Construction", as formulated by the American Welding Society or equivalent Standard.

A shielded arc-welding process shall be used. All welds shall be made in such a manner that residual shrinkage stresses will be reduced to a minimum.

Galvanizing

All plates, members and shapes shall be hot dipped galvanized in accordance with ASTM Designation A123 or equivalent Standard. All bolts, nuts and washers shall be hot dipped galvanized in accordance with ASTM A153 or equivalent Standard. Re-threading of bolt threads after galvanizing will not be permitted.

All necessary precautions shall be taken in the selection of steel and its fabrication and preparation for galvanizing to prevent embrittlement of any item or parts of item including bolts and nuts.

Material on which galvanizing has been damaged shall be re-dipped. Any member on which the galvanized coating becomes damaged after having been dipped twice shall be rejected.

1.7 Minimum Design Requirements

(a) Roof Elevated, Roof Mounted and Ground Mounted Structures:

- Wind Speed = 100mph or as per latest BCP-21/ASCE7-22
- Wind Pressure = As per BCP-21 or latest ASCE 7-22
- Seismic Zone = As per Latest seismic Map of Pakistan
- Concrete Strength = 21MPa for 28 days cylindrical strength
- Structural Steel Grade = A-36
- Galvanization of Structural Steel = As per ASTM A123 & A153
- Minimum Member thickness for columns = 2.5mm
- Minimum Member thickness for Rafter, Purlin & Bracing = 2.0mm
- Galvanized Steel Base Plate thickness = 6mm Minimum
- Reinforcement Steel Grade = G-60 (413MPa UTS)
- Galvanized Steel Bolt Class = 6.8
- Connection Detail = Proper bolted and Welded connection as per design requirements.
- PV mounting Structure Design = Proper Computer Aided Design (CAD) on Finite Element Based (FEM) Software (i.e ETABS, SAP2000 etc.)
- Grouting = As approved by the Employer's Representative or his delegated Assistant.
- Water Proofing = Chemical water proofing as approved by the Employer's Representative or his delegated Assistant.
- Replacement of GI Sheets = Replacement shall be carried out wherever applicable

- Replacement and Addition of Wooden Planks = Replacement & Addition shall be carried out wherever applicable
- Fixing Arrangements (i.e. U-Clamp & Middle Clamp) detail of PV modules along with jointing/clamps detail of GI sheets with PV module should be provided by The Contractor for safe installation

(b) Parking Shed:

- Wind Speed = 100mph or as per BCP-21/ASCE7-22
- Wind Pressure = As per BCP-21 or ASCE 7-22
- Seismic Zone = As per Latest seismic Map of Pakistan
- Concrete Strength = 21MPa for 28 days cylindrical strength
- Bitumen Coating = All concrete work shall be coated with 2 coats of bitumen compound after stripping of the form work as a curing compound
- Structural Steel Grade = Fy-50
- Galvanization of Structural Steel = As per ASTM A123 & A153
- Minimum Member thickness for columns = 3.0mm
- Minimum Member thickness for Rafter, Purlin, Bracing & Stiffeners = 2.5mm
- Minimum Dia. for Sag Rod = 10mm
- Galvanized Steel Base Plate thickness = 6mm Minimum
- Reinforcement Steel Grade = G-60 (413MPa UTS)
- Steel Bolt Class = 6.8
- Class of Anchor Bolt = 6.8
- Length & Dia. of Anchor Bolt = as per design requirements
- Connection Detail = Proper bolted and Welded connection as per design requirements.
- PV mounting Structure Design = Proper Computer Aided Design (CAD) on Finite Element Based (FEM) Software (i.e. ETABS, SAP2000 etc.
- Grouting = As approved by the Employer's Representative or his delegated Assistant.

Water Proofing = Chemical water proofing as approved by the Employer's Representative or his delegated Assistant.

SECTION – VI: OPERATION AND MAINTENANCE

1. OPERATION & MAINTENANCE (O&M) FOR ROOFTOP SOLAR POWER PLANTS

1.1. Introduction

The Rooftop PV Hybrid Systems are designed for an operation lifetime of at least 25 years. Their optimal performance is sensitive to best-in-class O&M practices, which will ensure the best performance during the 25-years period. The Bidder is required to describe in detail his definite plans how to execute the below described requirements for the defined mandatory O&M period. As part of that, the bidder shall provide an organisational chart and CVs of the key O&M staff as well as the locations where staff and facilities (e.g. spare parts inventory) will be located. Any failure to describe a convincing concept will be leading to a rejection of the bid.

1.2. General Scope of Work

The Contractor shall provide operational guarantee for the PV Hybrid System for the first three (03) years after commissioning. Any repair or replacement of component(s) during this time shall be at the expense of the Contractor. Later repair or replacement shall be at the expense of the Contractor as long as it is caused by component failure during warranty period, workmanship of installation or lacking O&M execution during the Contractor’s O&M phase.

The Contractor will provide the complete O&M service during this duration at its own expense. The Contractor has to warrant the performance of the PV Hybrid System within his area of influence, as well as the Availability and time consumed for detection of malfunctions and its repair. The Contractor shall provide a full-service Operation and Maintenance service in order to maintain a fully functional PV Hybrid System for each building including all equipment, subsystems and structures.

This shall include, but not be limited to, the following items:

- Preventive maintenance according to maintenance programs, such as periodic preventive maintenance of inverters, batteries, and PV modules etc., according to manufacturers’ requirements.
- Scheduled inspection routines: E.g. PV modules to check for discoloration, first signs of delamination, loose wires in the electronics, corrosion of mounting structures, erosion.
- Maintenance of spare parts inventory (prompt replenishment of used spare parts) including continuous reporting of status and consumption.
- Corrective maintenance with guaranteed response and reaction times, including all repair and replacement costs.
- Technical operation of the PV Hybrid System including presence of O&M personnel close to the Project site as required to fulfil all O&M Contract obligations.
- Regular cleaning of the PV Hybrid System site, preventive and corrective maintenance of civil works and cabinets.
- Smooth functioning of data communications over Centralized Monitoring System (CMS).
- Provision of regular service reports about performance, repairs, maintenance, and tests.
- Regular performance of variance analysis of the entire fleet of PV Hybrid Systems.

- Ensuring that any warranties and insurance policies for the PV Hybrid System are assignable / transferrable to Employer in case of change of Contractor.
- Provision of all O&M personnel trained and certified as far as applicable. The staffing concept and selected key employees shall be presented to the Employer for approval.
- Arrangement of service contracts with specialized sub-contractors, permitting the requested response and reaction times and quality of work required to maintain the PV Hybrid System.

1.3. Hiring / Training Period / Initial Inspection

The Contractor’s Personnel must be nominated by the Contractor no later than 8 weeks prior to operations start date of the first PV Hybrid System and contractually hired no later than 4 weeks prior to operations start date of the first PV Hybrid System.

The Contractor’s O&M Personnel shall be certified experts with the PV Hybrid System and its documentation, to enable an efficient operation & maintenance from handover day. The Contractor shall also understand all pending items (e.g. punch-list) and performance deficits (if any) for which the Contractor is responsible for, after operations start date.

The O&M Personnel shall familiarize themselves with the specific PV Hybrid System equipment and maintenance requirements as imposed by the component manufacturers and Employer. In addition, the O&M Contractor shall arrange and provide all training as a prerequisite for the selected staff and provide the respective certificates.

The O&M Contractor shall establish all maintenance routines, inspection checklists, working files, etc. as required.

At this phase, the O&M Contractor must always coordinate with Employer and keep Employer updated regarding progress of preparation, status of construction, pending issues of construction, commissioning and testing.

At the end of the mandatory O&M phase and if the contract is not extended further, the Contractor shall give sufficient and adequate training to the Employer’s staff (or its subcontractor’s staff) that will continue the O&M works.

1.4. Centralized and Remote Monitoring Systems (CMS and RMS)

The Contractor shall provide a CMS and RMS that must be capable of providing a reliable, stable and continuous (24/7) centralized and remote access with the monitoring system of the PV Hybrid System.

Centralized and remote access to all operational data for the PV Hybrid System must guarantee the uninterrupted transfer and acquisition of operational data.

The provided monitoring systems will be subject to review and approval by Employer prior to procurement. It must provide different access levels and access rights.

The communication network between the PV Hybrid System and the monitoring systems will be built with common and standardized components and network cables. The long-term availability of spare parts must be assured. Standardized communication protocols must be used.

The following functionalities are required:

- I. Remote monitoring and management of the whole system by Contractor on a 7-days 12-hour daytime basis, with the capability of web-based information sharing.
- II. Continuous transmission of monitoring data to centralized monitoring server.
- III. Data must be readily available for the fulfilment of all warranties.
- IV. Remote backup of centralized monitoring data.
- V. Frequent string level data collection (30-min sampling interval), analysis, and display of the fundamental parameters of the system and sub-system. Real-time transmission of Alarms.
- VI. Alarms / alerts and timely notification of key performance indicators.
- VII. Monthly, quarterly and annual reporting including opening/closing of service tickets, spare parts used, and any deviations from the guaranteed Performance.
- VIII. Status of overvoltage protection and grounding protection (DC).
- IX. Separate monitoring of inverters, battery charger and batteries (current and voltage).
- X. Provision of on-call service for the Employer for availability outside business hours and during weekends (24/7).
- XI. Any reductions in performance must be logged.
- XII. The data must present the current status of the PV Hybrid System, including the string level monitoring, battery SOC and SOH status, current production, balance of energy flow within system and via its system boundaries, daily, monthly and annual overview, and the current power being exported to the grid (in future).
- XIII. The remote monitoring must also control the operation of the PV Hybrid System. To ensure this, the PV Hybrid System data should be sent to a central server and stored permanently.
- XIV. The remote monitoring must also include the ticketing of faults and resolution measures taken.
- XV. the Contractor shall provide to Employer permanent online read access to the remote monitoring system for parallel monitoring of the PV Hybrid System’s raw data and performance. Additionally, the Contractor shall send the data automatically and regularly (minimum every 30 min) to an ftp server set up through CMS.
- XVI. The data transfer costs (fees for internet connection, etc.) are to be paid by the Contractor.
- XVII. The log data must be provided continuously, completely, and stored in CMS for a minimum period of five (5) years for all measuring channels. The on-site data storage should be provided for one (01) month.

The Bidder should detail the IT system architecture (the physical link, internet, transport, and application layers), hardware and software descriptions of servers, bus drivers, communication cables, and security and information exchange protocols for the data management outlined above. It should also explain the data backup processes to be implemented to ensure timely information for preventive and corrective measures in order to maintain optimal system output.

1.5. Allocation of O&M Personnel

The Contractor will provide all O&M personnel, trained and certified as far as applicable. The staffing concept and selected key employees shall be presented to the Employer for approval.

The Contractor shall arrange service contracts with specialized sub-contractors permitting the requested response times and the required quality of work to maintain the PV Hybrid System.

All operational data shall be logged on-site in parallel to the remote monitoring data storage.

2. SCOPE OF SUPPLY AND SERVICES FOR THE O&M OF ROOFTOP SOLAR POWER PLANTS

2.1. Quarterly Inspections

The Contractor shall perform quarterly inspections of the PV Hybrid System. The inspections must follow the detailed inspection procedure and be documented accordingly. The scope must include the following (as a minimum):

2.2. PV Modules and Supporting Structure

- Visual inspection of all PV modules regarding damage.
- Visual damage inspection of all accessible cable trenches and cable trays.
- Visual inspection and random testing of PV module DC connectors.
- Check for loosening of PV module clips. Clips should be replaced if necessary. (Scope: Min. 10% per inspection including documentation of location; 100% during 3-year PV Hybrid System inspection).
- Testing of sturdiness of mounting foundation / system and random substructure corrosion inspection.

2.3. Inverters

- Functional check of inverter ventilator system and filters (if applicable).
- Test of the internal circuit breakers and power switches, emergency shutoff test.
- Visual inspection of all fuses.
- Inspection of overvoltage protection and upstream fuses regarding external damage.
- Functional check of internal and external overvoltage and under voltage protection through operation of test terminal.
- Functional insulation monitoring check.
- Check of control and auxiliary voltages.
- Check of the safety circuit for the interruption of the AC-grid protection in the case of failure (emergency shutoff, over-/ under voltage, over temperature, etc.).
- Visual inspection of AC and DC clamps for tightness and discolouring, tightening of clamps.
- Inspection of the interior of the inverter regarding dust deposit, dirtiness, humidity, water penetration from outside. The inverter shall be cleaned if necessary.
- Testing of inverter features according to manufacturer’s maintenance schedule.
- Maintenance of inverters according to manufacturer’s instructions.

2.4. Battery Charge Controller

- Inspection of the exterior of the battery charge controller regarding dust deposit, dirtiness, humidity. The battery charge controller shall be cleaned if necessary.
- Testing of battery charge controller features according to manufacturer’s maintenance schedule.
- Maintenance of battery charge controller according to manufacturer’s instructions.
- Batteries / Electricity Storage

- Inspection of the exterior of the batteries regarding dust deposit, dirtiness, humidity. The batteries shall be cleaned if necessary.
- Testing of battery features according to manufacturer’s maintenance schedule, including remaining battery capacity.
- Maintenance of batteries according to manufacturer’s instructions

2.5. Enclosure Cabinet for Inverters and Batteries

- Functional check of enclosure cabinet ventilator system and filters (if applicable).
- Inspection of the interior of the electrical cabinet regarding dust deposit, dirtiness, humidity, water penetration from outside. The cabinet shall be cleaned if necessary.
- Visual damage inspection of all accessible cable trenches and cable trays.

2.6. Security System / Theft Protection

- Random test and retightening of security bolts if necessary, according to manufacturer’s instructions.

2.7. Additional Inspections

- Functionality testing of the remote monitoring system.
- Adequacy of settings for battery charge settings.
- Maintenance of all PV Hybrid System components according to manufacturer’s instructions.
- If applicable: Inspection of all aspects required from the applicable permits (environmental, building, etc.).

The Contractor has to modify the inspections routines as well as the frequency of the special inspection in case of specific the requirements and/or norms will be defined or modified by relevant authorities in Pakistan and/or grid operators.

2.8. Roof Maintenance

Roof maintenance includes all procedures necessary to avoid PV module shading and faults due to problems of the rainwater drainage. Any blockage of roof drains shall be cleared on each site visit.

In case the integrity of the roof is affected due to improper installation of the PV modules and/or the supporting structure, such as leakages through the affected roof, the Contractor shall carry out all the repairs at his own cost.

3. PERFORMANCE OF MAINTENANCE AND REPAIR WORKS

The results of the inspection and maintenance works, as well as the deactivations, must be documented in a report (blank maintenance report example shall be delivered by the Contractor as part of the O&M Works).

For the performance of the contractual services, the Contractor will be obliged to observe and respect the component manufacturer’s maintenance and operation specifications and regulations (especially for the PV modules, inverters and batteries), in particular during the warranty period.

For the performance of the contractual services, the Contractor will be obliged to observe and respect local laws, regulations and international PV standards.

Throughout the duration of the Contract, the Contractor will be held responsible for public safety at the PV Hybrid System.

4. PERFORMANCE GUARANTEES

Every fault message must be registered and stored by the on-site, centralized and remote monitoring software. According to the fault message, the Contractor will issue a fault diagnosis within a response time of 24 hours (24/7) and, as far as possible, immediately restart the operation of the affected part of the PV Hybrid System.

- All fault messages and results relevant for the operation of the PV Hybrid System are to be documented in the ticketing system. Any fault messages resulting in fault calls must be documented in the corresponding monthly reports, indicating start and end of fault, reason and/or any repair work performed, as well as the respective components of the PV Hybrid System fault management / warranty defects
- Fault management procedures must include necessary communication of faults, coordination of on-site appointments with service staff or service partners, as well as the corresponding and general operational structure.
- Fault management procedures must include the preparation, handling and support in events covered by insurance, and the enforcement of claims for compensation to third parties, including the component manufacturers.
- The Contractor is obliged to identify potential warranty defects and support Employer in obtaining rectification from the respective manufacturer. The Contractor shall be responsible for coordinating through Employer all claims related to warranty defects and their rectification during the respective product warranty period.
- Operational defects that are not considered as warranty defects must be rectified as soon as possible by the Contractor within its scope of work.
- All defects are to be documented within the same day of detection, and a summary provided to Employer on a monthly basis in the corresponding monthly report. All fault and defect rectification must be included in the monthly reports, with reference to the initial alarm/notification of occurrence.
- All incurred repair times outside of the fault rectification time identified above will be considered as unavailability of the affected PV Hybrid System component.
- All replacements and repairs are to be covered by Contractor’s annual remuneration under the Contract within the initial O&M Period of three (03) years.

4.1. Liquidated Damages for Failure to Comply with Performance Guarantees

- The scope of service shall include any working times for all fault calls including travel times and any travel costs.
- If faults cannot be identified completely from the fault message or the restart of operation is not possible, additional service staff or service partner shall take action with standard tools and spare parts. The following fault rectification times shall apply, which will start (i) as soon as the fault message is received by the monitoring system, or (ii) as soon as the fault has been detected onsite, or (iii) as soon as the fault is detected during regular on-site controls.

Fault Rectification Time		
	Fault / Error / Defect	Rectification time
Priority 1	- Failure of complete communication with RMS - Failure of battery backup system - Failure of at least 50% of connected PV strings or inverter	2 Calendar days
Priority 2	- Failure of single PV modules or single PV module string	4 Calendar days

The fault call is to include on-site fault diagnosis, as well as an immediate fault correction, if possible. The fault must be corrected within the fault rectification time and, failing that, an in-depth diagnosis of the fault must be performed indicating further measures.

In-case the fault is not rectified within the fault rectification time as defined above, then the Contractor shall pay to the Employer Liquidated Damages (LDs) as stated in Volume-I.

Fault calls can be performed without prior consent of Employer.

4.2. Approval of Extensive Repairs

Extensive repairs requiring an amendment of the PV Hybrid System or an exchange of original equipment for different types (i.e. the installation of non-original components), must be approved by Employer. All non-original components (e.g. a specific inverter or battery type) must be procured from the original component manufacturer (e. g. the inverter manufacturer needs to remain the same, but the inverter or battery type can be modified).

4.3. Repair Works Documentation

All major repair works (defined as all repair works which require spare parts not fully provided by the spare parts inventory) and insurance compensations must be documented in the corresponding monthly reports.

4.4. Inspection of Repair Works

The Employer reserves the right to inspect the repair works within three months (90 days) of receiving the repair works documentation. Employer reserves the right to consult an independent expert in the event that any doubt arises as to the Contractor’s performance.

4.5. Spare Parts Inventory and Maintenance Tools

The Contractor will provide a spare parts inventory by the start of O&M Period at the latest. The spare parts inventory will be placed in Employer’s designated premises. e.g. in a specific container with safety locks and connected to a security surveillance system.

The Contractor shall operate and maintain the spare parts inventory during the term of the O&M Period. The Contractor will be responsible for the immediate replenishment of the spare parts. The Contractor is responsible to cover all cost for the replenishment of the spare parts inventory within its annual remuneration under the Agreement.

The status and consumption of the spare parts inventory must be included in the corresponding monthly reports.

The Contractor must provide the necessary set of maintenance tools to perform the services.

5. SCOPE OF SUPPLY FOR SECURITY SERVICES

The Contractor will not be responsible for Security Services of the PV Hybrid System. The Client will be responsible for the security of each PV Hybrid System against any theft and vandalism.

5.1. Reporting of all O&M Activities

Monthly and annual reports based on the data of the remote monitoring are to be prepared by O&M Contractor and provided to Employer within 4 four weeks after the end of the corresponding reporting period. The reports must include the reporting any deviations from the expected performance of the PV Hybrid System.

Any fault messages resulting in fault calls must be documented in the corresponding monthly reports indicating start and end of fault, reason and/or any performed repair works, as well as the respective components of the PV Hybrid System.

The status and consumption of the spare parts inventory must be included in the corresponding monthly reports.

The results of inspection performed maintenance works, as well as deactivations must be documented in a report.

The specific reporting format of each report type will be subject to review and approval by Employer and its OE prior to the execution of the O&M Contract.

6. MISCELLANEOUS

6.1. Change of Inspection and Maintenance Work Procedures

The Contractor shall perform the work in accordance with all applicable laws. In case of conflict between the specified requirements and the applicable law, the Contractor shall propose a solution to adapt the works accordingly and resolve the matter in a mutual sense for Employer’s approval.

6.2. Person in Control of PV Hybrid Systems

The Contractor must propose at least one main responsible and suitable person in charge of the PV Hybrid Systems for buildings for each district, the “O&M Manager”. These persons must fulfil all local requirements, permits and standards, must have sufficient experience and be approved by Employer and be available for communication with Employer (mobile phone) during the above-defined O&M times. Any replacement or substitute of these persons will be subject to approval by Employer.

6.3. Handover of Documentation after end of O&M Contract

Within one month after the end of the O&M Contract, the Contractor must hand over the complete electronic, printed and written documentation for the O&M of the PV Hybrid Systems. This includes the complete documentation which was previously handed over to the Contractor by

Employer or its service provider. This also includes the complete raw data of the PV Hybrid System monitoring acquired through the remote monitoring system.

6.4. Codes, Standards, Regulations, Permit, etc.

State of the art O&M is required. The fulfilment of all relevant IEC and Pakistani norms, standards and regulations is the full responsibility of the Contractor.

The O&M Works for the PV Hybrid Systems must fulfil all applicable international and regional norms, standards, and grid connection requirements.

The Contractor must comply with all applicable permits and the conditions imposed on the PV Hybrid System by all authorities.

The Contractor must fulfil all applicable health and safety standards required by the relevant Pakistani authorities during the entire Operation and Maintenance phase

7. Rooftop Plant BESS O&M

7.1. System Operation and User Interface

Roof top Solar BESS systems shall feature user-friendly mobile applications and cloud-enabled monitoring. The system automatically manages charging from PV arrays and provides backup power during grid outages.

Systems generate user-friendly notifications through mobile applications:

- State of Charge notifications: As per Employer’s Requirements
- State of Health status: Continuous
- Load Disconnection Notifications

7.2. Maintenance and Safety

Biweekly visual inspection of system indicators, quarterly cleaning of ventilation areas, and annual professional maintenance ensure safe operation. The system's IP65 enclosure protection and low noise operation (≤ 65 dB(A)) enable indoor installation.

Annual inspection by certified technicians includes BMS diagnostics, electrical connection testing, and performance verification. The system's integrated safety features minimize maintenance requirements while ensuring long-term reliability.

7.3. Warranty and Support

All Roof top Solar BESS systems include 10-year product warranty with performance guarantee of $\geq 70\%$ initial capacity after 10 years or 6000 cycles @ 80% DoD. Monitoring enables proactive support and rapid issue resolution within 48-hour response time guarantee.

ANNEXURE I – DRAWINGS

Preambles to Annexure 1

The drawings included in this Part are provided for reference and general guidance only. For specific PV modules and inverters, complete set of Employer’s requirements has set forth under section I (Scope of Work) , Section II (General Project Requirements), Section III (DC Systems), Section IV (AC Systems), and Section V (Civil & Structure Works) shall prevail, which shall be subject to Employer’s approval prior to procurement and delivery at site.

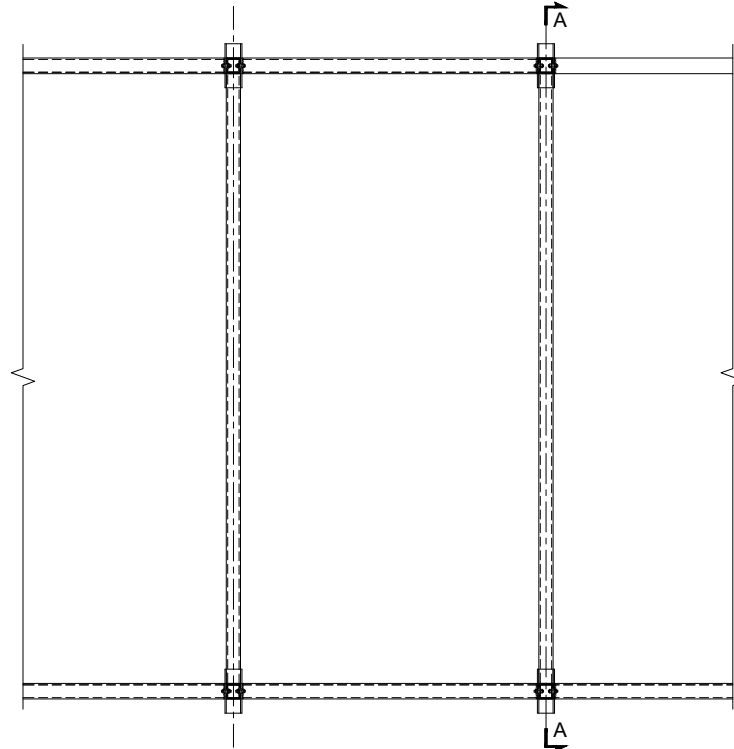
These drawings shall not be considered as Issued for Construction (IFC) documents. In accordance with Sub-Clause 5.2 [Contractor’s Documents] of the Conditions of Contract, the Contractor shall be solely responsible for preparing, submitting, and obtaining approval of its own detailed design and construction drawings. The Contractor shall ensure that its design complies fully with the Employer’s Requirements, applicable standards, and good industry practice.

Any discrepancies, omissions, or variations in the reference drawings shall not relieve the Contractor of its obligations to complete the Works in full compliance with the Contract.

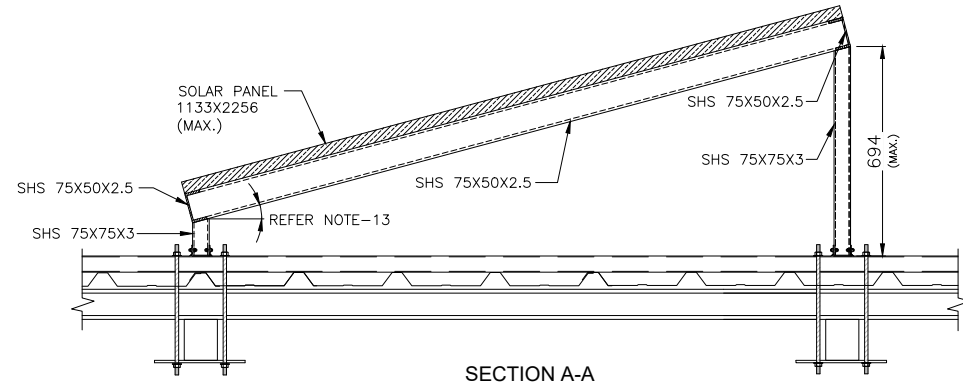
The list of drawings is also attached herewith attached

Sr. No.	Drawing No.	Drawing Title
1	4894/TD/STR/01	CGI Structure
2	4894/TD/STR/03/01	Typical Solar Panel Framing for Ground Elevated Structure
3	4894/TD/STR/03/02	Typical Solar Panel Framing for Ground Elevated Structure
4	4894/TD/STR/03/03	Typical Solar Panel Framing for Ground Elevated Structure
5	4894/TD/STR/04/01	Typical Solar Panel Framing for Ground Mounted Structure
6	4894/TD/STR/04/02	Typical Solar Panel Framing for Ground Mounted Structure
7	4894/TD/STR/02/01	Typical Solar Panel Framing for Parking Shed
8	4894/TD/STR/02/02	Typical Solar Panel Framing for Parking Shed
9	4894/TD/STR/02/03	Typical Solar Panel Framing for Parking Shed
10	4894/TD/STR/02/04	Typical Solar Panel Framing for Parking Shed
11	4894/TD/STR/05/01	Typical Solar Panel Framing for R.C.C Roof Mounted Structure
12	MV / LV – 21	1-10 KW Single Line Diagram
13	MV / LV – 22	10-20 KW Single Line Diagram
14	MV / LV – 23	20-30 KW Single Line Diagram

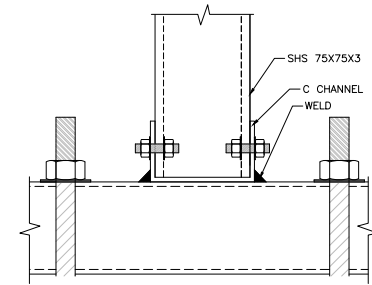
Sr. No.	Drawing No.	Drawing Title
15	MV / LV – 24	30-50 KW Single Line Diagram
16	MV / LV – 25	50-70 KW Single Line Diagram
17	MV / LV – 26	70-100 KW Single Line Diagram
18	MV / LV – 27	100-125 KW Single Line Diagram
19	MV / LV – 28	125-150 KW Single Line Diagram
20	MV / LV – 29	150-200 KW Single Line Diagram
21	MV / LV – 30	200-250 KW Single Line Diagram
22	MV / LV – 31	300 KW Single Line Diagram
23	MV / LV – 32	350 KW Single Line Diagram
24	MV / LV – 33	400 KW Single Line Diagram
25	MV / LV – 34	500 KW Single Line Diagram
26	MV / LV – 35	700 KW Single Line Diagram
27	MV / LV – 36	Earthing Details
28	MV / LV – 37	Lightning Arrestor



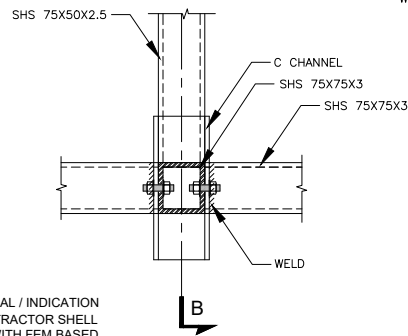
TYPICAL STRUCTURAL FRAMING AND SHEETING PLAN



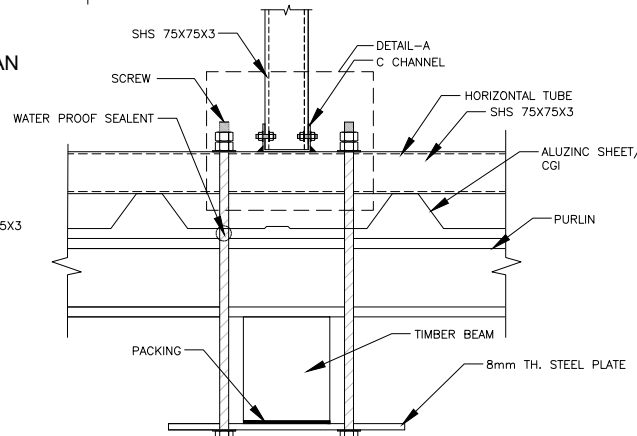
SECTION A-A



DETAIL-A



FIXING DETAIL



SECTION B-B

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL STEEL GRADE SHALL HAVE MINIMUM YIELD STRENGTH OF 250 Mpa.
4. ALL WELD SHALL BE OF E70XX ELECTRODE.
5. ALL STEEL STRUCTURE AND ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED (MIN 85 MICRON).
6. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE 304) AND ANTI-THEFT.
7. IT IS ASSUMED THAT THE EXISTING STRUCTURE IS ADEQUATE TO BEAR THE LOADINGS FROM STRUCTURAL FRAMING OF SOLAR PANEL.
8. TWO DRAINAGE CLIPS SHALL BE PROVIDED FOR EACH MODULE IN THE LAST/LOWEST ROW OF THE MODULES IN A SHED.
9. ALL BEAM TO BEAM & BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING AT LEAST 4MM THICKNESS.
10. AN APPROVED WATER PROOF SEALANT SHOULD BE PROVIDED AT EACH PUNCHING POINT IN ORDER TO AVOID WATER LEAKAGE.
11. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
12. CONTRACTOR TO ENSURE THAT THE EXISTING DRAINAGE CHARACTERISTICS OF THE ROOF TOP ARE NOT COMPROMISED.
13. FOR ANGLE REFER TO SIMULATION DRAWINGS/REPORT.

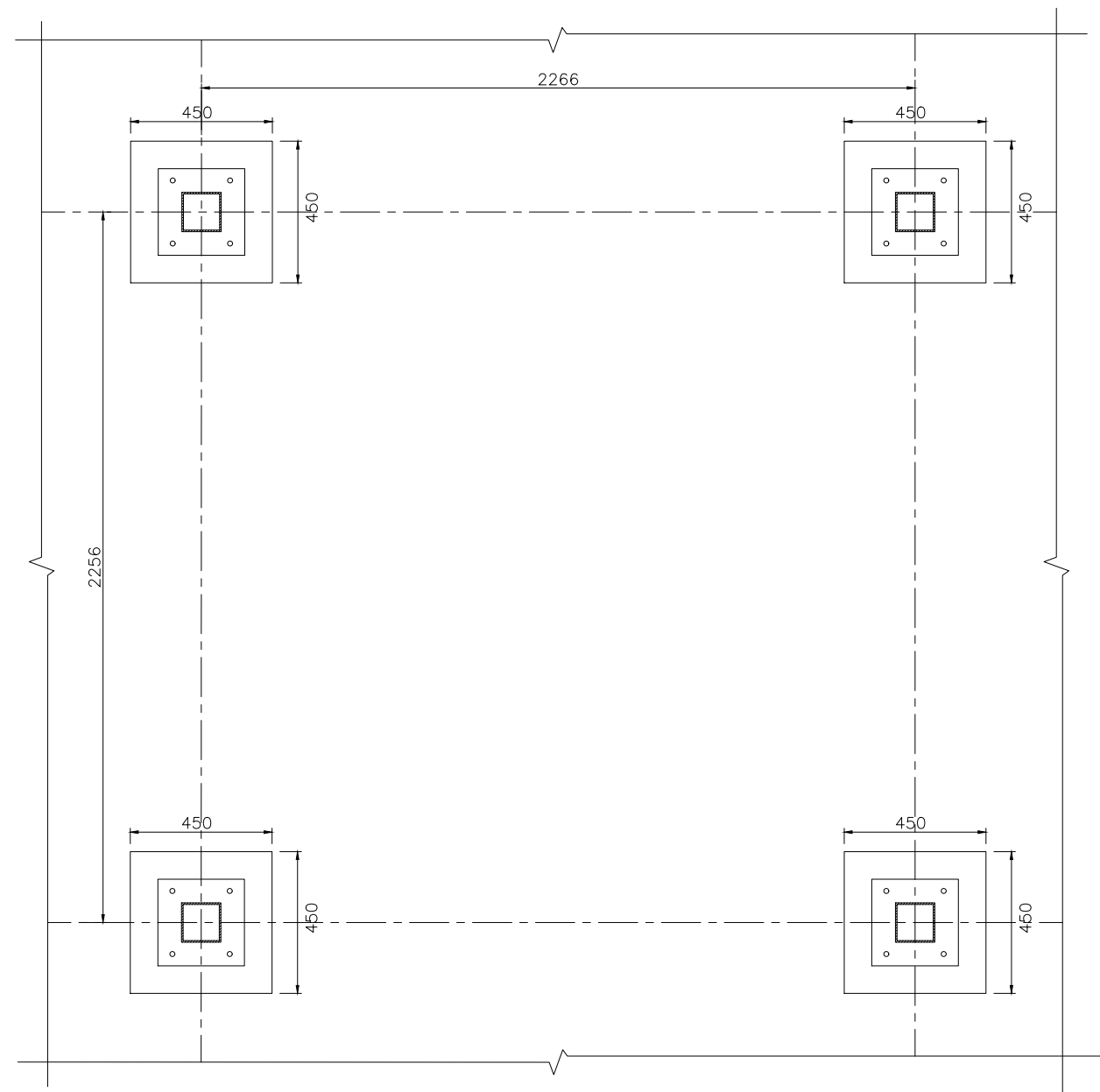
NOTE:

THESE ARE MINIMUM REQUIRED CONCEPTUAL / INDICATION DRAWINGS ONLY HOWEVER, THE EPC CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS ALONG WITH FEM BASED MODEL FOR APPROVAL PURPOSES.

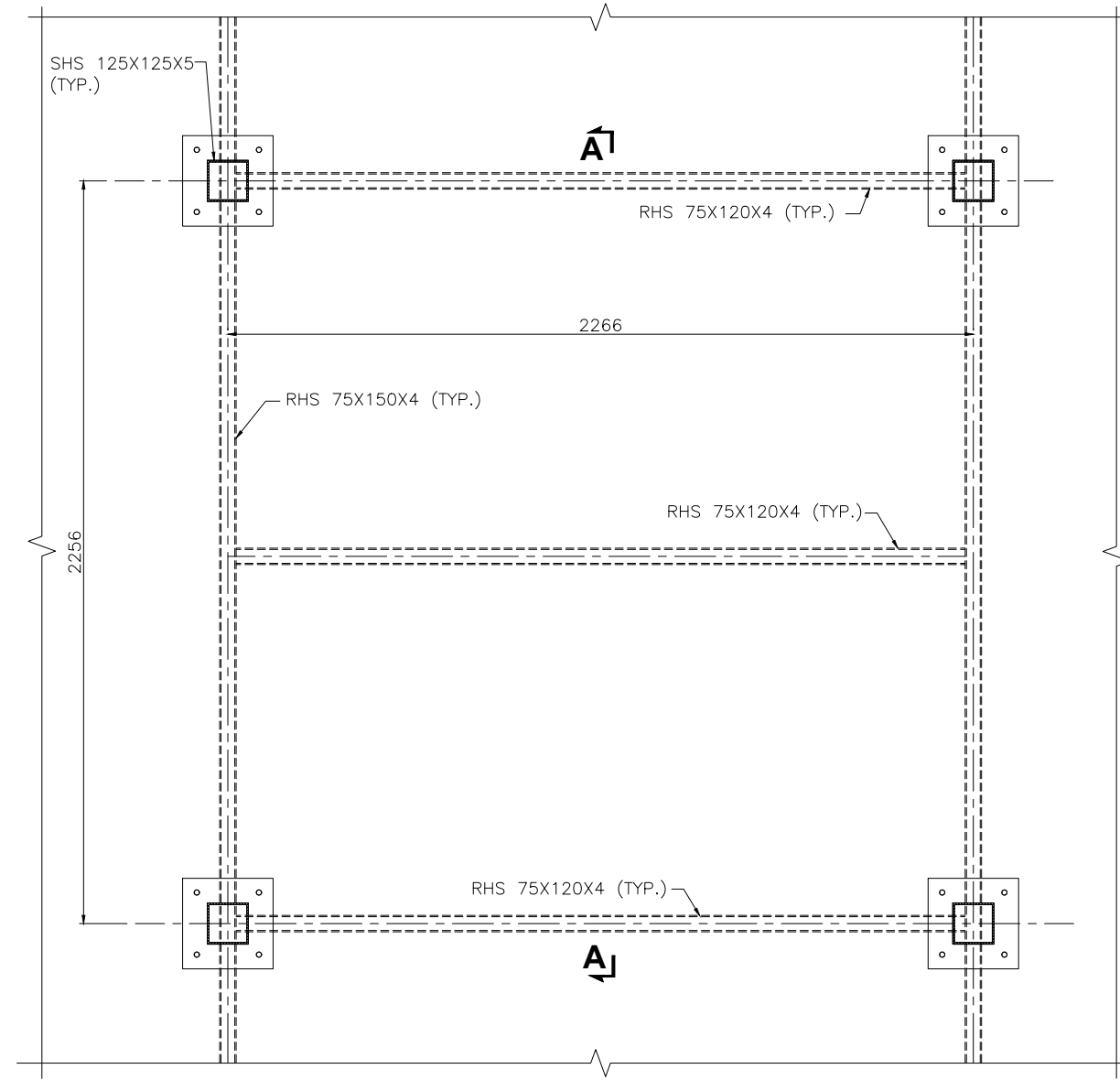
CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE- NESPAK HOUSE, I.C. BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	CLIENT	04			DRAWN	M.A	PROJECT	<p>CGI STRUCTURE</p> <p>100 WM DISTRIBUTED SOLAR PV PLANTS AT VARIOUS SITES IN GILGAT BALTISTAN</p> <p>DATE MAR. 2025 DRAWING No. 4894/TD/STR/01</p>	SCALE
	WATER & POWER GILGAT BALTISTAN	03			SUBMITTED				NTS
		02			RECOMMENDED				REV.
		01			CHD./VER.				
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			

NOTES:
1. REFER NOTE ON SHEET G02.




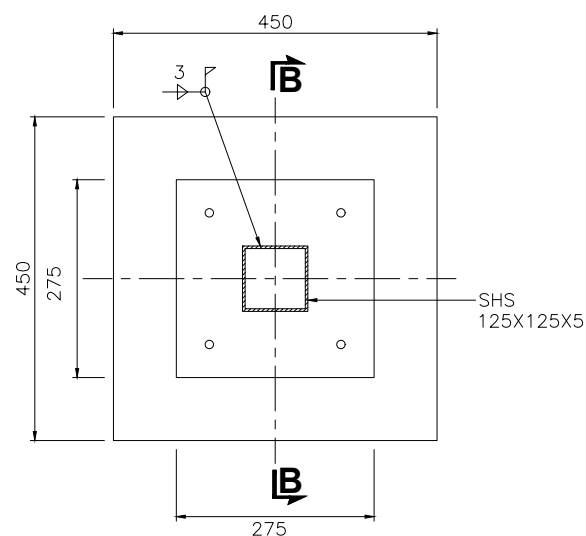
FOUNDATION LAYOUT PLAN



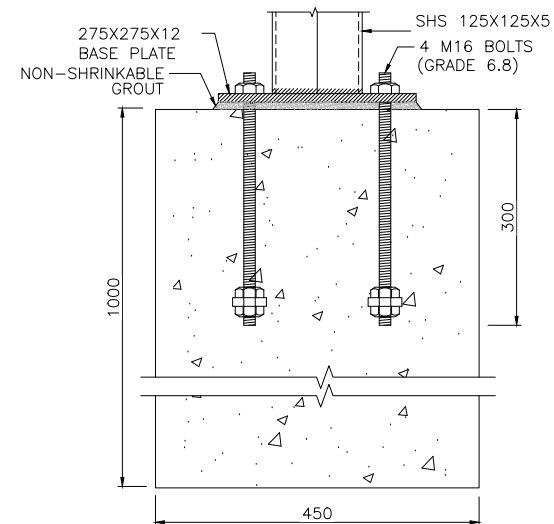
TYPICAL STRUCTURAL FRAMING PLAN

NOTES:
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 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT	04			DRAWN	S.A	PROJECT	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
	WATER AND POWER GILGAT BALTISTAN	03			SUBMITTED		100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	DATE	DRAWING No.	NTS
		02			RECOMMENDED			MAR-2025	4894/TD/STR/03/01	REV.
		01			CHD./VER.					0
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED					



CONCRETE BLOCK DETAIL



SECTION B-B


GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
11. WELDED ELECTRODES SHALL BE 70XX.
12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.5 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN $1.5T/\text{FT}^2$.
17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
21. THE STRENGTH OF P.C.C IS 14MPa , AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa .
22. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
23. REFER TO SIMULATION REPORT FOR ANGLE.

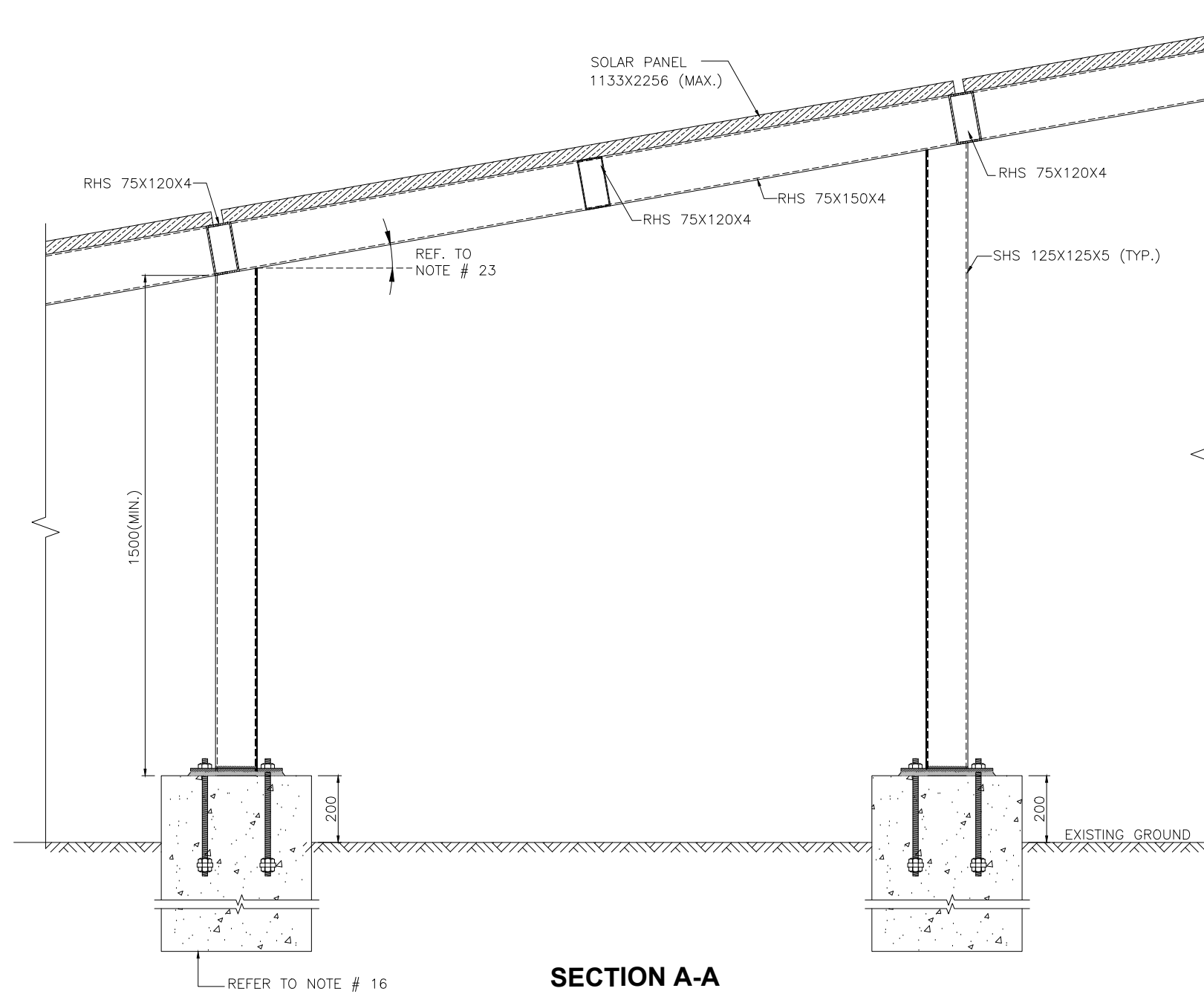
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CONCEPTUAL DESIGN

 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
		03			SUBMITTED					NTS
		02			RECOMMENDED					
		01			CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.
								MAR-2025	4894/TD/STR/03/02	0

NOTES:
1. REFER NOTE ON SHEET G02.

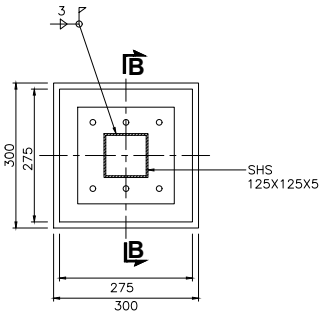


SECTION A-A

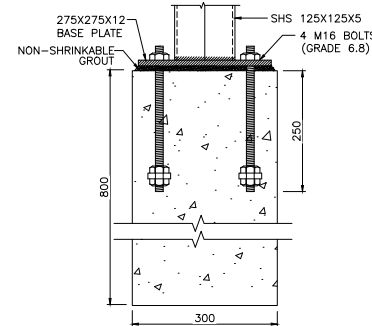
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CONCEPTUAL DESIGN

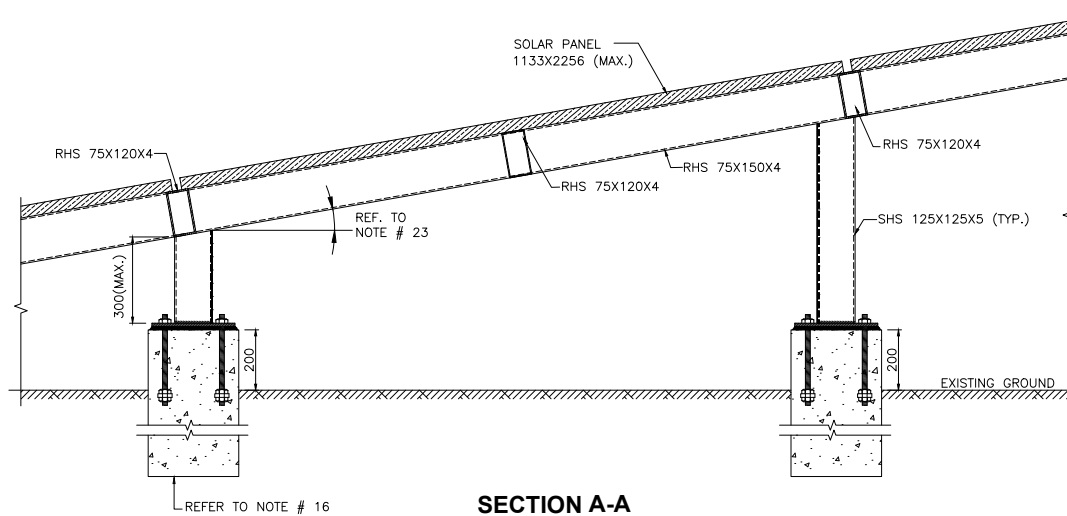
<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	<p>CLIENT</p> <p>WATER AND POWER GILGAT BALTISTAN</p>	04			DRAWN	S.A	<p>PROJECT</p> <p>100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN</p>	<p>TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE</p>		SCALE
		03			SUBMITTED			NTS		
		02			RECOMMENDED					
		01			CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.
								MAR-2025	4894/TD/STR/03/03	0



CONCRETE BLOCK DETAIL



SECTION B-B



SECTION A-A

- GENERAL NOTES:
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 13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
 14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
 15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.5 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
 16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN 1.5T/FT^2 .
 17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
 18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
 19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
 20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
 21. THE STRENGTH OF P.C.C IS 14MPa , AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa .
 22. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
 23. REFER TO SIMULATION REPORT FOR ANGLE.

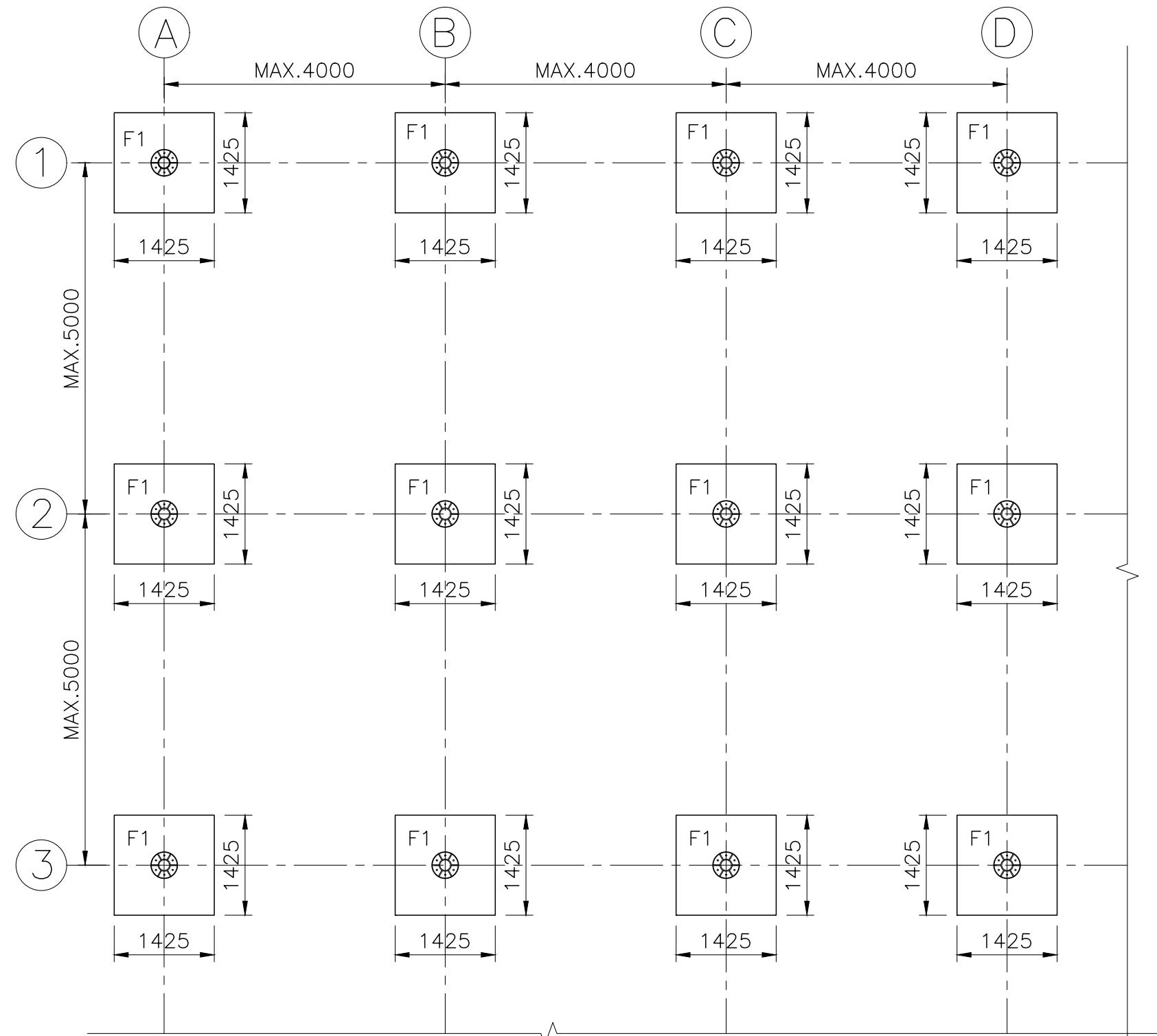
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CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</p> <p>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	<p>CLIENT</p> <p>WATER AND POWER GILGAT BALTISTAN</p>	04				DRAWN	S.A	<p>PROJECT</p> <p>100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN</p>	<p>TYPICAL SOLAR PANEL FRAMING FOR GROUND MOUNTED STRUCTURE</p>		SCALE
		03				SUBMITTED			NTS		
		02				RECOMMENDED					
		01				CHD./VER.			DATE	DRAWING No.	REV.
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			MAR-2025	4894/TD/STR/04/02	1

NOTES:
1. REFER NOTE ON SHEET G03.



FOUNDATION LAYOUT PLAN

NOTES:
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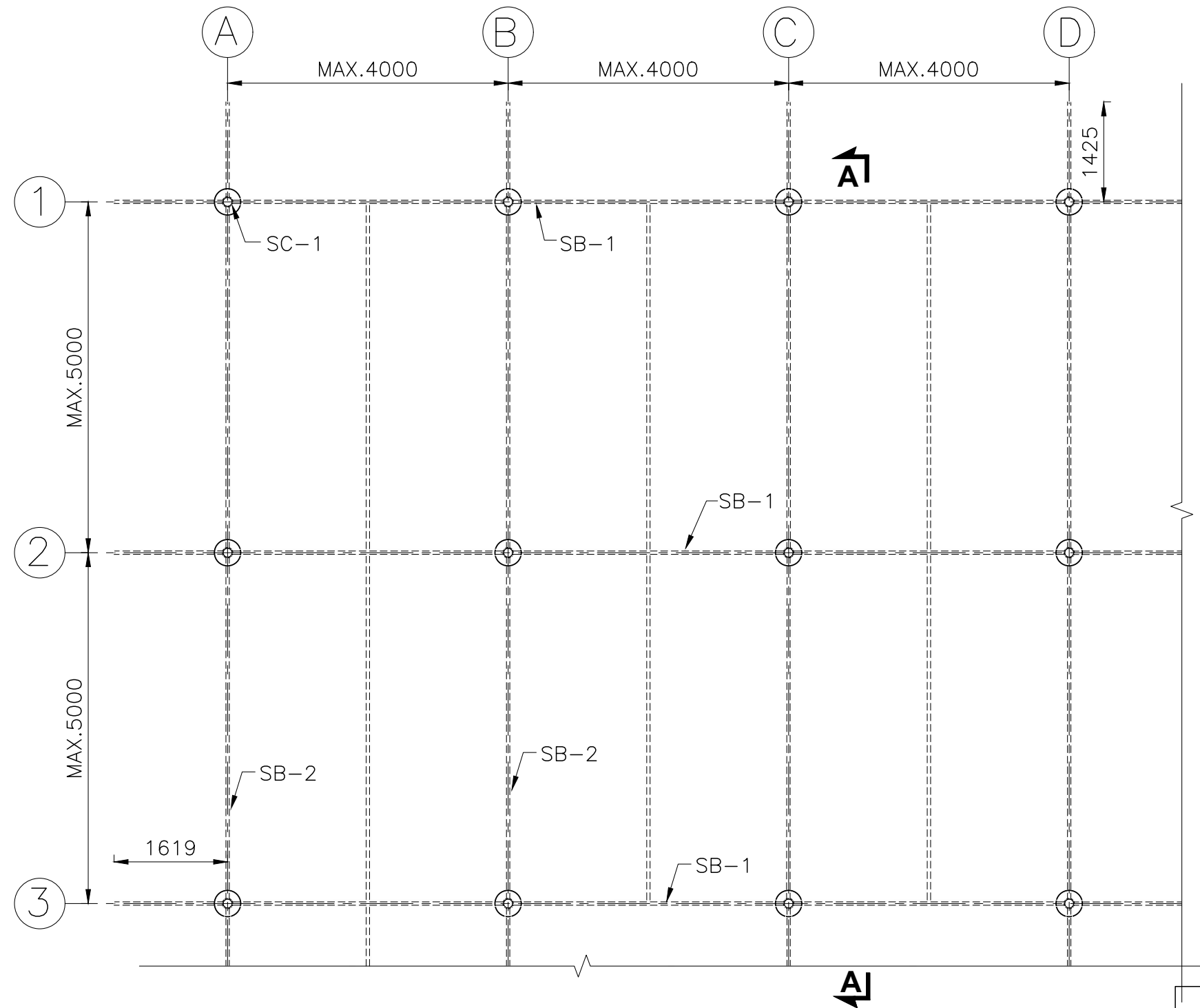
CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. <small>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</small>	CLIENT	WATER AND POWER GILGAT BALTISTAN	04		DRAWN	S.A	PROJECT	SCALE
				03		SUBMITTED		NTS
				02		RECOMMENDED		
				01		CHD./VER.		
				REV.	DATE	DESCRIPTION	APPROVED	APPROVED
							DATE	DRAWING No.
							MAR-2025	4894/TD/STR/02/01
								0

100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN

SOLAR PANEL FRAMING FOR PARKING SHED

NOTES:
1. REFER NOTE ON SHEET G03.



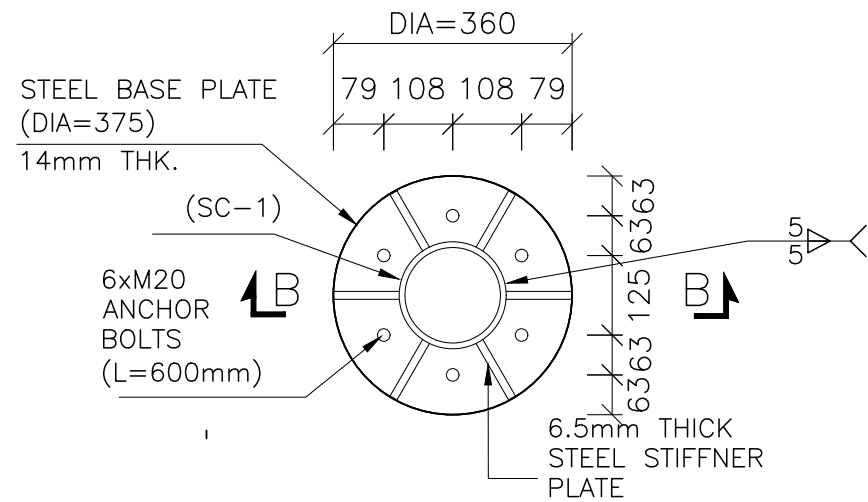
FRAMING LAYOUT PLAN

MEMBERS	SIZE/DESIGNATION
SC-1	I-SECTION OF 150X75X6mm
SB-1	I-SECTION OF 150X75X6mm
SB-2	C-CHANNEL OF 125X75X3mm

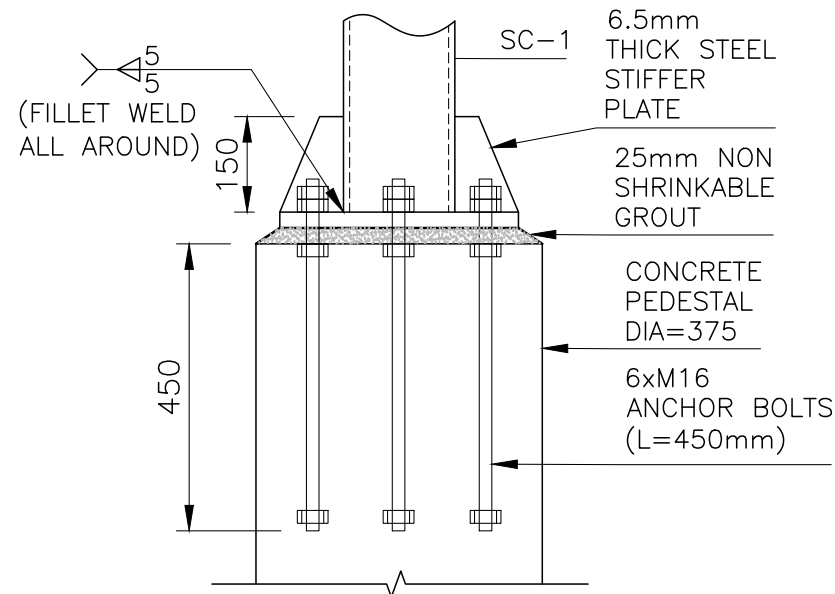
NOTES:
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CONCEPTUAL DESIGN

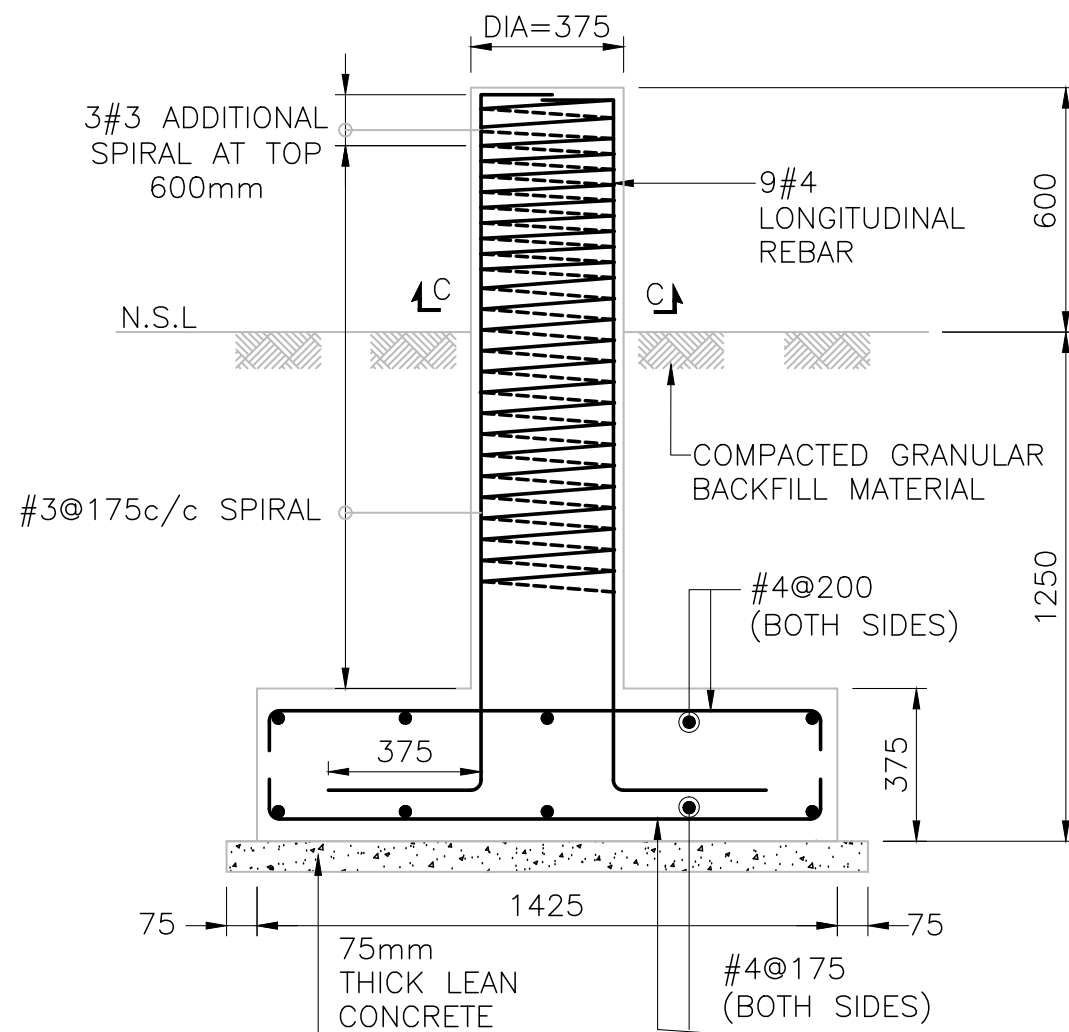
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED		SCALE
		03			SUBMITTED				DATE	DRAWING No.
		02			RECOMMENDED			MAR-2025	4894/TD/STR/02/02	REV.
		01			CHD./VER.					0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



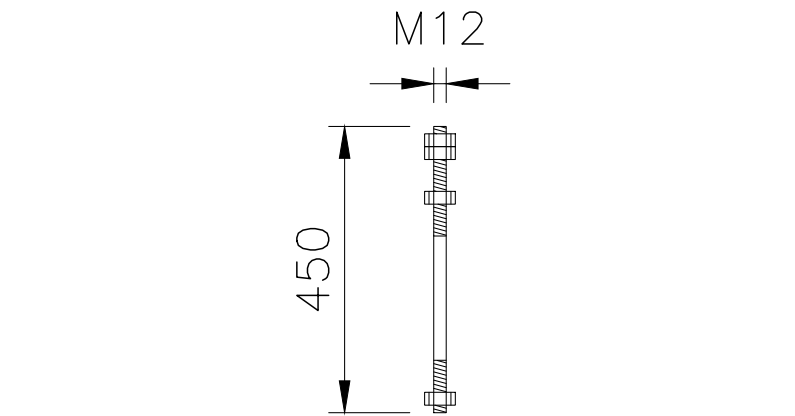
TYPICAL BASE PLATE DETAIL



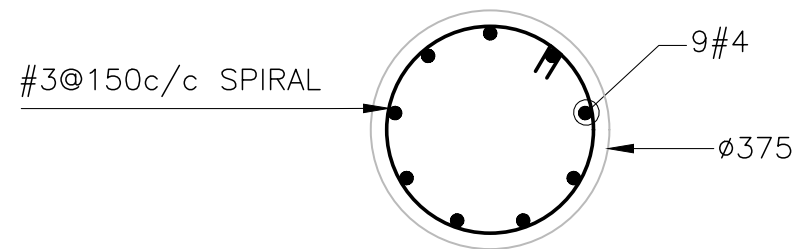
SECTION B-B



TYPICAL FOUNDATION REBAR DETAIL (F1)



TYPICAL BOLT DETAIL



SECTION C-C

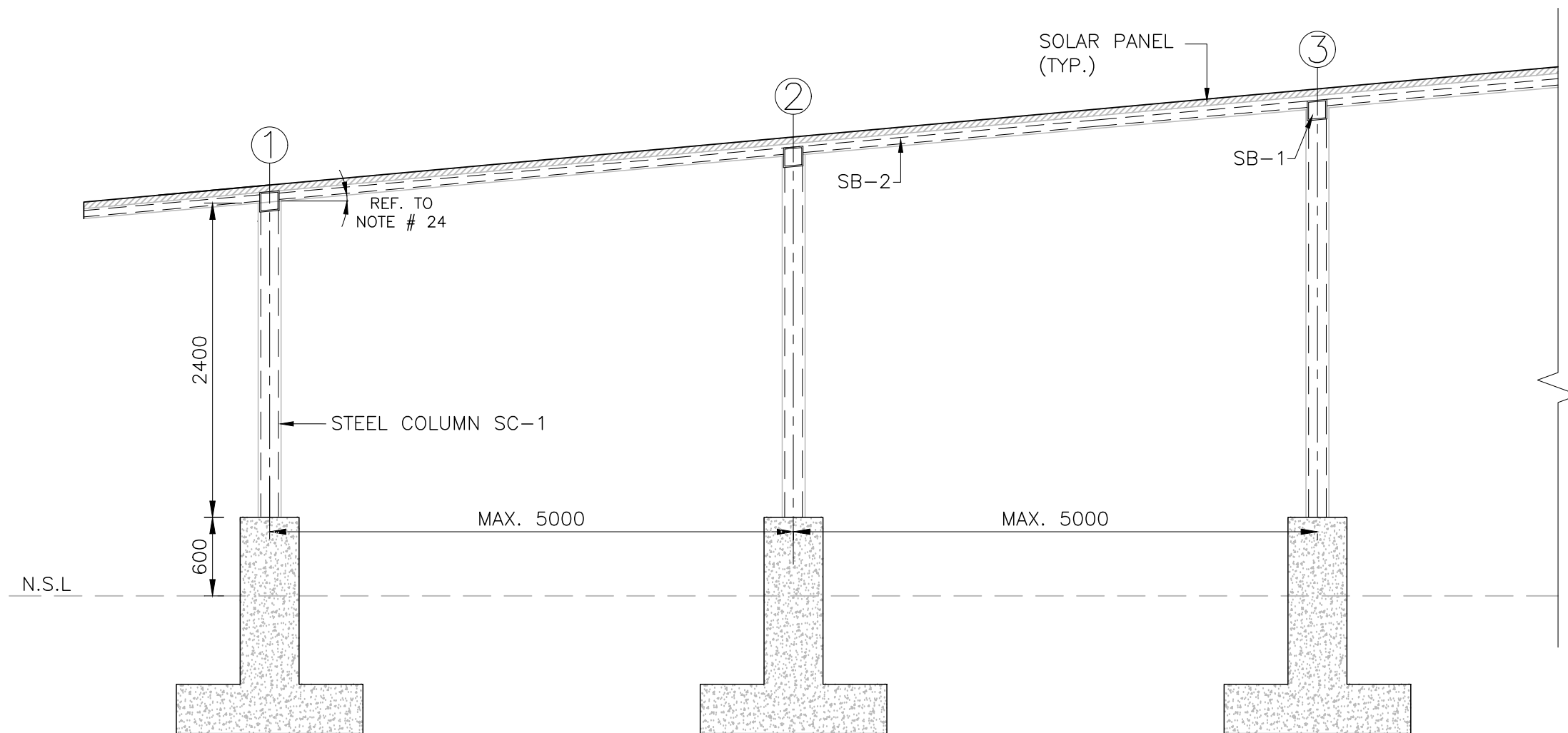
GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
11. WELDED ELECTRODES SHALL BE 70XX.
12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.0 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN 1.5T/FT^2 .
17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
21. THE STRENGTH OF P.C.C IS 14MPa , AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa .
22. THE CABLE TRAY WILL BE ATTACH WITH THE STRUCTURE IF REQUIRED.
23. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
24. REFER TO SIMULATION REPORT/DRAWING FOR ANGLE.

CONCEPTUAL DESIGN

NOTES:
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04				DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED	SCALE
		03				SUBMITTED				NTS
		02				RECOMMENDED				
		01				CHD./VER.				
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			DATE	DRAWING No.
									MAR-2025	4894/TD/STR/02/03



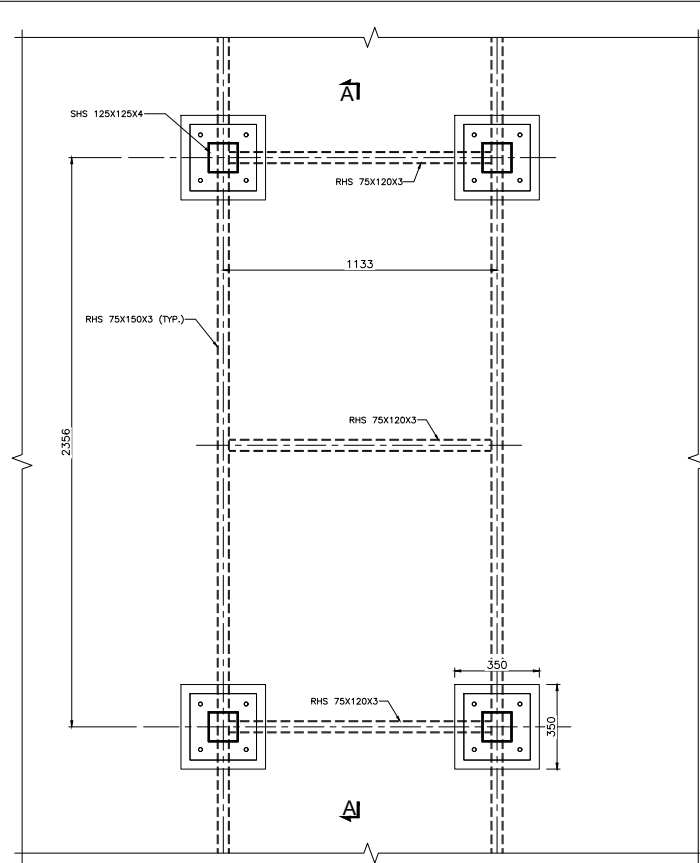
SECTION A-A

MEMBERS	SIZE/DESIGNATION
SC-1	I-SECTION OF 150X75X6mm
SB-1	I-SECTION OF 150X75X6mm
SB-2	C-CHANNEL OF 125X75X3mm

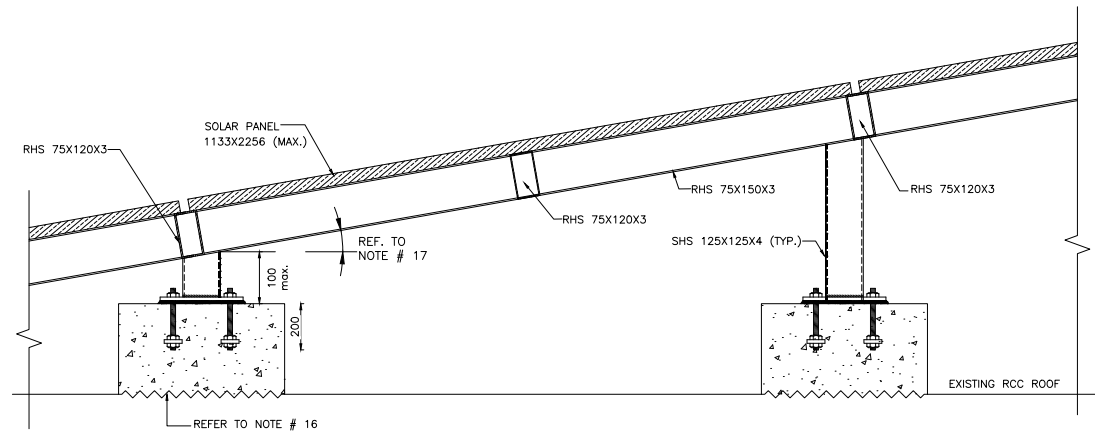
NOTES:
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CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED		SCALE
		03			SUBMITTED					NTS
		02			RECOMMENDED			DATE	DRAWING No.	REV.
		01			CHD./VER.			MAR-2025	4894/TD/STR/02/04	0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



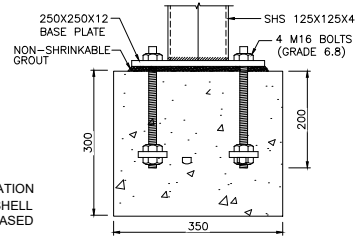
TYPICAL STRUCTURAL FRAMING PLAN



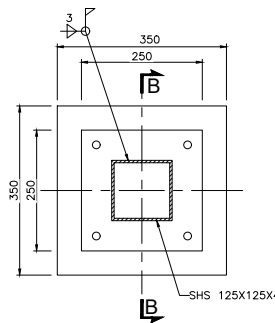
SECTION A-A

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL STEEL GRADE SHALL HAVE MINIMUM YIELD STRENGTH OF 250 Mpa.
4. ALL WELD SHALL BE OF E70XX ELECTRODE.
5. ALL STEEL STRUCTURE AND ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED (MIN 85 MICRON).
6. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
7. IT IS ASSUMED THAT THE EXISTING ELEVATED SURFACE OF ROOF IS ADEQUATE TO BEAR THE LOADINGS FROM STRUCTURAL FRAMING OF SOLAR PANEL.
8. MINIMUM CLEARANCE OF PV MODULE SHALL BE 6 FEET ABOVE THE ROOF LEVEL.
9. TWO DRAINAGE CLIPS SHALL BE PROVIDED FOR EACH MODULE IN THE LAST/LOWEST ROW OF THE MODULES IN A SHED.
10. ALL BEAM TO BEAM & BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING AT LEAST 4MM THICKNESS.
11. NON-SHRINKAGE GROUT OF AT LEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
12. ANCHOR BOLT (GRADE A490) SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
14. CONTRACTOR TO ENSURE THAT THE EXISTING DRAINAGE CHARACTERISTICS OF THE ROOF TOP ARE NOT COMPROMISED.
15. A PROTECTION MAT OF APPROVED TYPE SHALL BE PROVIDED BETWEEN ROOF TOP LAYER AND MOUNTING STRUCTURE/CONCRETE BLOCKS.
16. EXISTING SURFACE TO BE ROUGHENED & APPLY EPOXY CHEMICAL PRIOR TO CASTING OF NEW CONCRETE.
17. REFER TO SIMULATION REPORT FOR ANGLE .
18. COMMENCEMENT OF WORK SHOULD BE CARRIED OUT AFTER CLEARING OF SITE AND APPROVAL FROM CONSULTANT .



SECTION B-B



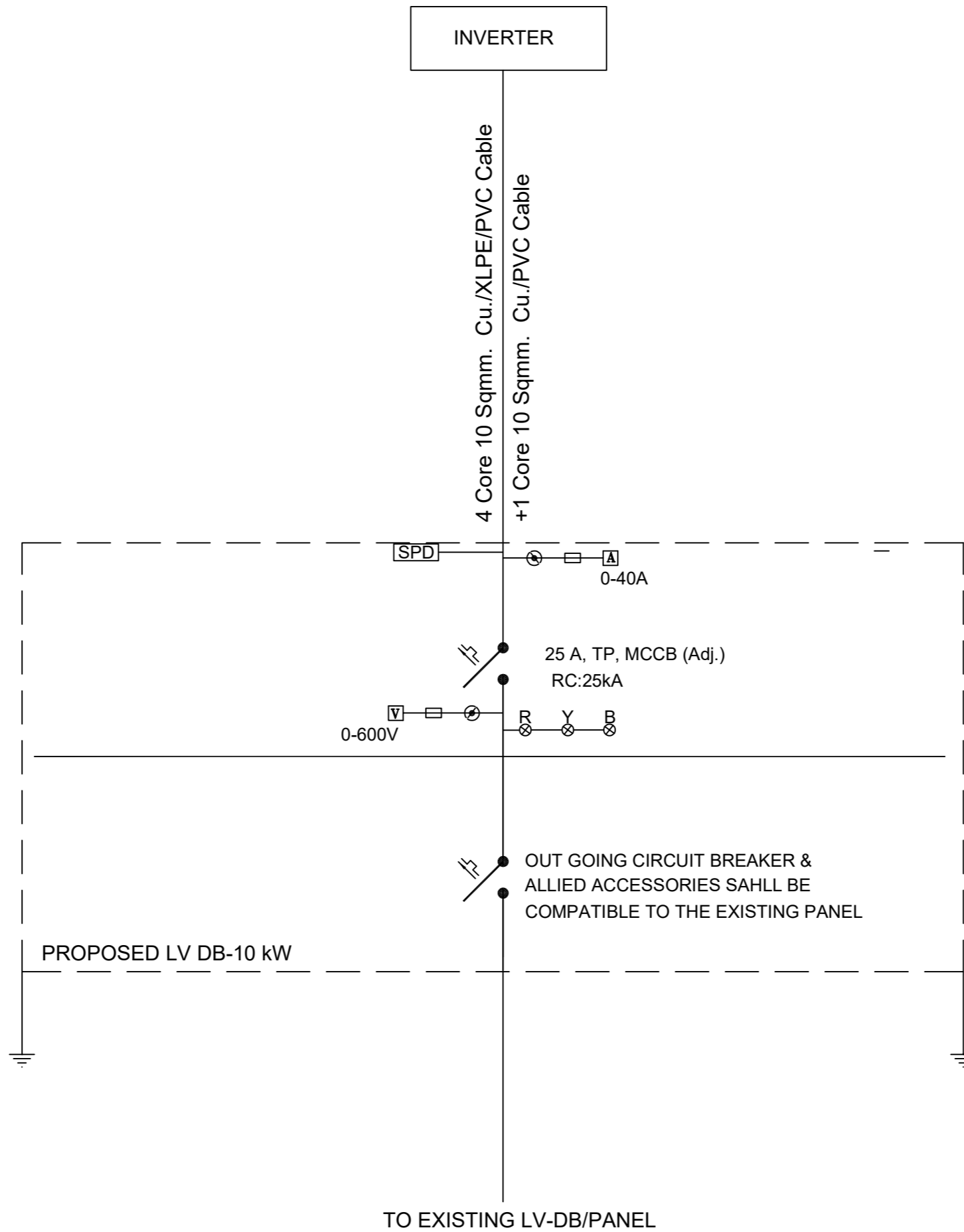
CONCRETE BLOCK DETAIL

NOTE:

THESE ARE MINIMUM REQUIRED CONCEPTUAL / INDICATION DRAWINGS ONLY HOWEVER, THE EPC CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS ALONG WITH FEM BASED MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

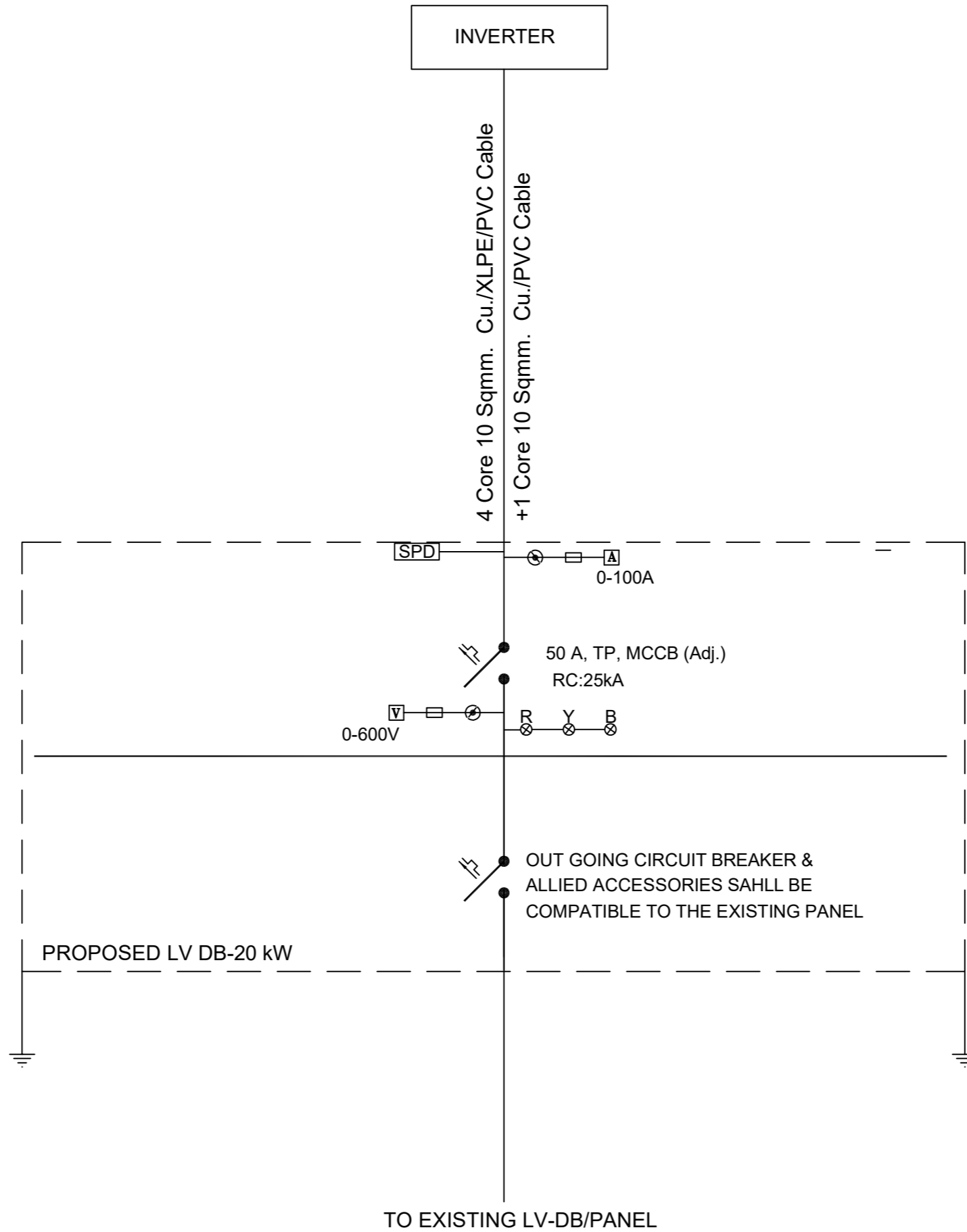
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE- NESPAK HOUSE, I.C. BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT	04			DRAWN	M.A	PROJECT	TYPICAL SOLAR PANEL FRAMING FOR R.C.C ROOF MOUNTED STRUCTURE	SCALE
	WATER & POWER GILGAT BALTISTAN	03			SUBMITTED		100 WM DISTRIBUTED SOLAR PV PLANTS AT VARIOUS SITES IN GILGAT BALTISTAN		NTS
		02			RECOMMENDED			DATE	REV.
		01			CHD./VER.			MAR- 2025	4894/TD/STR/05/01
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			↕



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

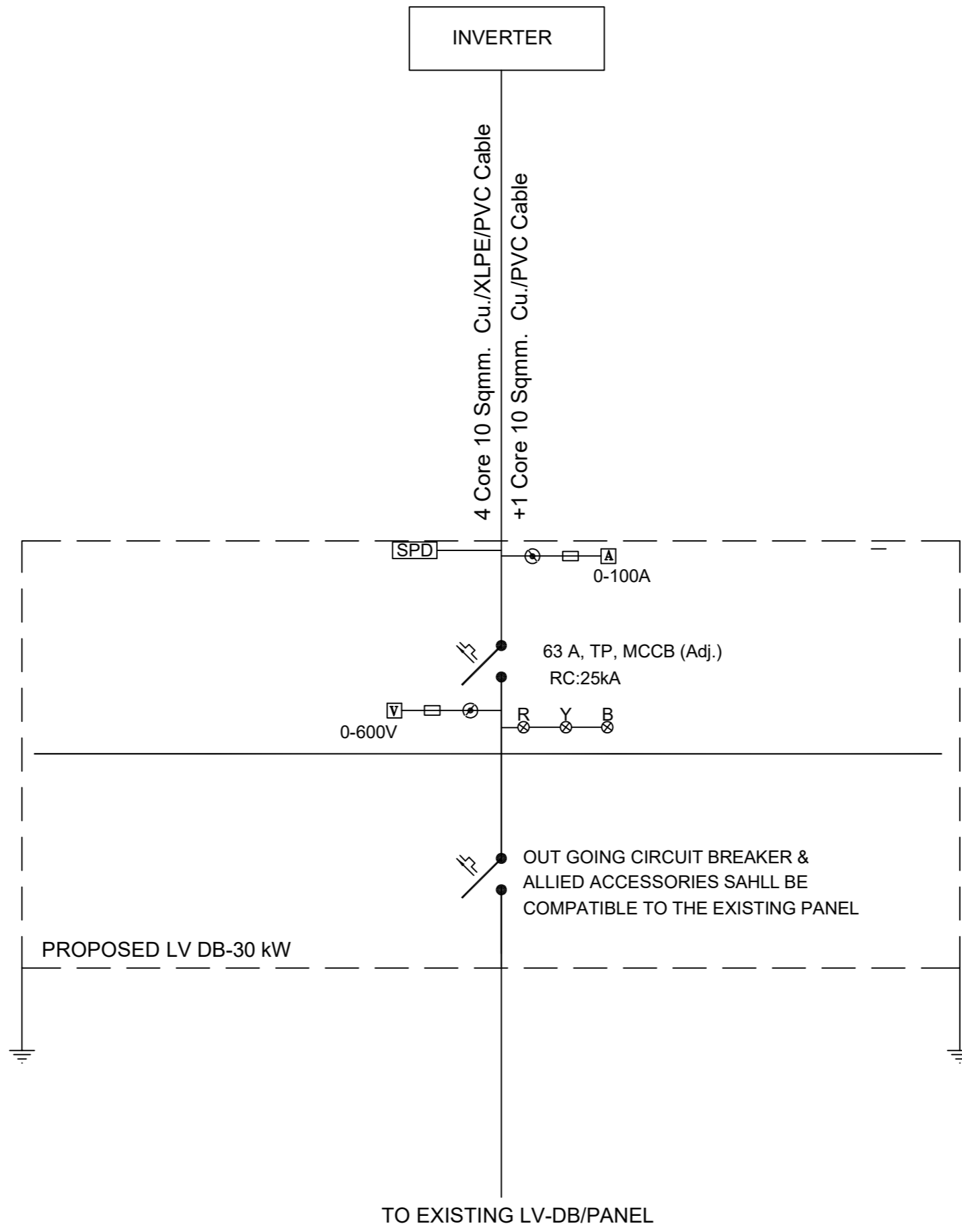
CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04				DRAWN	SH	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(1-10 KW) SINGLE LINE DIAGRAM		SCALE
	03				SUBMITTED					
	02				RECOMMENDED					
	01				CHD./VER.					
REV.	DATE	DESCRIPTION	APPROVED	APPROVED			DATE	DRAWING No.	REV.	
							AUG, 2025	MV/LV-21	0	



NOTE:

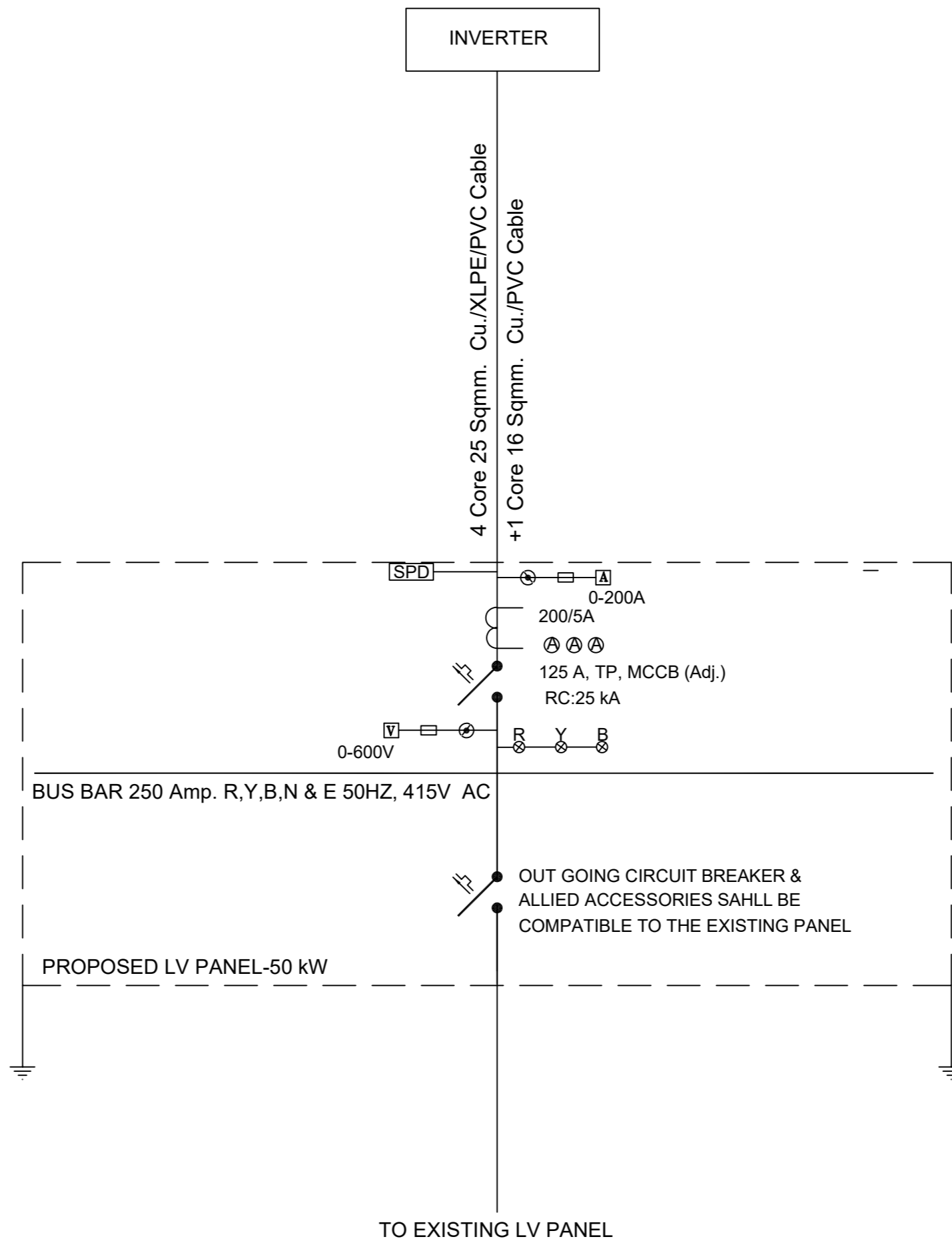
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04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:
THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

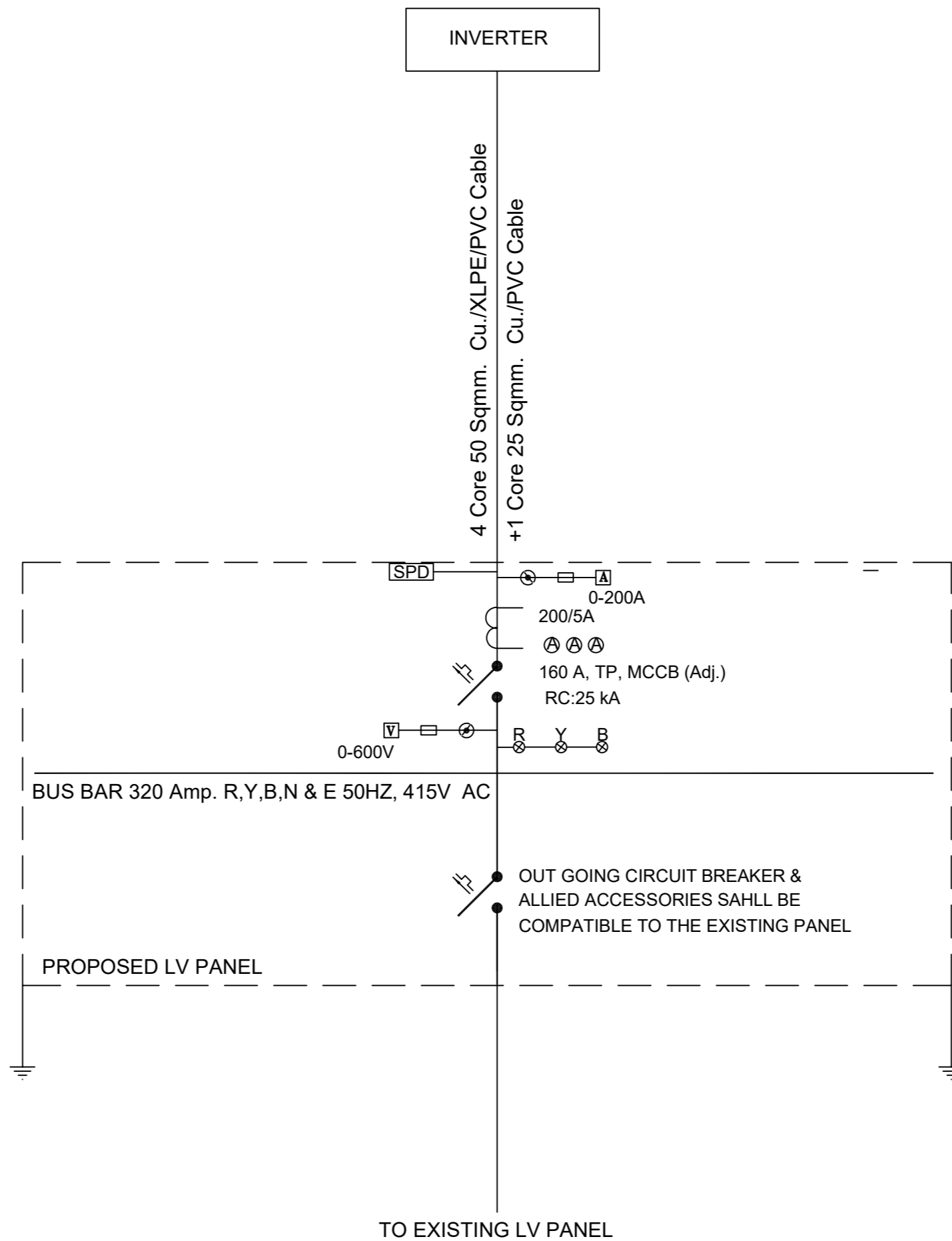
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04		DRAWN	S.H	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(20-30 KW) SINGLE LINE DIAGRAM		SCALE	
	03		SUBMITTED						NTS
	02		RECOMMENDED						
	01		CHD./VER.						
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED	DATE	DRAWING No.	REV.	
						AUG, 2025	MV/LV-23	0	



NOTE:

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04				DRAWN	S.H
03				SUBMITTED	
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01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

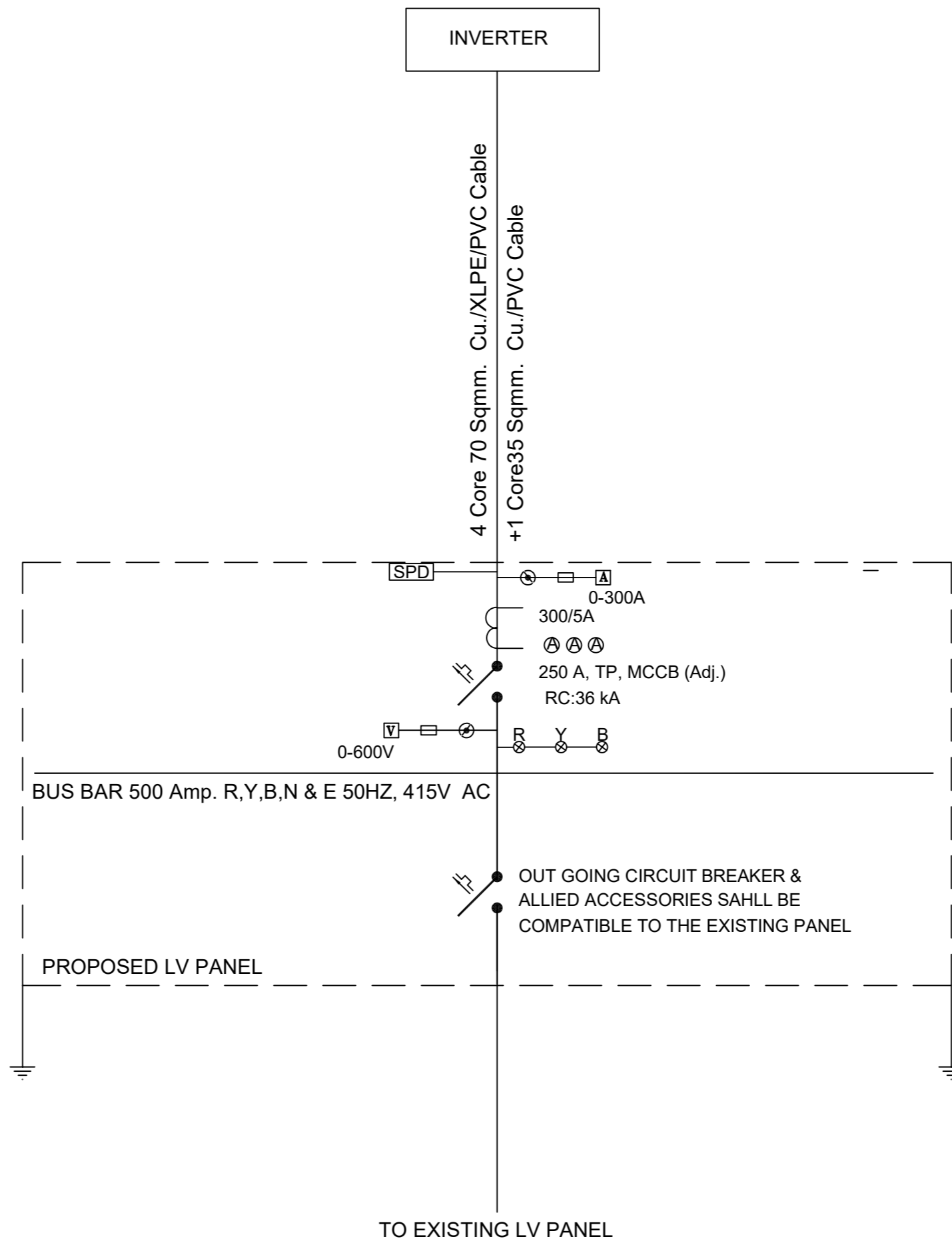


NOTE:

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REV.	DATE	DESCRIPTION	APPROVED

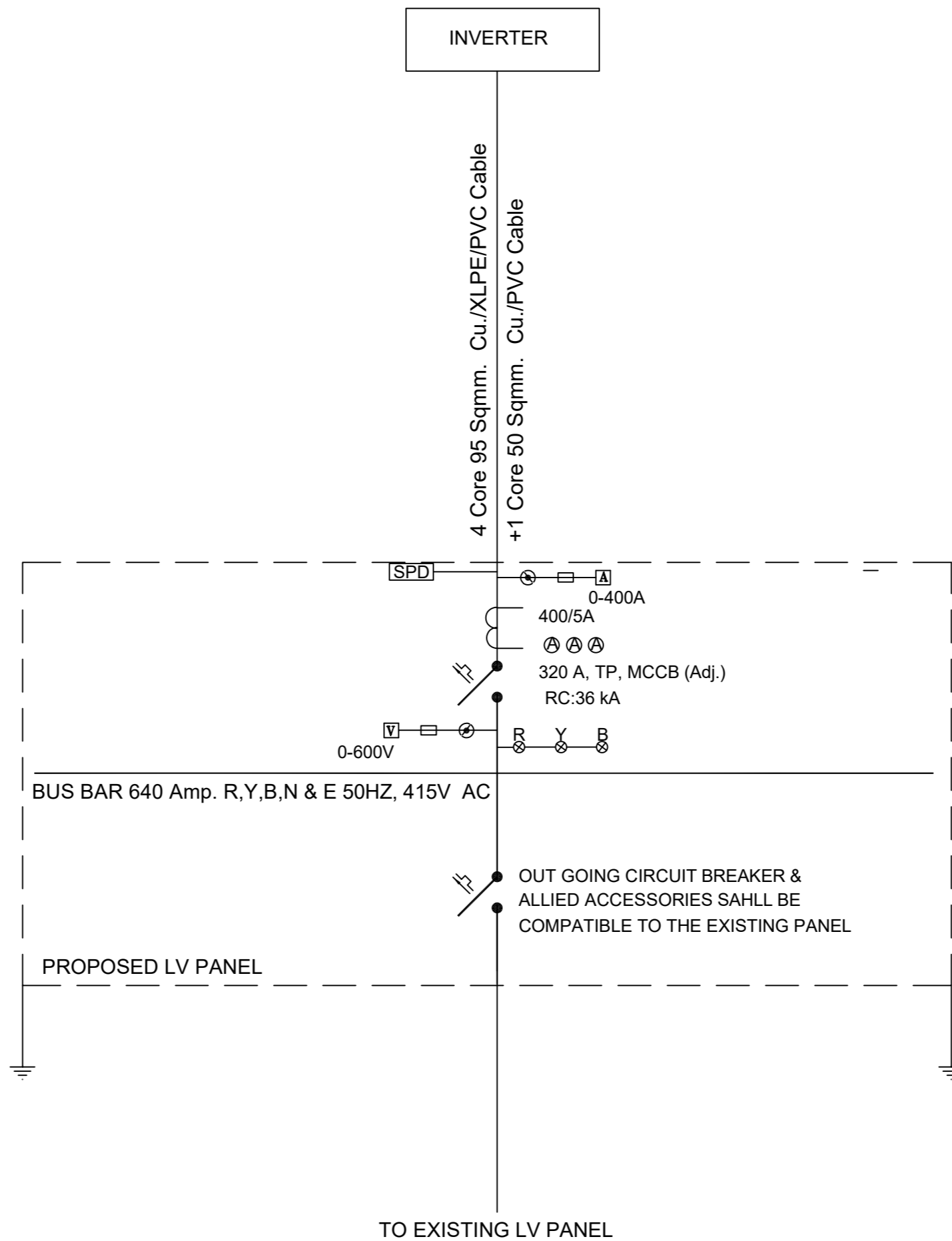
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SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	



NOTE:
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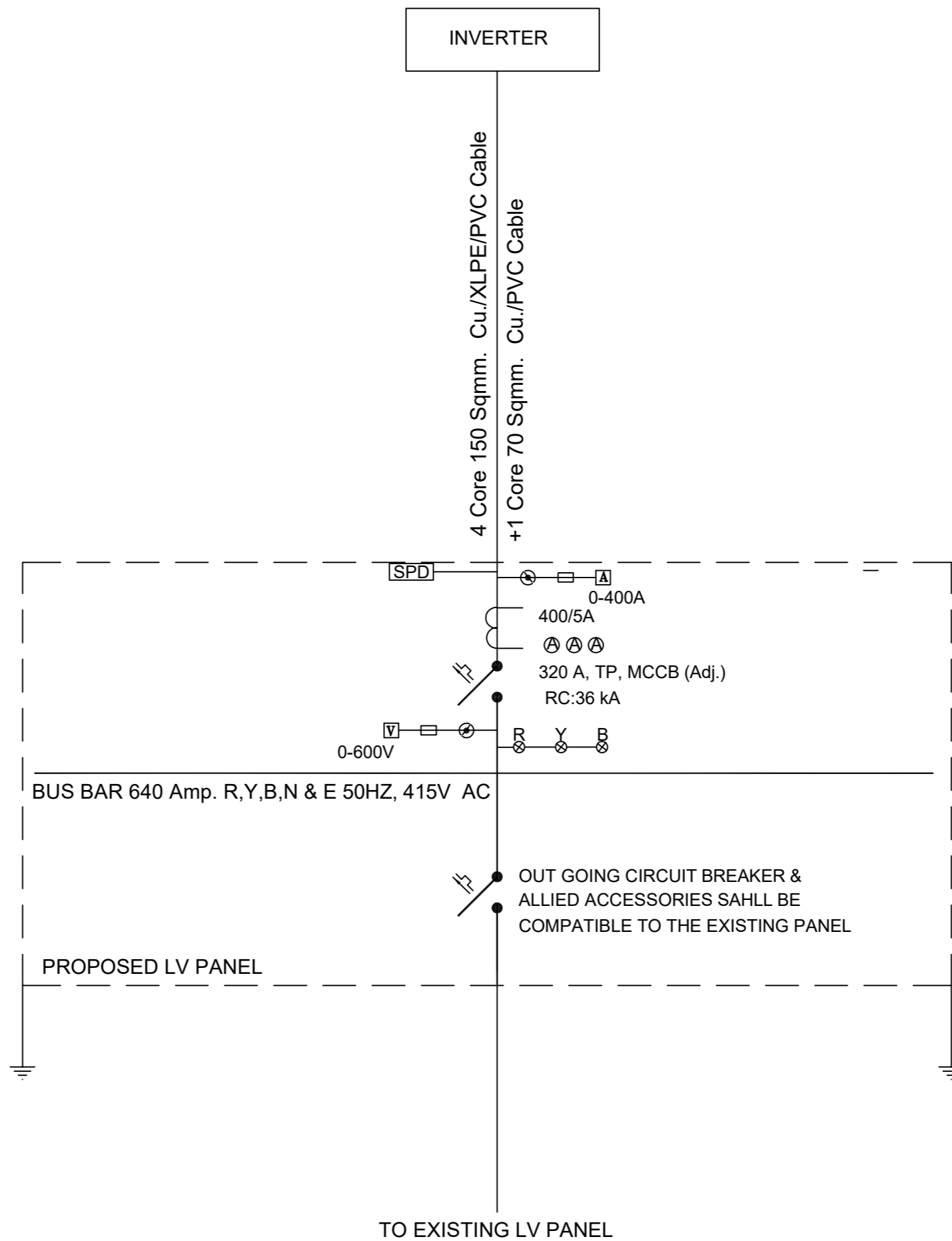
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REV.	DATE	DESCRIPTION	APPROVED

DRAWN	S.H
SUBMITTED	
RECOMMENDED	
CHD./VER.	
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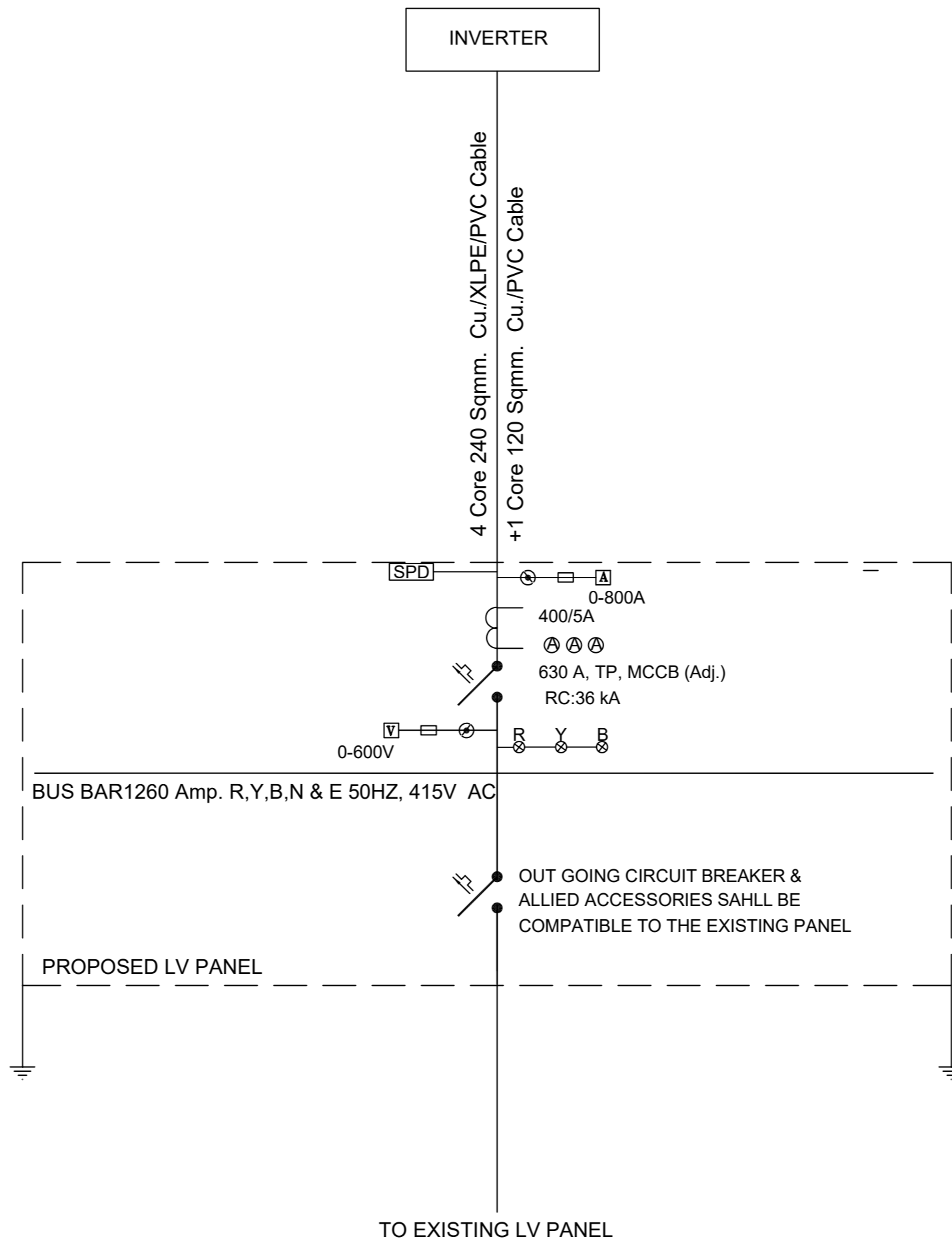
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04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:
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04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:
 THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

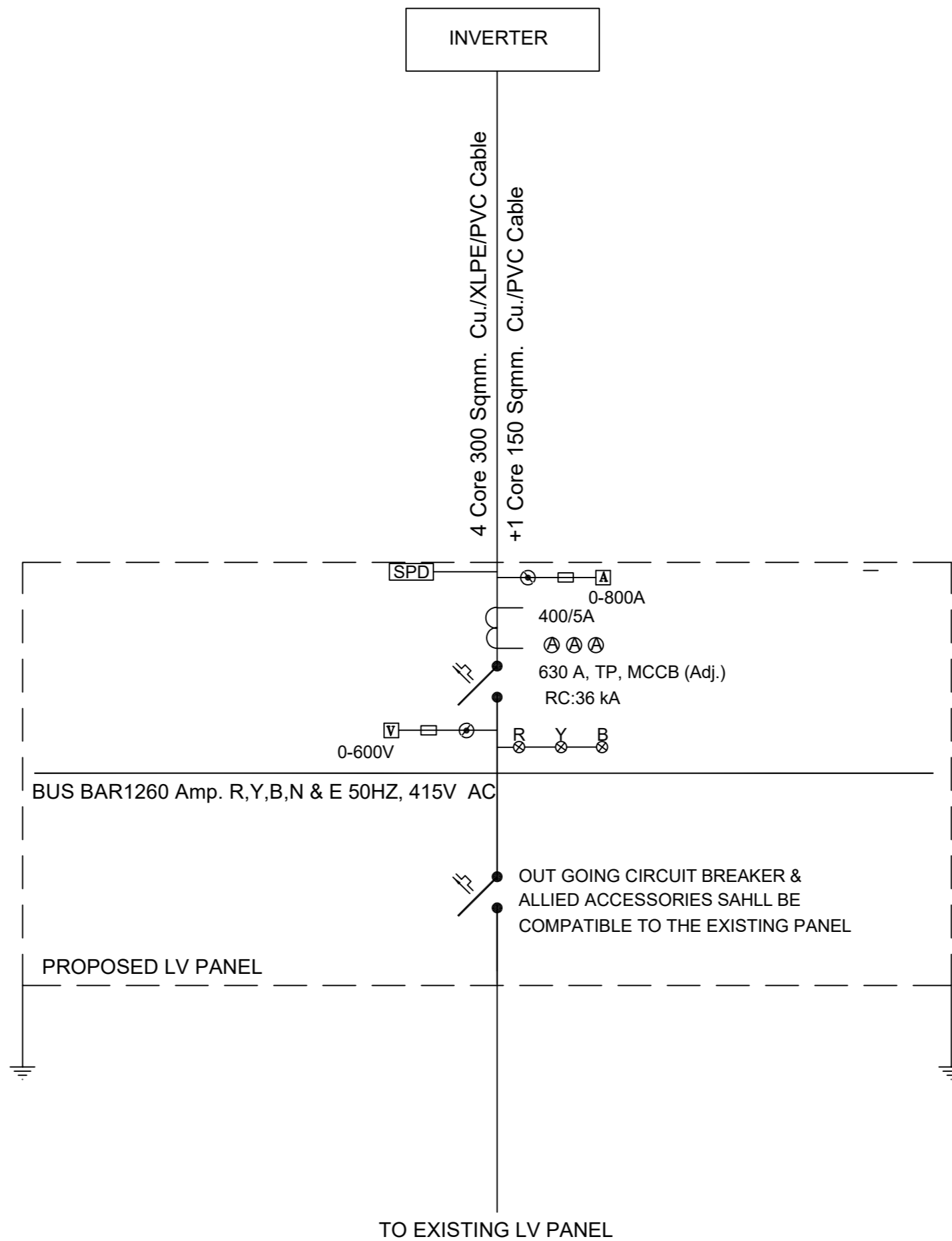
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REV.	DATE	DESCRIPTION	APPROVED

DRAWN	S.H
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	APPROVED

PROJECT
**100 MW PROJECT OF SOLARIZATION IN
 GILGIT BALTISTAAN**

**(150-200 KW)
 SINGLE LINE DIAGRAM**
 DATE: AUG 2025
 DRAWING No. **MV/LV-29**

SCALE
 NTS
 REV.



NOTE:
 THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

NES
PAS
 NATIONAL ENGINEERING SERVICES
 PAKISTAN (PVT.) LTD.
 HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N,
 MODEL TOWN EXTENSION, LAHORE, PAKISTAN.

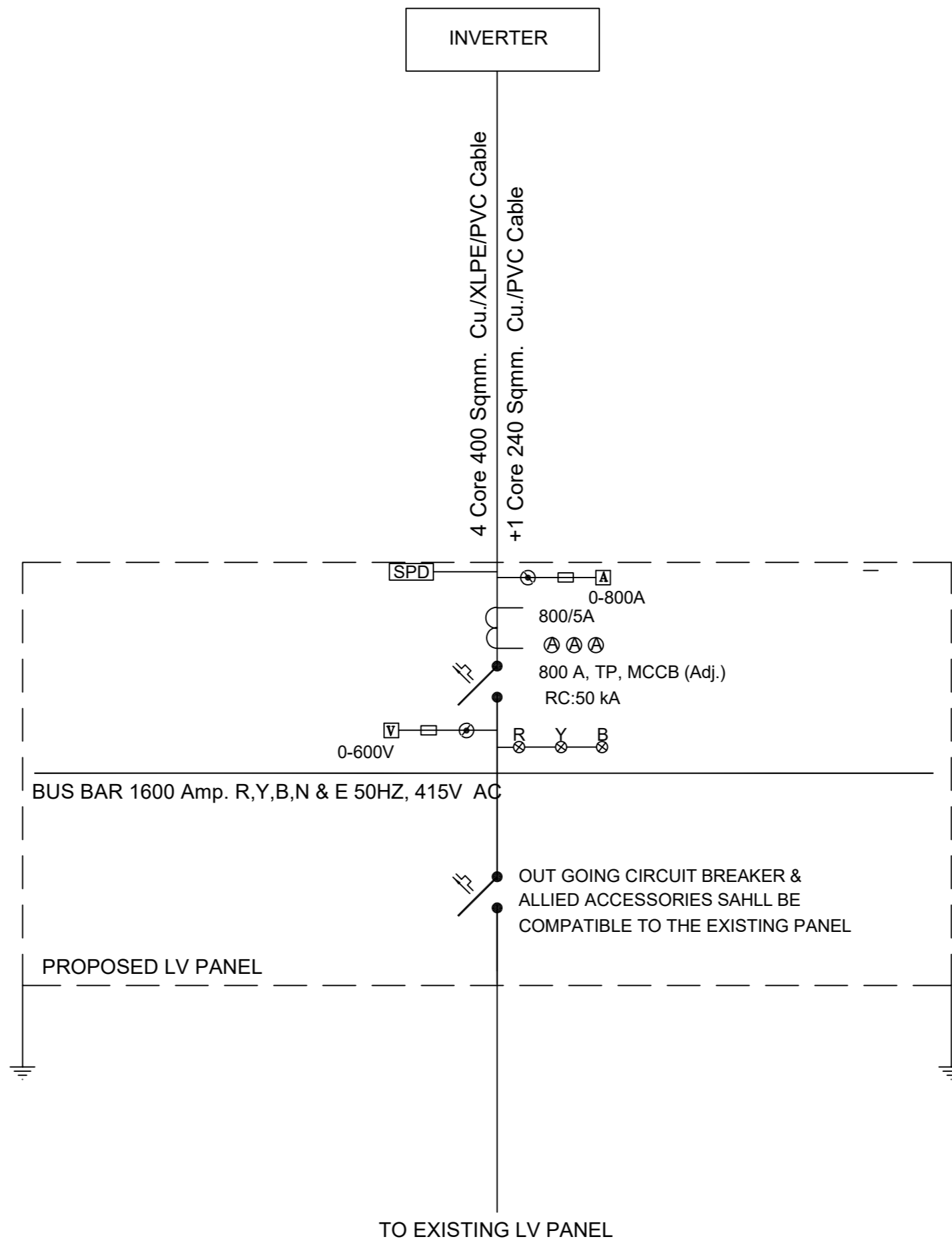
04			
03			
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REV.	DATE	DESCRIPTION	APPROVED

DRAWN	S.H	PROJECT
SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
RECOMMENDED		
CHD./VER.		
APPROVED	APPROVED	

**(200-250 KW)
 SINGLE LINE DIAGRAM**

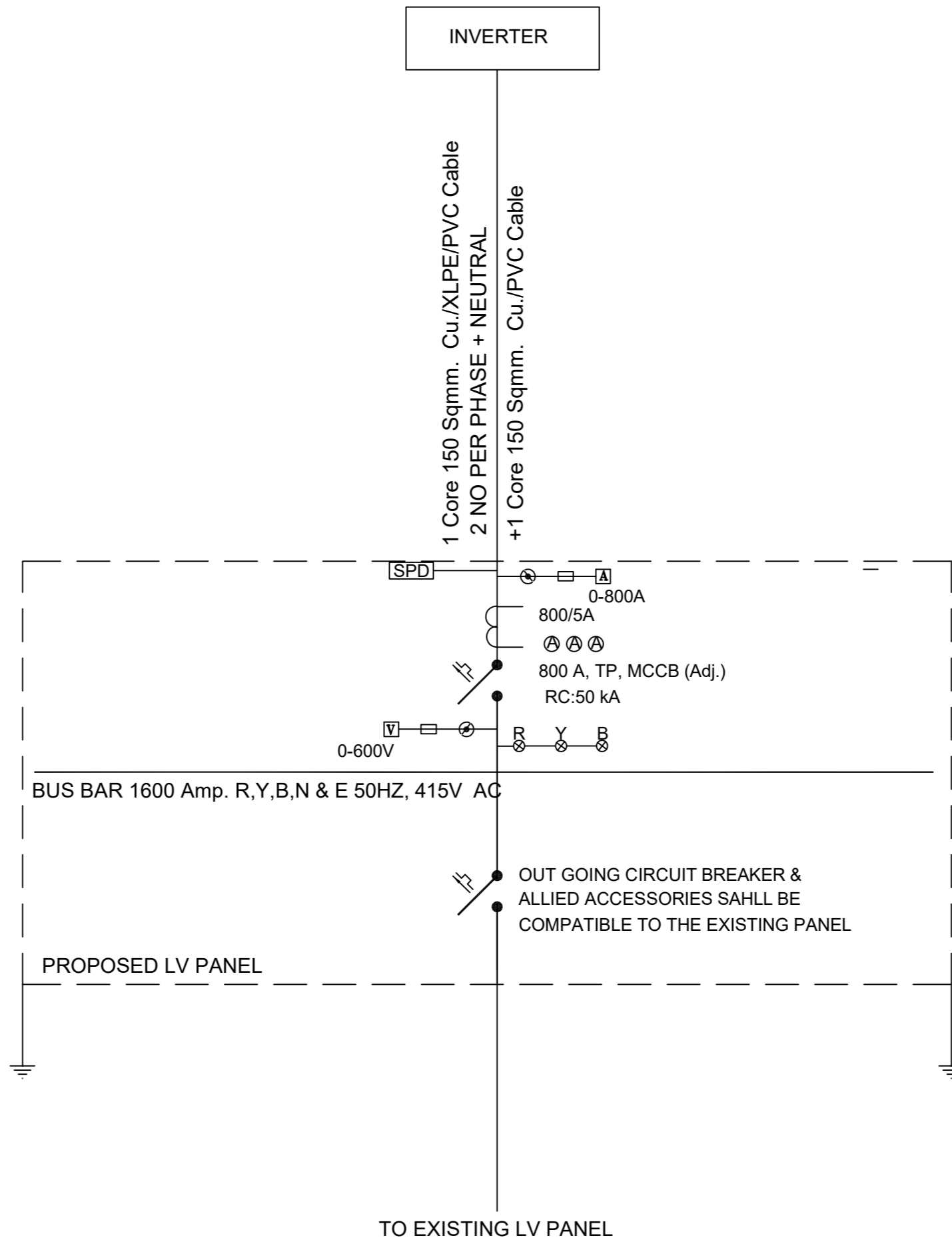
SCALE	NTS
DATE	DRAWING No.
AUG 2025	MV/LV-30

REV.



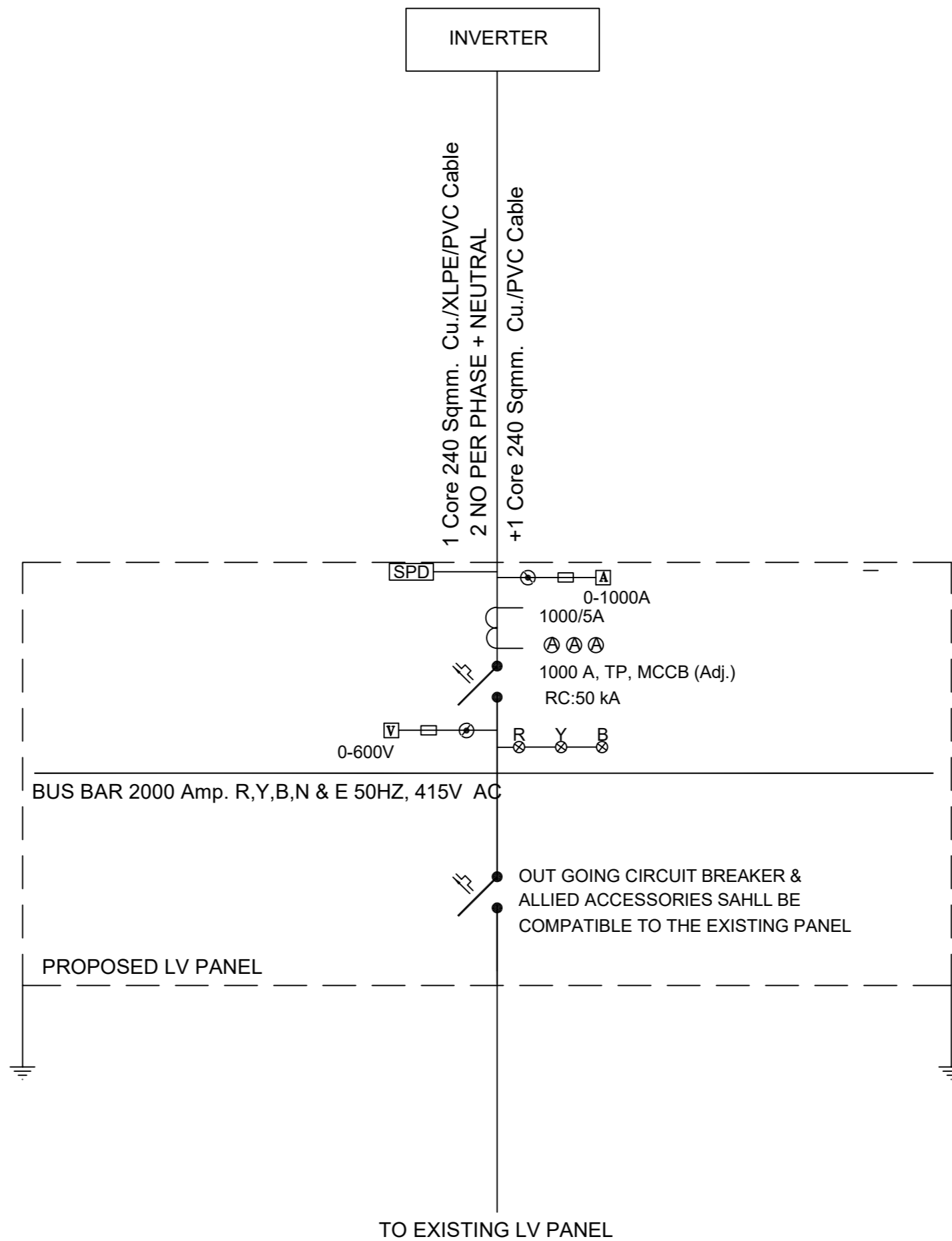
NOTE:
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04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



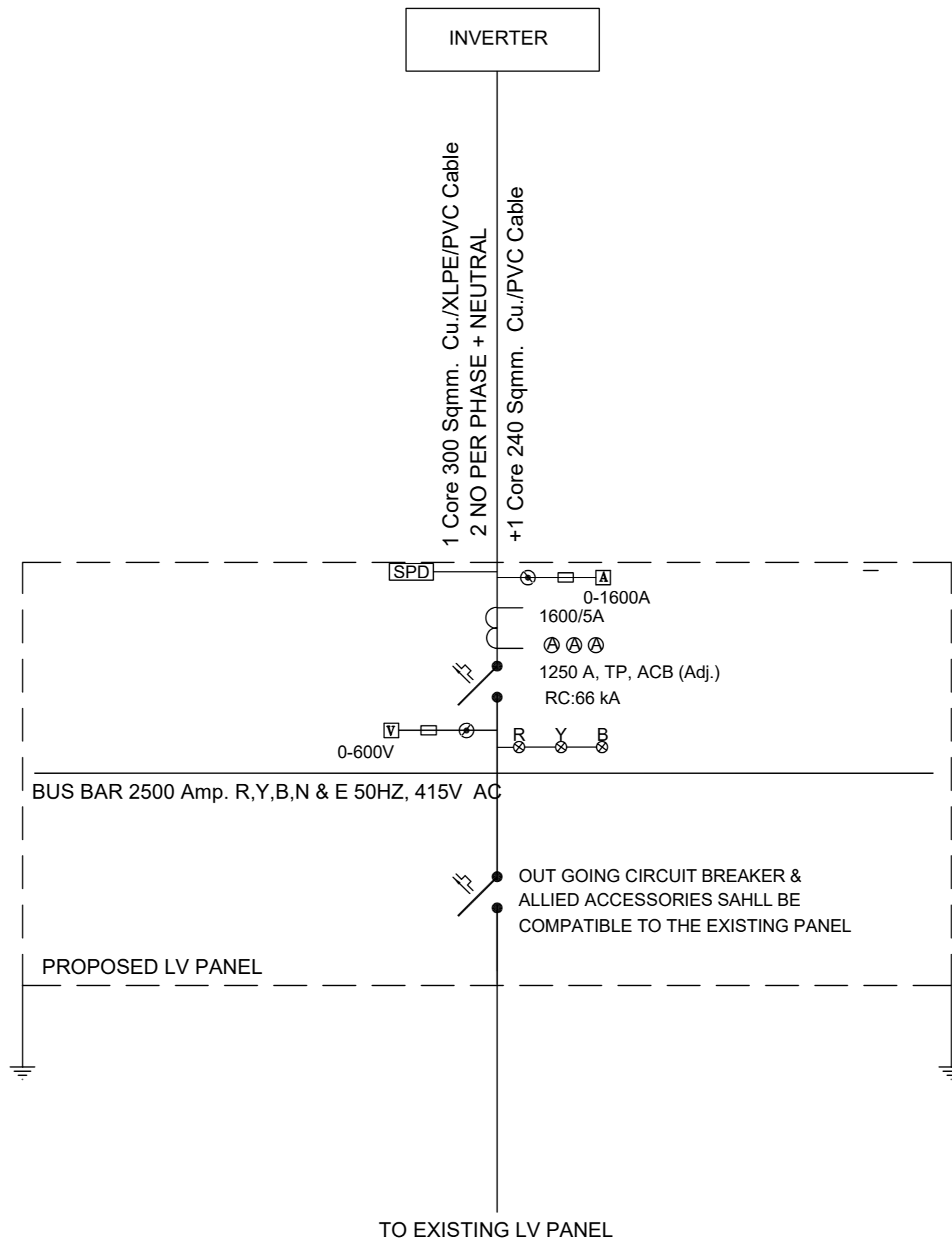
NOTE:
 THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



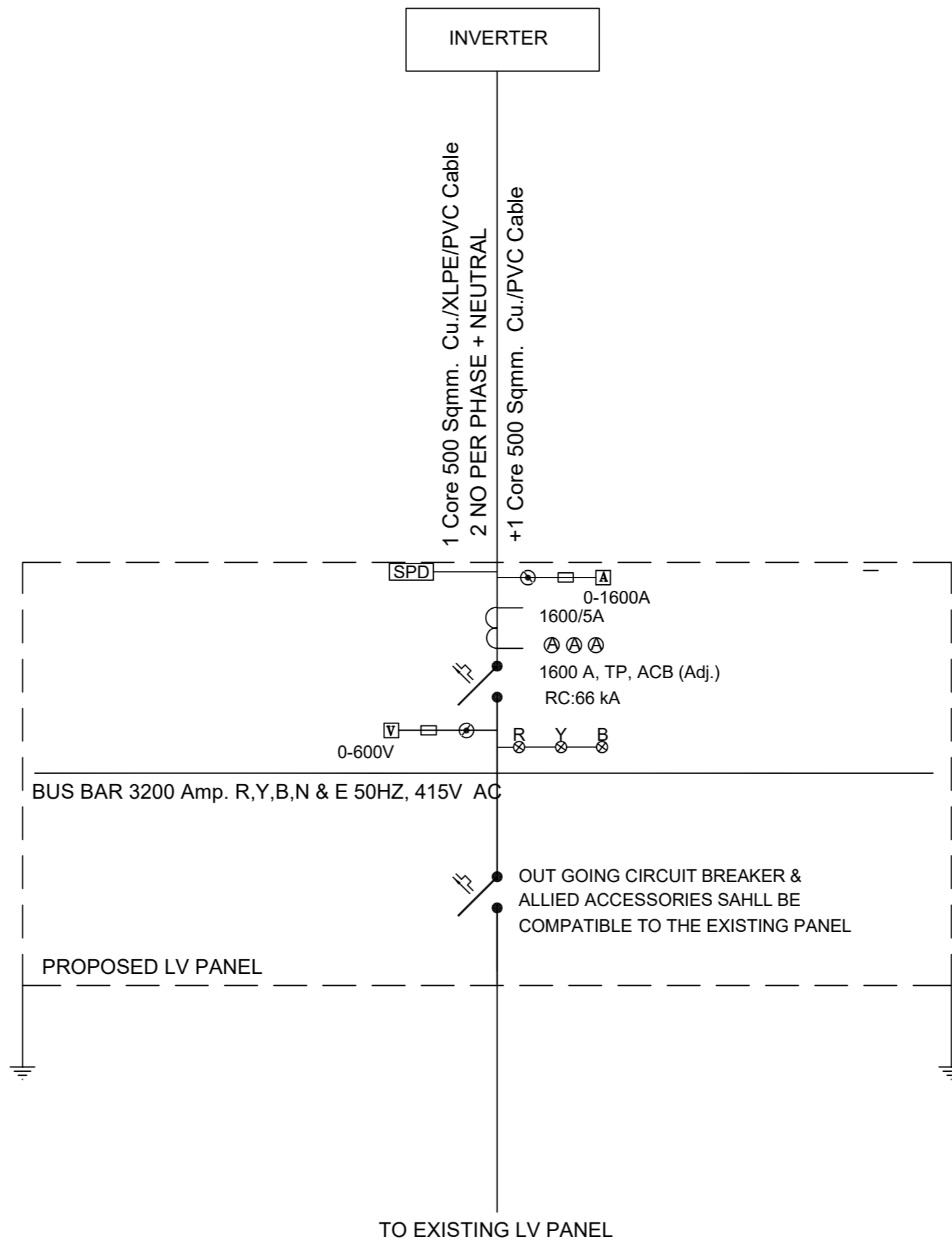
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04					DRAWN	S.H
03					SUBMITTED	
02					RECOMMENDED	
01					CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED		



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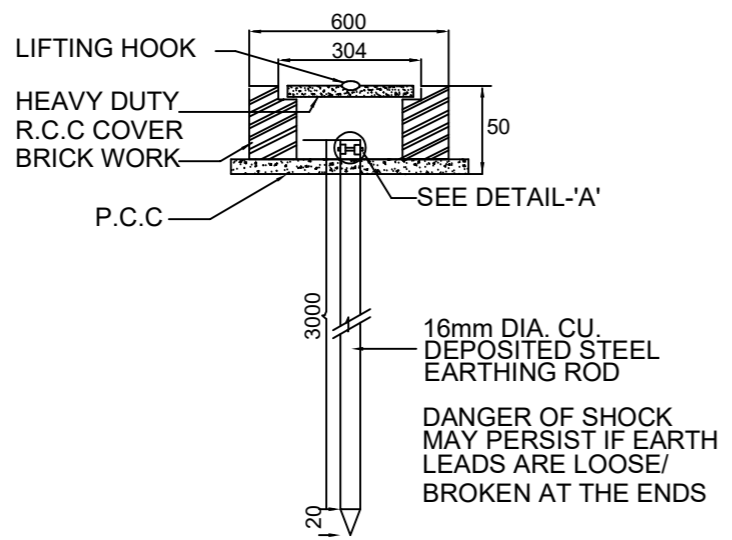
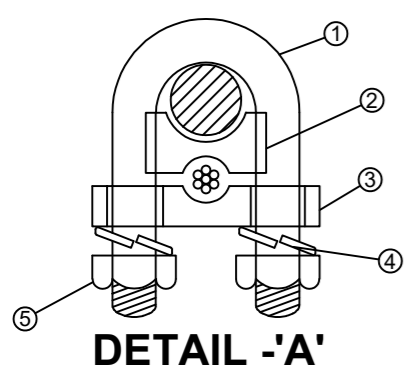
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REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

DRAWN	S.H	PROJECT
SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
RECOMMENDED		
CHD./VER.		
APPROVED	APPROVED	

(700 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-35	REV.

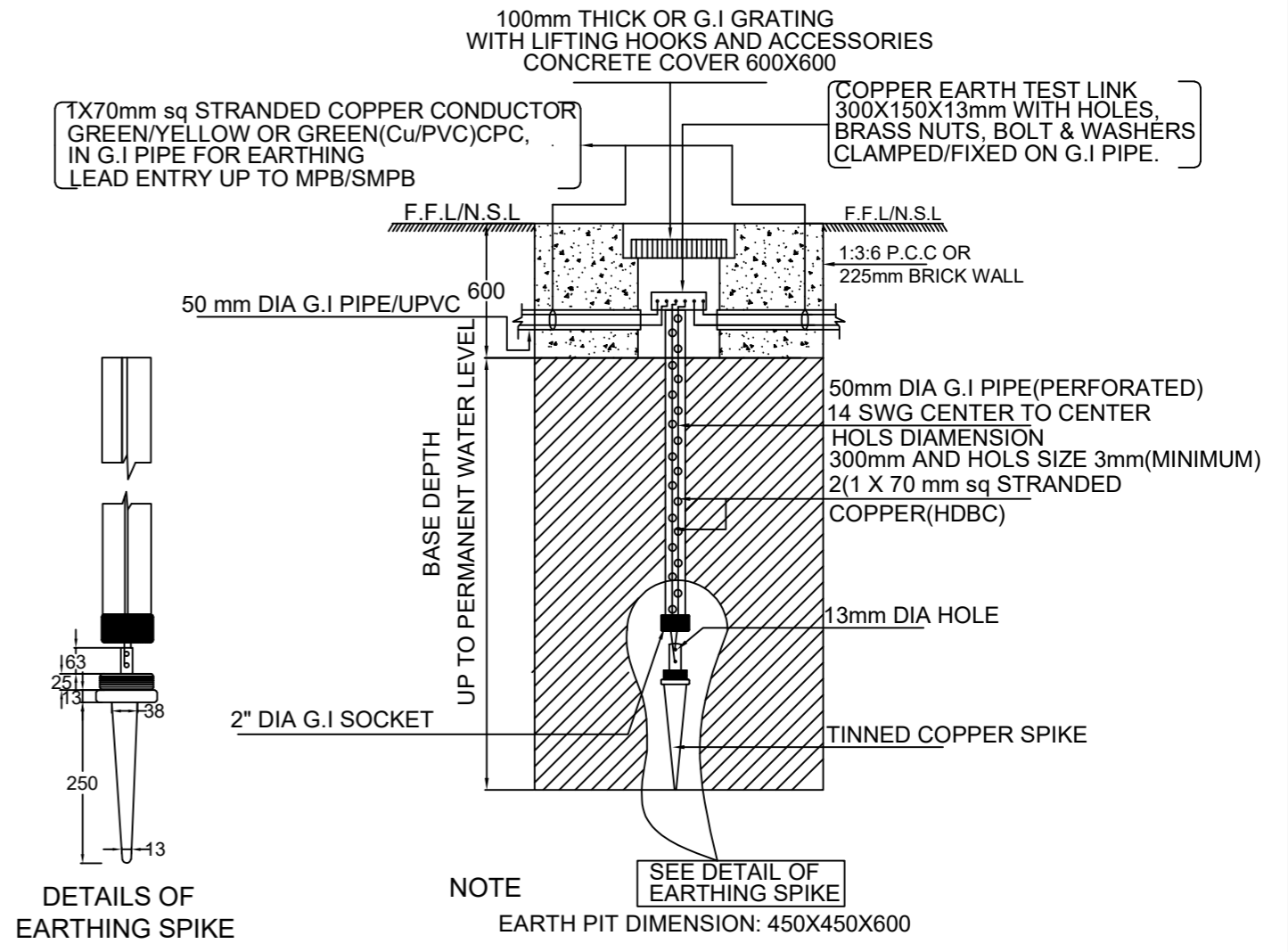
(700 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-35	REV.

ROD TYPE EARTHING DETAIL



ITEM NO.	ITEM NAME	MATERIAL
1	U-BOLT	MILD STEEL
2	SPACER	CAST IRON
3	BASE	MILD STEEL
4	SPRING WASHER	CARBON STEEL
5	NUT	MILD STEEL

BORE TYPE EARTHING DETAIL



DETAILS OF EARTHING SPIKE

NOTE
EARTH PIT DIMENSION: 450X450X600

NOTES

1. THIS DRAWING IS FOR INDICATIVE DESIGN MODEL AND SHOULD BE READ IN CONJUNCTION WITH SPECIFICATIONS AND ITEMS OF BILL OF QUANTITIES.
2. EARTH BORE SHALL BE MADE AT 2000MM (2M) AWAY FROM FOUNDATION/STRUCTURE.
3. DISTANCE BETWEEN TWO EARTH BORES SHALL NOT BE LESS THAN 3000MM (3M)
4. CONNECTION SHALL BE BOLTED WITH THIMBLES, BRASS NUTS, BOLTS/WASHER ETC.
5. CONTRACTOR SHALL MEASURE EARTHING RESISTANCE IN THE PRESENCE OF SITE ENGINEER, FOR FINAL ACCEPTANCE.
6. THE VALUE OF EARTH RESISTANCE SHALL BE INCORPORATED IN FINAL AS-BUILT DRAWINGS.

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</p> <p>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	04				DRAWN	S.H	PROJECT	(EARTHING DETAILS FOR PANELS)	SCALE	
	03				SUBMITTED				100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	NTS
	02				RECOMMENDED					
	01				CHD./VER.					
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED					DATE
							AUG. 2025	MV/LV-36	0	



WATER AND POWER DEPARTMENT, GILGIT
BALTISTAN



3.34 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT – III)

**BIDDING DOCUMENTS
ON EPC/TURNKEY BASIS
(SINGLE STAGE TWO ENVELOPE)**

VOLUME – I



November 2025



National Engineering Services Pakistan (Pvt.) Ltd. (NESPAK)

1-C, Block N, Model Town Extension, Lahore, Pakistan

Tel: +92-42-99090000, Web: www.nespak.com.pk E-mail: power@nespak.com.pk

3.34 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN LOT – III

INDEX TO BIDDING DOCUMENTS

VOLUME – I

**BIDDING PROCEDURES
AND
CONDITIONS OF CONTRACT**

1. Section I – Instruction to Bidders (ITB)
2. Section II – Bid Data Sheet (BDS)
3. Section III – Evaluation & Qualification Criteria
4. Section IV – Bid Forms
5. Section V – General Conditions (GC)
6. Section VI – Particular Conditions
7. Section VII – Contract Forms and Schedules



DRAFT INVITATION FOR BIDS

Contract No. and Title: ICB-01 EPC/Turnkey Contracts for Implementation of Rooftop Solarization of Gilgit Baltistan (18.15 MW_{DC}, in 3 Lots)

1. The Water and Power Department, Gilgit Baltistan, Pakistan (the "Employer"), has allocated PSDP funds for the implementation of the 100 MW_{DC} Distributed Solarization of Gilgit Baltistan Project. As a part of this Project, the present Invitation for Bids relates to Rooftop Solarization works aggregating 18.15 MW_{DC}. The Employer has divided these works into three separate Lots for procurement on an Engineering, Procurement, and Construction (EPC) / Turnkey basis. Bids are open to all Bidders eligible in accordance with the Bidding Documents.
2. The Employer invites sealed Bids (Technical and Financial Bids) from eligible Bidders as defined under Clause ITB.4 of Instruction to Bidders for one, **several, or all Lots** listed below. However, **each Lot shall be awarded under a separate Contract, and no Bidder shall be awarded more than one Lot**. The Works comprise the detailed engineering design, construction, supply, erection, installation, testing, and commissioning of Rooftop Solar PV Plants with integrated Battery Energy Storage Systems (BESS), followed by a Defects Notification Period of three (3) years, and provision of Operation and Maintenance services for three(3) years, further extendable on the option of the Employer as specified in the Bidding Documents.

A foreign Bidder may participate only as part of a joint venture with a Pakistani constructor duly registered/licensed with the Pakistan Engineering Council (PEC). This requirement is prescribed in the Bidding Data Sheet (BDS) pursuant to the Procuring Agency's authority under Rules 18–20 of the Gilgit-Baltistan Public Procurement Rules, 2022, and the PEC registration requirements applicable to foreign constructors. The Works mainly comprise the following:

Sr. NO	DISTRICT NAME	TOTAL NUMBER OF BUILDINGS	PV (kWp)	BESS (kWh)	Bid Security Amount (PKR) For Each Lot
LOT I (Gilgit Region): 9.11 MW_{dc} and 4.952 MWh					18 million
1	Gilgit	78	5,229	2,755	
2	Hunza	61	1,533	844	
3	Nagar	56	965	533	
4	Ghizer	41	1,379	820	
LOT II (Baltistan Region): 5.70 MW_{dc} and 3.892 MWh					10 million
1	Skardu	78	4,155	2,839	
2	Ghanche	42	652	347	
3	Shigar	35	530	481	
4	Kharmang	20	368	225	
LOT III (Diامر-Astore Region): 3.34 MW_{dc} and 2.269 MWh					5 million
1	Astore	41	1,246	722	
2	Chillas	47	2,097	1,547	

3. International Competitive Bidding will be conducted in accordance with the Gilgit-Baltistan Public Procurement Rules, 2022, under the "Single Stage - Two Envelope" Bidding Procedure (Rule 39 (b)), separately for each Lot.



Government of Gilgit Baltistan
OFFICE OF THE PROJECT DIRECTOR
100 MW SOLARIZATION OF GB PROJECT
W&P Department Gilgit-Baltistan

Bidders may obtain further information, inspect, and acquire the complete set of Bidding Documents for the desired Lot(s) from the **Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email:**pd100mwpsolar@gmail.com

4. Interested Bidders may purchase a complete set of Bidding Documents for any Lot on submission of a written application to the above office and upon payment of a non-refundable fee of PKR 20,000 (Pakistani Rupees Twenty Thousand Only) per Lot. Requests for delivery of Bidding Documents can be made by sending a written application to the above Office. The application must include a pay order/demand draft in favor of the Project Director for the non-refundable fee of PKR 20,000/- per Lot and charges of PKR 5,000/- for local delivery or PKR 30,000 for overseas delivery per set or proof of online submission in the **account Titled "Executive Engineer Billing Division W&PD" IBAN NO: PK72MPBL0286027140132801**. The documents will be sent by courier. No liability will be accepted for loss or late delivery.
5. Each Bid must be submitted separately for each Lot and must be accompanied by a Bid Security for the corresponding amount specified in the table of this RFP, in the form of a bank guarantee from a scheduled bank in Pakistan or from a foreign bank, duly counter-guaranteed by a scheduled bank in Pakistan. The Bid Security must be valid for a period of not less than 180 days after the date of Bid opening. Bids for the desired Lot(s) must be delivered to the address above on or before 1330 hrs (Pakistan Standard Time) on December 26, 2025.
6. Technical Bids will be opened for each Lot immediately at 1400 hours on the same day at the address above, in the presence of Bidders' representatives who choose to attend at the same address.
7. Bidders are permitted to submit Bids for one, several, or all Lots. However, in the interest of ensuring wider participation and effective implementation, the Employer shall award only one (1) Lot to any Bidder (whether participating individually or as a part of joint venture).
8. A Pre-Bid meeting will be held as follows. Bidders are strongly encouraged to attend.
 - Date: December 12,2025
 - Time: 1100 hrs
 - Venue: **Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan**
9. This advertisement is also available on GBPPRA website <https://www.gbppra.gov.pk/> and W&PD GB Website <https://wpdgb.gov.pk/> .

Office of Project Director
100 MW Distributed Solarization of Gilgit Baltistan Project
Water and Power Department
Gilgit Baltistan, Pakistan

Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email:pd100mwpsolar@gmail.com

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PART-I: BIDDING PROCEDURES

SECTION I - INSTRUCTIONS TO BIDDERS (ITB)

A. General

<p>1. Scope of Bid</p>	<p>1.1 The Employer, as specified in the BDS, issues these Bidding Documents for the execution and completion of the Engineering, Procurement and Construction (EPC) / Turnkey Works for Distributed Solar Photovoltaic Plants as described in Volume-II (Employer's Requirements). The name, identification and number of lots (contracts) of this RFB are specified in the BDS.</p> <p>1.2 Unless otherwise stated, throughout these Bidding Documents definitions and interpretations shall be as prescribed in the Section V (General Conditions).</p> <p>1.3 Throughout these Bidding Documents:</p> <ul style="list-style-type: none">(a) the term "in writing" means communicated in written form (e.g. by mail, e-mail, fax, including if specified in the BDS, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;(b) "The word "Bidding Documents" is synonymous with "Bid", the word "Bidding Documents" or "Bidder" with "Bidder" and the words "Bidding Documents" and "request for bids documents" with "bidding document(s)", as applicable."(c) if the context so requires, "singular" means "plural" and vice versa.(d) "Day" means calendar day, unless otherwise specified as "Business Day". A Business Day is any day that is an official working day of the Employer. It excludes the Employer's official public holidays;(e) "Works" refers to Works, subject of these Bidding Documents, to be executed on EPC/Turnkey contracting arrangement;(f) "ES" means environmental and social(g) "Contractor's Personnel" is as defined in Sub-Clause 1.1.14 of the General Conditions; and(h) "Employer's Personnel" is as defined in Sub-Clause 1.1.29 of the General Conditions.
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	<p>(i) “Taking Over” is defined as the taking over at the end of the EPC phase and the simultaneous start of the O&M phase of the particular Section as per relevant conditions of the Contract, which shall not constitute final acceptance or a waiver of defects.</p>
<p>2. Source of Funds</p>	<p>2.1 The Employer has received funds from Government of Pakistan towards the cost of the Project named in the BDS. The Employer intends to apply a portion of the funds to eligible payments under the Contract for which these Bidding Documents are issued.</p>
<p>3. Fraud and Corruption</p>	<p>3.1 The Employer will reject a Bid if it determines that the Bidder recommended for award, or any of its personnel, or its agents, or its sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract under this Bidding process.</p> <p>3.2 The Employer will blacklist and hence forthwith debar a Bidder or individual, at any time, in accordance with the prevailing Gilgit-Baltistan Public Procurement Rules, 2022 (Rule 22)</p> <p>The Bidder shall sign and stamp the Integrity Pact provided in Contract Forms and Schedules of the Bidding Documents for all government procurement contracts exceeding Rupees ten million. Failure to provide such Integrity Pact shall make the Bidder non-responsive.</p>
<p>4. Eligible Bidders</p>	<p>4.1 A Bidder may be a firm that is a private entity, a state-owned enterprise or institution subject to ITB 4.8 or any combination of such entities in the form of a joint venture (JV) under an existing agreement. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms. The JV shall nominate a representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified in the BDS, there is no limit on the number of members in a JV.</p> <p>4.2 The Bidder (single entity or each member in the JV) shall be duly licensed by the Pakistan Engineering Council (PEC). In case, the bidder is a single entity it shall have valid PEC licence in category C1 and in case of JV, the combined value of limits of all the JV members shall not be less than that of C1. The Bidder (single entity or any member in the JV) shall also be registered with the Private Power and Infrastructure Board (the “PPIB”) and have a valid PPIB Certificate (applicable for the Local Firm, if certificate</p>

	<p>yet not issued valid payment proof is acceptable) issued under AEDB Certification Regulations, 2021.</p> <p>However, a foreign firm may submit a valid PEC provisional license in a relevant category with its Bid but shall obtain and submit a full PEC license before signing of the Contract and commencement of Works</p> <p>Foreign firm shall not be eligible to participate in Bidding process individually. Foreign firm shall enter into joint venture with Pakistani firm registered with the Pakistan Engineering Council in equivalent/compatible category and submit the joint venture agreement delineating inter alia the division of responsibilities among each JV member, to the Employer before participating in Bidding process in accordance with PEC Construction and Operation of Engineering Works Byelaws, 1987.</p> <p>4.3 Pakistani firm must be on Active Taxpayer List of the Federal Board of Revenue and provincial revenue authority/ board where applicable.</p> <p>4.4 A Bidder shall not have a conflict of interest. Any Bidder found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:</p> <ul style="list-style-type: none">(a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or(b) receives or has received any direct or indirect subsidy from another Bidder; or(c) has the same legal representative as another Bidder; or(d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the Bid of another Bidder, or influence the decisions of the Employer regarding this Bidding process; or(e) any of its affiliates participates as a consultant in the preparation of the Employer's Requirements for the Works that are the subject of the Bid; or(f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer as the Employer's Representative for the Contract implementation; or(g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly
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	<p>controls, is controlled by, or is under common control with that firm; or</p> <p>(h) has a close business or family relationship with a professional staff of the Employer (or of the project implementing agency) who: (i) are directly or indirectly involved in the preparation of the Bidding Documents or Employer's requirements of the Contract, and/or the Bid evaluation process of such Contract; or (ii) would be involved in the implementation or supervision of such Contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Employer throughout the Bidding process and execution of the Contract.</p> <p>4.5 A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid for the same Lot, except for permitted alternative Bids for the same Lot. However, a Bidder may participate in more than one Lot. For the avoidance of doubt, a subcontractor cannot be a member of a JV and a subcontractor at the same time in the Bidding process. Such participation shall result in the disqualification of all Bids in all Lots in which the said firm is involved. However, a firm that is not an individual Bidder or a JV member in a Bid may participate as a subcontractor in more than one Bid.</p> <p>4.6 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.10. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed sub-contractors or sub-consultants for any part of the Contract including related Services.</p> <p>4.7 All members constituting the Bidder including proposed subcontractors do not appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and the Gilgit-Baltistan Public Procurement Regulatory Authority (GBPPRA) and other relevant federal/provincial authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.</p> <p>4.8 Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Employer, that they (i) are legally and financially</p>
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	<p>autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.</p> <p>4.9 A Bidder shall not be under suspension from submitting Bids by the Employer as the result of the operation of a Bid Securing Declaration.</p> <p>4.10 Eligible countries to participate in this Bidding process shall be all countries, except those restricted under the laws, rules, or policies of Pakistan or Gilgit-Baltistan, or under international obligations (e.g., UN sanctions). Any country-specific restrictions, if applicable, will be notified in the BDS.</p> <p>4.11 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.</p>
<p>5. Eligible Materials, Equipment, and Services</p>	<p>5.1 The materials, equipment and services to be supplied under the Contract may have their origin in any country subject to the restrictions specified in the laws of Pakistan, the Gilgit-Baltistan Public Procurement Rules, 2022, or any applicable international obligations (including UN sanctions) and all expenditures under the Contract will not contravene such restrictions. At the Employer’s request, Bidders may be required to provide evidence of the origin of materials, equipment and services.</p>

B. Contents of Bidding Documents

<p>6. Sections of Bidding Document</p>	<p>6.1 The Bidding Documents consist of two (02) Volumes, Volume-I and Volume-II which include all the sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8:</p> <p>VOLUME-I: BIDDING PROCEDURES AND CONDITIONS OF CONTRACT</p> <p>Part-I: Bidding Procedures</p> <p>Section I - Instructions to Bidders (ITB) Section II - Bid Data Sheet (BDS) Section III - Evaluation and Qualification Criteria Section IV - Bid Forms</p> <p>Part-II: Conditions of Contract and Contract Forms and Schedules</p> <p>Section V - General Conditions Section VI - Particular Conditions Part A - Contract Data Part B - Special Provisions</p>
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	<p>Section VII - Contracts Forms and Schedules</p> <p>VOLUME-II: EMPLOYER’S REQUIREMENTS</p> <p>Section I - Scope of Works Section II - General Project Requirements Section III - DC Systems Section IV - AC Systems Section V - Civil & Structure Works Section VI - Operation and Maintenance Annexure I - Drawings</p> <p>6.2 The Invitation to Bids issued by the Employer, is not part of this Bidding Documents.</p> <p>6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the document, responses to requests for clarification, the Minutes of the pre-Bid meeting (if any), or Addenda to the Bidding Documents in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.</p> <p>6.4 The Bidder is expected to examine all instructions, forms, terms, and Employer’s requirements in the Bidding Documents and to furnish with its Bid all information or documentation as is required by the Bidding Documents.</p>
<p>7. -</p>	<p>7.1 A Bidder requiring any clarification of the Bidding Documents shall contact the Employer in writing at the Employer’s address specified in the BDS or raise its enquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. The Employer will respond to any request for clarification within the time given in the BDS, provided that such request is received prior to the deadline for submission of Bids within a period specified in the BDS. The Employer shall forward copies of its response to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Documents as a result of a request for clarification, it shall do so following the procedure under ITB 8.</p> <p>7.2 The Bidder is advised to visit and examine the Site of the Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract. The costs of visiting the site shall be at the Bidder’s own expense.</p> <p>7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and</p>

	<p>lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.</p> <p>7.4 The Bidder’s designated representative is invited to attend a pre-Bid meeting and/or a site visit, if provided for in the BDS. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.</p> <p>7.5 The Bidder is requested to submit any questions in writing, to reach the Employer not later than three days before the meeting.</p> <p>7.6 Minutes of the pre-Bid meeting, including the text of the questions raised without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Documents in accordance with ITB 6.3. Any modification to the Bidding Documents that may become necessary as a result of the pre-Bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITB 8 and not through the minutes of the pre-Bid meeting.</p>
<p>8. Amendment of Bidding Documents</p>	<p>8.1 At any time prior to the deadline for submission of Bids, the Employer may amend the Bidding Documents by issuing addenda.</p> <p>8.2 Any addendum issued shall be part of the Bidding Documents and shall be communicated in writing to all who have obtained the Bidding Documents from the Employer in accordance with ITB 6.3.</p> <p>8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 23.2.</p>
<p>9. Cost of Bids</p>	<p>9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer will in no case be responsible or liable for those costs regardless to the conduct or outcome of the Bidding process.</p>

<p>10. Contacting the Employer</p>	<p>10.1 From the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the Bid, it should do so in writing.</p> <p>10.2 If a Bidder tries to directly influence the Employer or otherwise interfere in the Bid evaluation process and the Contract award decision, its Bid may be rejected.</p>
<p>11. Language of Bids</p>	<p>11.1 Unless otherwise specified in the BDS, the Bid prepared by the Bidder and all correspondence and documents related to the Bid exchanged by the Bidder and the Employer shall be written in the English Language. Any printed literature furnished by the Bidder as part of its Bid may be in a language not specified in the BDS, as long as such literature is accompanied by a translation of its pertinent passages into the language of the Bid, in which case, for purposes of interpretation of the Bid, the translation shall govern.</p>

C. Preparation of Bids

<p>12. Documents Comprising the Bid</p>	<p>12.1 The Bid shall comprise two Parts, namely the Technical Bid and the Financial Bid. These two Bids shall be submitted simultaneously in two (02) separate sealed envelopes (single-stage, two-envelope Bidding Process). One envelope shall contain only information relating to the Technical Bid and the other, only information relating to the Financial Bid. These two envelopes shall be enclosed in a separate sealed outer envelope marked “ORIGINAL BID”.</p> <p>12.2 The Technical Bid submitted by the Bidder shall comprise the following:</p> <ul style="list-style-type: none"> (a) Letter of Technical Bid, prepared in accordance with ITB 13; (b) Security: Bid Security in accordance with ITB 19; (c) Alternative Technical Bid, if permissible in accordance with ITB 14; (d) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 21.1; (e) documentary evidence that the Bidder is eligible and qualified to perform the Contract if its Bid is accepted, in accordance with ITB 17; (f) documentary evidence that the Works offered by the Bidder conform to the Bidding Documents, in accordance with ITB 18;
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	<p>(g) Bidders shall give details of all departures in their Technical Bid with respect to the contractual terms and conditions and/or to the required technical features specified in the performance and/or functional requirements, that they would like the Employer to consider during the evaluation of the Technical Bid;</p> <p>(h) in the case of a Technical Bid submitted by a JV, JV agreement, indicating at least the parts of the Works to be executed by the respective members;</p> <p>(i) list of subcontractors, in accordance with ITB 18.3;</p> <p>(j) any other document required in the BDS or elsewhere.</p> <p>12.3 The Financial Bid submitted by the Bidder shall comprise the following:</p> <p>(a) Letter of Bid - Financial Bid: prepared in accordance with ITB 13;</p> <p>(b) Schedule of Rates and Prices: completed in accordance with ITB 15 and ITB 16;</p> <p>(c) Alternative Financial Bid: if permissible in accordance with ITB 14;</p> <p>(d) Financial Disclosure: The Bidder shall furnish in the Letter of Financial Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid; and</p> <p>(e) Other: any other document required in the BDS or elsewhere.</p> <p>12.4 The Technical Bid shall not include any financial information related to the Bid Price. Where material financial information related to the BidPrice is contained in the Technical Bid, the Bid shall be declared non-responsive.</p>
<p>13. Letter of Bid, and Schedules</p>	<p>13.1 The Bidder shall complete the Letter of Technical Bid and Letter of Financial Bid using the relevant forms furnished in Section IV (Bid Forms). The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 21.3. All blank spaces shall be filled in with the information requested.</p>
<p>14. Alternative Technical Bids</p>	<p>14.1 Alternative Bids are not permitted.</p>

<p>15. Bid Prices</p>	<p>15.1 The Bidders shall fill up the Schedule of Rates and Prices attached to this Bidding Documents indicating the Lump Sum amounts of the works to be performed under the Contract. Prices on the Schedule of Rates and Prices shall be entered keeping in view the instructions contained in the Preamble to the Schedule of Rates and Prices. The Bidders shall quote for the entire Works on a “single responsibility” basis such that the Bid Price, subject to any adjustments, in accordance with the Contract, covers all the Contractor’s obligations under the Contract. The Works shall include any work which is necessary to satisfy the Employer’s Requirements and Schedules, or is implied by the Contract, and all works which (although not mentioned in the Contract) are necessary for stability or for the completion, or safe and proper operation, of the Works.</p> <p>15.2 The cost of any items that the Bidder may have omitted is deemed to be included in the total Bid Price and will not be paid for separately by the Employer.</p> <p>15.3 All indirect taxes i.e., custom duties, sales taxes, VAT levies, other charges and similar taxes payable by the Contractor under the Contract, or for any other cause, as of the date 28 days prior to the deadline for submission of Bids, shall be included in the rates and prices and the Bid Price submitted by the Bidder. However, the Employer shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax Withholding Tax. Turnover Tax, Super Tax etc.) payable by the Contractor and the Contractor’s Personnel.</p> <p>15.4 In the case of Fixed Price, prices quoted by the Bidder shall be fixed during the Bidder’s performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price quotation will be treated as non-responsive and rejected.</p>
<p>16. Bid Currencies</p>	<p>16.1 The currency of the Bid and the currency of payments shall be Pakistani Rupee (PKR) only and further referred to as “the local currency” except where expressly permitted in the BDS for a portion of foreign currency costs.</p> <p>For imported Plant and Materials quoted in PKR, the prices quoted by the Bidder shall not be subject to adjustment during performance of the Contract on account of exchange rate parity.</p> <p>16.2 A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer’s country shall bear all costs and risks for arranging such currencies including exchange rate parity.</p>

<p>17. Documents Establishing the Qualification of the Bidder</p>	<p>17.1 The Bidder shall meet the qualification criteria as provided in Section III (Evaluation and Qualification Criteria).</p>
<p>18. Documents Establishing Conformity of the Works</p>	<p>18.1 Pursuant to ITB 12.2(f), the Bidder shall furnish, as part of its Bid documents establishing the conformity to the Bidding Documents of the Works that the Bidder proposes to execute on EPC/Turnkey basis under the Contract.</p> <p>18.2 The documentary evidence of the conformity of the Works with the Bidding Documents may be in the form of literature, drawings and data, and shall include:</p> <ul style="list-style-type: none"> (a) the documents specified in Section IV (Bid Forms) - Technical Bid. (b) detailed description of the essential technical and functional/performance characteristics of the proposed Works, in response to the Employer’s Requirements. (c) adequate evidence demonstrating the substantial responsiveness of the Works to the Employer’s Requirements. Bidders shall note that standards for workmanship, materials and equipment designated by the Employer in the Bidding Documents are intended to be descriptive (establishing standards of quality and performance) only and not restrictive. The Bidder may substitute alternative standards, in its technical Bid, provided that it demonstrates to the Employer’s satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Performance / Functional requirements specified by the Employer. <p>18.3 The Bidder shall be responsible for ensuring that any proposed subcontractor complies with the requirements of ITB 4, and that any Works to be provided by the subcontractor comply with the requirements of ITB 5 and ITB 18.1.</p>
<p>19. Securing the Bid</p>	<p>19.1 The Bidder shall furnish as part of its Bid, a Bid Security in original form in the amount specified in the BDS in PKR or an equivalent amount in a freely convertible currency.</p> <p>19.2 The Bid security shall be in the form of an unconditional bank guarantee issued by a Scheduled Bank in Pakistan operating or branch in Gilgit or a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan operating or branch in Gilgit</p> <p>19.3 The Bid Security shall be submitted either using the Bid Security Form included in Section IV (Bid Forms) or in another</p>

	<p>substantially similar format approved by the Employer prior to Bid submission. In either case, the form must include the complete name and address of the Bidder. The Bid Security shall be valid for at least twenty-eight days (28) beyond the original date of expiry of the Bid validity, or beyond any extended date if requested under ITB 20.2.</p> <p>19.4 Any Bid not accompanied by a substantially responsive Bid Security shall be rejected by the Employer as non-responsive.</p> <p>19.5 The Bid Security of the Bidders shall be returned as promptly as possible once the successful Bidder has furnished the required Performance Security and signed the Contract except the Bid Security of bidders declared non-responsive at the technical evaluation shall be returned with their Financial Bid after the evaluation of Technical Bid.</p> <p>19.6 The Bid Security may be forfeited:</p> <p>(a) if a Bidder withdraws its Bid prior to the expiry date of the Bid validity specified by the Bidder on the Letter of Bid or any extended date provided by the Bidder; or</p> <p>(b) if the successful Bidder:</p> <p>(i) fails to accept the correction of his Bid Price in accordance with ITB 36.3; or</p> <p>(ii) fails to furnish a Performance Security, in accordance with ITB 45; or</p> <p>(iii) fails to sign the Contract, in accordance with ITB 44; or</p> <p>(iv) is found involved in corrupt and fraudulent practices, in accordance with ITB 3.</p> <p>19.7 The Bid Security of a JV shall be in the name of the JV that submits the Bid. If the JV has not been legally constituted into a legally enforceable JV at the time of submission of Bids, the Bid Security shall be in the name of either JV member(s).</p>
<p>20. Period of Validity of Bids</p>	<p>20.1 Bids shall remain valid for the period specified in the BDS after the deadline for submission of Bids or any extended date if amended by the Employer in accordance with ITB 8. A Bid that is not valid until the date specified in the BDS, or any extended date if amended by the Employer in accordance with ITB 8, shall be rejected by the Employer as non-responsive.</p> <p>20.2 In exceptional circumstances, prior to the date of expiry of the Bid validity, the Employer may request that the Bidders extend the date of validity for a specified additional period which may not be</p>

	<p>more than the original Bid validity period. The request and the responses to the request shall be made in writing. A Bidder may refuse the request without risking forfeiting the Bid Security. A Bidder agreeing to the request will not be required or permitted to modify its Bid but will be required to ensure that the Bid Security is extended for a correspondingly longer period, pursuant to ITB 19.3.</p>
<p>21. Format and signing of Bid</p>	<p>21.1 The original and all copies of the Bid, each consisting of the documents listed in ITB 12, shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder. The authorization must be in writing as specified in the BDS and included in the Bid pursuant to ITB 12.2(d). The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid where entries or amendments have been made shall be signed or initialled by the person signing the Bid.</p> <p>21.2 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.</p> <p>21.3 The Bid shall contain no interlineations, erasures, or overwriting, except to correct errors made by the Bidder, in which case such corrections shall be initialled by the person or persons signing the Bid.</p> <p>21.4 The Bidder shall furnish in the Letter of Financial Bid (Section IV) information regarding commissions or gratuities, if any, paid or to be paid to agents relating to this procurement and to the execution of the Contract should the Bidder be successful.</p>

D. Submission of Bids

<p>22. Submission, Sealing and Marking of Bids</p>	<p>22.1 Unless the BDS states that Bids are to be submitted electronically the following procedures shall apply</p> <p>(a) The Bidder shall deliver the Bid in two separate, sealed envelopes. One envelope containing the Technical Bid and the other the Financial Bid. These two envelopes shall be enclosed in a sealed outer envelope and clearly marked "Bid - Original". in accordance with Rule 39(b) of the Gilgit-Baltistan Public Procurement Rules, 2022 (Single Stage – Two Envelope procedure).</p>
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	<p>(b) In addition, the Bidder shall prepare copies of the Bid, in the number specified in the BDS. Copies of the Technical Bid shall be placed in a separate sealed envelope marked “Copies: Technical Bid”. Copies of the Financial Bid shall be placed in a separate sealed envelope marked “Copies: Financial Bid”. The Bidder shall place both of these envelopes in a separate, sealed outer envelope marked “Bid - Copies”. In the event of any discrepancy between the original and the copies, the original shall prevail.</p> <p>The Bidder shall also provide complete searchable PDF version as well as Word, Excel etc., versions of the Technical Bid only on flash drive provided that in case of discrepancy, the hard copy shall prevail</p> <p>22.2 The inner and outer envelopes shall:</p> <p>(a) bear the name and address of the Bidder.</p> <p>(b) be addressed to the Employer, at the address given in the BDS for ITB 23.1; and</p> <p>(c) bear the name of the Bid, as specified in the BDS for ITB 1.1, and the statement “Do Not Open Before [time and date],” to be completed with the time and date specified in the BDS for ITB 23.1.</p> <p>22.3 If the outer envelope is not sealed and marked as required by ITB 22.1 and ITB 22.2, the Employer will assume no responsibility for the Bid’s misplacement or premature opening.</p>
<p>23. Deadline for Submission of Bids</p>	<p>23.1 Bids must be received by the Employer at the address specified, and no later than the time and date specified, in the BDS.</p> <p>23.2 The Employer may, at its discretion, extend this deadline for submission of Bids by amending the Bidding Documents in accordance with ITB 8.3, in which case all rights and obligations of the Employer and Bidders will thereafter be subject to the deadline as extended.</p>
<p>24. Late Bids</p>	<p>24.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 23. Any Bid received by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.</p>
<p>25. Withdrawal, Substitution,</p>	<p>25.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted, and before the deadline for submission of Bids,</p>

and Modification of Bids	<p>by sending a written notice, duly signed by an authorized representative, including a copy of the authorization in accordance with ITB 21.1, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:</p> <p>(a) prepared and submitted in accordance with ITB 21 and ITB 22 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “Withdrawal,” “Substitution, (“Technical Bid” and/or “Financial Bid”)” “Modification (“Technical Bid” and/or “Financial Bid”);” and</p> <p>(b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 23.</p>
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E. Opening of Technical Bids

26. Opening of Technical Bids by Employer	<p>26.1 Except as in the cases specified in ITB 24 and ITB 25, the Employer shall conduct the Technical Bids' opening in public, in the presence of Bidders` designated representatives and anyone who chooses to attend, and at the address, date and time specified in the BDS.</p> <p>26.2 First, the written notice of withdrawal in the 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.</p> <p>26.3 Next, envelopes marked “Substitution” shall be opened and read out and exchanged with the corresponding Technical Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid opening.</p> <p>26.4 Next, envelopes marked “Modification” shall be opened and read out with the corresponding Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at Bid opening.</p> <p>26.5 Next, all other envelopes marked “Technical Bid” shall be opened one at a time. All envelopes marked “Financial Bid” shall remain sealed and kept by the Employer in safe custody</p>
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	<p>until they are opened at a later public opening, following the evaluation of the Technical Bid of the Bidders. On opening the Technical Bid envelopes, the Employer shall read out: the name of the Bidder and whether there is a modification; the presence or absence of a Bid Security; and other details as the Employer, at its discretion, may consider appropriate.</p> <p>26.6 Only Technical Bids that are opened and read out at Bid opening shall be considered further. At the Bid opening the Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with ITB 24.1).</p> <p>26.7 The Employer shall prepare a record of the Technical Bids of public opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification. The Bidders' representatives who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.</p>
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F. Evaluation of Bids - General Provisions

<p>27. Confidentiality</p>	<p>27.1 Information relating to the evaluation of the Technical Bid shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding Process until the announcement of evaluation of the Technical Bid in accordance with ITB 33.</p> <p>27.2 Information relating to the evaluation of the Financial Bid and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with the Bidding Process until the announcement of final evaluation report.</p> <p>27.3 Any effort by a Bidder to influence the Employer in the evaluation of the Bids may result in the rejection of its Bid.</p> <p>27.4 Notwithstanding ITB 27.1 and ITB 27.2, from the time of Bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the Bidding Process, it should do so in writing.</p>
<p>28. Clarification of Bids</p>	<p>28.1 To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its Bid including breakdowns of unit rates and lump sum prices. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be</p>

	<p>in writing. However, any clarification shall not affect the prices or the Bid evaluation parameters</p> <p>28.2 The Employer may, at its discretion, ask any Bidder for confirmation/submission of missing information to clarify its Bid. However, the Employer does not have an obligation to request any additional information or clarification with respect to missing or deficient information in a Bid. The Employer may reject any Bid as non-responsive if found materially incomplete, obscure, irregular or omitting any material information required to be submitted in accordance with the Bidding Documents.</p> <p>28.3 If a Bidder does not provide clarifications of its Bid by the date and time set reasonably in the Employer’s request for clarification, the Employer may proceed with the evaluation based on the information submitted in the Bid without waiting for the Bidder’s response.</p>
<p>29. Deviations, Reservations, and Omissions</p>	<p>29.1 During the evaluation of Bids, the following definitions apply:</p> <ul style="list-style-type: none"> (a) “Deviation” is a departure from the requirements specified in the Bidding documents. (b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Documents; and (c) “Omission” is the failure to submit part or all of the information or documentation required in the Bidding Documents.

G. Evaluation of Technical Bids

<p>30. Determination of Responsiveness of Technical Parts</p>	<p>30.1 The Employer will examine the Technical Bids submitted by Bidders, to determine whether they are complete, have been properly signed, and are generally in order.</p> <p>30.2 The Employer’s determination of a Technical Bids’ substantial responsiveness is to be based on the contents of the Bid itself. For purposes of this determination, a substantially responsive Bid is one that materially conforms to the requirements of the Bidding Documents without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:</p> <ul style="list-style-type: none"> (a) if accepted, would:
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	<p>(i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or</p> <p>(ii) limit in any substantial way, inconsistent with the Bidding Documents, the Employer’s rights or the Bidder’s obligations under the proposed Contract; or</p> <p>(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.</p> <p>30.3 Provided that a Technical Bid is substantially responsive, the Employer may waive any nonmaterial nonconformity in the Bid.</p> <p>30.4 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements.</p> <p>30.5 The Employer will also determine if the Bids contain departures from the requirements of the Bidding Documents (e.g., documentary evidence, responsiveness of the technical Bid, etc.) in such numbers or of such nature that the Bid cannot reasonably be expected to become responsive within the framework of the single-stage process. In this case, the Bid shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.</p>
<p>31. Evaluation of Bidder’s Eligibility and Qualification</p>	<p>31.1 The Employer shall ascertain to its satisfaction that, on the basis of documentary evidence submitted in accordance with ITB 12.2 (e), and Section III (Evaluation and Qualification Criteria) that the Bidder is eligible and qualified to satisfactorily perform the Contract.</p> <p>31.2 Only Bids that meet the eligibility and qualification criteria as specified in Section III (Evaluation and Qualification Criteria) shall be considered for further evaluation.</p>
<p>32. Evaluation of Technical Bids</p>	<p>32.1 The Employer’s evaluation of Technical Bids will be carried out as specified in Section III (Evaluation and Qualification Criteria).</p> <p>32.2 The Employer will carry out a detailed technical evaluation of each Technical Bid that was determined to be substantially responsive in accordance with ITB 30, in order to determine</p>

	<p>whether the technical aspects of the Bid are responsive to the requirements set forth in the Bidding Documents.</p> <p>32.3 Only Bids that are substantially responsive to the Bidding Documents shall have their envelopes marked “FINANCIAL BID” opened at the second public opening.</p>
<p>33. Notification of Evaluation of Technical Bids</p>	<p>33.1 Following the completion of the evaluation of the Technical Bids, the Employer shall announce the results technical bids’ evaluation report and make the following notifications in accordance with Gilgit Baltistan Public Procurement Rules, 2022:</p> <p>(a) Notify in writing those Bidders whose Bids were considered substantially non-responsive to the requirements in the Bid, advising them of the following information:</p> <ul style="list-style-type: none"> (i) the justification on which their Technical Bids have been considered to be non-responsive; (ii) their envelope marked “Financial Bid” will be returned to them unopened completion of grievance redressal proceedings, if any, in accordance with Rule 51 of the Gilgit-Baltistan Public Procurement Rules, 2022; <p>(b) simultaneously, notify in writing those Bidders whose Bids were considered substantially responsive to the requirements in the Bid, advising them that their Bid has been evaluated as substantially responsive to the Bid; and</p> <p>(c) notify all Bidders the date, time and location of the public opening of the envelopes marked ‘Financial Bid’.</p>

H. Opening of Financial Bids

<p>34. Public Opening of Financial Bids</p>	<p>34.1 The Financial Bids will be opened in public by the Employer in the presence of Bidders, or their designated representatives, and anyone else who chooses to attend. Each envelope marked “Financial Bid” shall be inspected to confirm that it has remained sealed and unopened. These envelopes shall then be opened by the Employer</p> <p>The Employer shall read out the names of each Bidder, the Bid Price, including any discounts and any other details as the Employer may consider appropriate. Only discounts read out at the public opening shall be considered for evaluation. The Letter of Financial Bid</p>
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	<p>and the Schedule of Rates and Prices are to be initialled by representatives of the Employer.</p> <p>34.2 The Employer shall prepare a record of the Financial Bids' opening that shall include, as a minimum:</p> <ul style="list-style-type: none"> (a) the name of the Bidders whose Financial Bids were opened. (b) the Bid Prices, including any discounts. <p>34.3 The Bidders whose envelopes marked "Financial Bid" have been opened, or their representatives who are present, shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record.</p>
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I. Evaluation of Financial Bid

<p>35. Nonmaterial Nonconformities</p>	<p>35.1 Provided that a Bid is substantially responsive, and Bids have been invited on single responsibility basis in accordance with ITB 15, the Employer:</p> <ul style="list-style-type: none"> (a) may waive any nonconformities in the Bid; or (b) may request that the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid. <p>35.2 Provided that a Bid is substantially responsive, and Bids have been invited to include any part of the Works to be paid according to work done in accordance with ITB 15, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component by adding the average price of the item or component quoted by substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bidders, the Employer shall use its best estimate.</p>
<p>36. Arithmetic Correction</p>	<p>36.1 If Bids have been invited on single responsibility basis in accordance with ITB 15, the Bidder is deemed to have included all prices in the (lump sum) Total Bid Price. Arithmetical corrections shall therefore not be made, except that where there is a discrepancy between the amount in words and the amount figures, the amount in words shall prevail.</p>

	<p>36.2 If Bids have been invited to include any part of the Works to be paid according to work done in accordance with ITB 15, the Employer shall correct arithmetical errors only for the price for such part of the Works on the following basis:</p> <ul style="list-style-type: none"> (a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Bid Price, the former shall prevail, and the latter will be corrected accordingly. (b) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) above. <p>36.3 A Bidder shall be requested to accept the correction of arithmetical errors. Failure to accept the correction in accordance with ITB 36.1 and ITB 36.2 shall result in the rejection of the Bid and forfeiture of Bid Security in accordance with ITB 19.6(b)(i).</p>
<p>37. Evaluation Process Financial Bids</p>	<p>37.1 To evaluate and compare the Financial Bids, the Employer shall consider the following:</p> <ul style="list-style-type: none"> (a) the Bid Price, excluding provisional sums, if any. (b) price adjustment for correction of arithmetic errors, in accordance with ITB 36; (c) price adjustment due to discounts offered in accordance with ITB 15.4; and (d) price adjustment due to quantifiable nonmaterial nonconformities, in accordance with ITB 35.2. <p>37.2 If price adjustment is allowed, in accordance with ITB 15.3(BDS), the estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.</p>
<p>38. Abnormally Low Bids</p>	<p>38.1 An Abnormally Low Bid is one where the Bid Price, in combination with other elements of the Bid, appears so low that it raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid Price.</p> <p>38.2 In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder, including detailed price analyses of its Bid Price in relation to the subject matter of the contract, scope, proposed</p>

	<p>methodology, schedule, allocation of risks and responsibilities and any other requirements of the Bidding Documents.</p> <p>38.3 After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.</p>
<p>39. Unbalanced or Front-Loaded Bids</p>	<p>39.1 If the Bid that is evaluated as the lowest evaluated cost is, in the Employer’s opinion, seriously unbalanced or front loaded the Employer may require the Bidder to provide written clarifications. Clarifications may include price analyses to demonstrate the consistency of the Bid Prices with the scope of the Works, proposed methodology, schedule and any other requirements of the Bidding Documents.</p> <p>39.2 After the evaluation of the information and price analyses presented by the Bidder, the Employer may:</p> <ul style="list-style-type: none"> (a) accept the Bid, or (b) if appropriate, require that the additional Performance Security be provided, at the expense of the Bidder, to a level to secure the risk of the Employer due to such seriously unbalancing or front loading under the scenario that the successful Bidder defaults under the contract; or (c) reject the Bid.

J. Determination of the Most Advantageous Bid

<p>40. Most Advantageous Bid (MAB)</p>	<p>40.1 The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria, and whose Bid has been determined to be:</p> <ul style="list-style-type: none"> (a) substantially responsive to the requirements of the Bidding Documents; and (b) the lowest evaluated Bid Price.
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K. Award of Contract

<p>41. Award Criteria and Notification of Evaluation of Financial Bids</p>	<p>41.1 Subject to ITB 42.1, the Employer shall award the Contract to the Bidder whose Bid has been determined as the Most Advantageous Bid provided that such Bidder has been determined to be qualified to satisfactorily perform the Contract in accordance with ITB 40 and ITB 40(A).</p> <p>41.2 The Employer shall also announce the results of the Bids evaluation in the form of final evaluation report at least Twelve (12) days prior to award of the Contract in accordance with Gilgit Baltistan Public Procurement Rules, 2022, and redressal</p>
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	<p>of the grievances, if any, in accordance with Gilgit Baltistan Public Procurement Rules, 2022.</p>
<p>42. Employer’s Right to Annul the Bidding Process</p>	<p>42.1 Notwithstanding ITB 41.1, the Employer reserves the right to annul the Bidding Process and reject all Bids, at any time prior to Contract award, without thereby incurring any liability to the affected Bidders or any obligation. In case of annulment, all Bids (unopened Financial Bids, if any) submitted and specifically, Bid securities shall be promptly (but not later than 14 days) returned to the Bidders.</p> <p>The Employer shall upon request communicate to any Bidder who submitted a Bid, the grounds for its rejection of all Bids but is not required to justify those grounds. Rejection of all Bids shall be notified to all Bidders promptly.</p>
<p>43. Notification of Award</p>	<p>43.1 Prior to expiration of the period of Bid validity prescribed by the Employer, the Employer will notify the successful Bidder in writing (“Letter of Acceptance”) that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the “Contract Price”).</p> <p>The Letter of Acceptance will also state the remedies with respect to ITB 38 and ITB 39 if applicable.</p> <p>43.2 No negotiation with the Bidder having submitted most advantageous Bid or any other Bidder shall be permitted, however, Employer may have clarification meetings before issuing Letter of Acceptance to get clarified any item in the Bid evaluation report.</p> <p>43.3 The Letter of Acceptance/notification of award and its acknowledgement/acceptance by the Bidder will constitute the formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.</p> <p>43.4 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and also return their Bid Securities in accordance with ITB 19.5.</p>
<p>44. Signing of Contract</p>	<p>44.1 Within 7 days or within such period as may be extended by the Employer in writing, provided that the total period does not exceed the Bid validity period from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will notify the successful Bidder to depute its representative with appropriate Power of Attorney to</p>

	<p>sign the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the Parties.</p> <p>44.2 The formal Agreement between the Employer and the successful Bidder shall be executed within 7 days of the receipt of the above stated notification by the successful Bidder from the Employer. or within such period as may be extended by the Employer in writing, provided that the total period does not exceed the Bid validity period</p>
<p>45. Performance Security</p>	<p>45.1 Within fourteen (14) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security in the form of Bank Guarantee and the amount, in accordance with the Conditions of Contract, and additional Performance Security if applicable under ITB 39.2 (b), using the Performance Security Form included in Section VII (Contract Forms) or another form acceptable to the Employer. Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the Contract shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid security. In that event the Employer may award the Contract to the next advantageous Bid.</p>
<p>46. Procurement Related Complaint</p>	<p>46.1 The procedures for making a Procurement-related Complaint are as specified in the BDS.</p>
<p>47. Instructions not Part of Contract</p>	<p>47.1 Bids shall be prepared and submitted in accordance with the Instructions to Bidders which are provided to assist the Bidders in preparing Bids but do not constitute part of the Contract.</p>

SECTION II - BID DATA SHEET (BDS)

A. General

ITB 1.1	<p>The reference number of the Request for Bids is: PD/100MW/SPP/1(1)/2025/ The Employer is: Water and Power Department, Gilgit Baltistan, Pakistan</p> <p>Employer’s Representative: Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,Email: pd100mwpsolar@gmail.com</p> <p>The Works for Distributed Solar Photovoltaic Plants are divided into three (3) Lots corresponding to different geographical regions of Gilgit-Baltistan as follows:</p> <ul style="list-style-type: none"> • Lot I (Gilgit Region) • Lot II (Baltistan Region) • Lot III (Diamer-Astore Region) <p>Each Lot is comprised of a separate set of Bidding Documents. These Bidding Documents relate to Lot -III named as:</p> <p>3.34 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT – III)</p> <p>The Bidding Process is: Single Stage, Two-Envelope.</p>
ITB 1.3 (a)	Electronic Procurement System: not Applicable.
ITB 2.1	The name of the Project is: 100 MW_{DC} DISTRIBUTED SOLARIZATION OF GILGIT BALTISTAN
ITB 4.1	Maximum number of members in the JV shall be: Three (03)

B. Contents of Bidding Documents

ITB 7.1	<p>For Clarification of Bid purposes only, the Employer’s address is:</p> <p>Project Director, 100 MW_{DC} Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,</p> <p>Email: pd100mwpsolar@gmail.com</p> <p>Requests for clarification should be received by the Employer no later than:</p> <p>14 Days before deadline for submission of Bids.</p> <p>The Employer’s response shall not be later than seven (07) days before deadline of submission of Bids.</p>
ITB 7.4	A Pre-Bid Meeting shall take place at the following date, time and place:

	<p>Date: December 12, 2025. Time: 1100 hrs. Venue: Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan.</p>
ITB 11.1	<p>The language of the Bid is: English. All correspondence exchange shall be in English language. Language for translation of supporting documents and printed literature is English.</p>

C. Preparation of Bids

ITB 12.3 (e)	The Bidder shall submit with its Bid the following additional documents: None
ITB 15.1	<p>List of Schedule of Rates & Prices is as follows: Schedule No. A1 EPC Works for Rooftop Solar Schedule No. A2 O&M Works and Services Schedule No. A3 Grand Summary Schedule No. A4 Mandatory Spare Parts Schedule No. A5 Recommended Spare Parts</p>
ITB 15.3	The prices quoted by the Bidder shall not be subject to adjustment during the performance of the Contract.
ITB 16.3	<p>Insert the following additional Sub-Clause at the end of Clause 16: The exchange rate parity in respect of Seventy percent (70%) of the EPC Price shall be adjusted in accordance with item (g) of Sub-Clause 14.15 of Part A [Contract Data] of Section VI – Particular Conditions of Contract.</p>
ITB 19.1	The amount of the Bid Security shall be: PKR 5 million
ITB 20.1	The Bid shall be valid for a period: 180 days .
ITB 21.1	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Power of Attorney as per Section IV (Bid Forms) .

D. Submission of Bids

ITB 22.1	<p>The following procedures shall apply.</p> <p>(a) The Bidder shall submit the Bid Lot-wise in two separate, sealed envelopes for each Lot (in case, participating more than One Lot). One envelope containing the Technical Bid and the other the Financial Bid. These two envelopes shall be enclosed in a sealed outer envelope and clearly marked “Bid - Original”. in accordance with Rule 39(b) of the Gilgit-Baltistan Public Procurement Rules, 2022 (Single Stage – Two Envelope procedure).</p> <p>(b) In addition to Original Bid, the Bidder shall prepare Three (3) copies of the Bid for each participating Lot(s) independently by following the procedure described below:</p> <p>Copies of the Technical Bid shall be placed in a separate sealed envelope marked “Copies: Technical Bid”. Copies of the Financial Bid shall be placed in a separate sealed envelope marked “Copies:</p>
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	<p>Financial Bid”. The Bidder shall place both of these envelopes in a separate, sealed outer envelope marked “Bid - Copies”. In the event of any discrepancy between the original and the copies, the original shall prevail.</p> <p>The Bidder shall also provide complete searchable PDF version as well as Word, Excel etc., versions of the Technical Bid only on flash drive, provided that in case of discrepancy, the hard copy shall prevail</p>
ITB 23.1	<p>For Bid Submission Purposes only, the Employer’s address is:</p> <p>Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,Email: pd100mwpvssolar@gmail.com</p> <p>Date: December 26, 2025 Time: on or before 1330 hrs.</p>

E. Opening of Technical Bids

ITB 26.1	<p>The Bid Opening shall take place at:</p> <p>Date: December 26, 2025 Time: 1400 hrs. Venue: Office of Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan</p> <p>Add the following additional Sub-Clause 26.1.1 at the end of Sub-Clause 26.1:</p> <p>26.1.1: Technical Bids for all Lots (1 to 3) will be opened simultaneously on the above said date, time and place in accordance with ITB 26 and evaluated first.</p>
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F. Opening of Financial Bids

ITB 34.1	<p>Opening and Evaluation of Financial Bids (Lot-wise Procedure)</p> <p>Upon completion of the technical evaluation for all Lots, announcement of the results, and expiration of the grievance period prescribed under the Gilgit-Baltistan Public Procurement Rules, 2022, the Employer shall open the Financial Bids sequentially, Lot by Lot, commencing with the Lot designated for award first, as identified in these Bidding Documents. The opening of Financial Bids for each Lot shall be conducted in accordance with ITB 34 in the following manner:</p> <ol style="list-style-type: none"> a) The Date, time, and location for the opening of Financial Bids for a given Lot shall be communicated only to the Bidders who have been declared technically qualified and responsive for that specific Lot. b) The Financial Bids for Lot 1 shall be opened first, in accordance with ITB 34, at the date, time, and location to be notified by the Employer solely to the technically qualified and responsive Bidders for Lot 1. Such
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	<p>Financial Bids shall be evaluated in accordance with the relevant provisions of these Bidding Documents.</p> <p>c) Upon declaration of a Bidder as the lowest evaluated and successful Bidder for a particular Lot, any Financial Bids submitted by that Bidder for the remaining Lots (if any) shall remain unopened and shall be returned to the Bidder.</p> <p>d) Following the award of Lot 1, the Financial Bids for Lot 2 shall be opened in accordance with the procedure set forth above and evaluated solely among the remaining technically qualified and responsive Bidders for Lot 2 (excluding any Bidder already declared successful for Lot 1). The same procedure shall apply to Lot 3 as well.</p>
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K. Award of Contract

ITB 41.1	<p>Each designated Lot shall be awarded sequentially. The Bidder determined to be the lowest evaluated and successful Bidder for a specific Lot, in accordance with ITB Clause 40, shall be awarded the Contract for that Lot. Upon such award, the Financial Bids submitted by the same Bidder for all remaining Lots shall become null and void. These Financial Bids shall remain unopened and shall be returned to the Bidder in their original, sealed condition.</p>
ITB 46.1	<p>The Procurement related complaints will be dealt in accordance with Rule 51 of Gilgit Baltistan Public Procurement Rules, 2022.</p> <p>If a Bidder wishes to make a Procurement-related Complaint, the Bidder shall submit its complaint following these procedures, in writing (by the quickest means available, such as by email), to:</p> <p>Project Director, 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpvsolar@gmail.com</p>

SECTION III - EVALUATION AND QUALIFICATION CRITERIA

This Section contains the criteria that the Employer shall use to evaluate Bids and qualify Bidders. No other factors, methods or criteria shall be used other than specified in this Bidding Documents.

To establish the Bidder's qualification to perform the Contract, the Bidder shall provide the information requested in the corresponding Qualification Forms included in Section IV, Bid Forms. The information provided in the Forms shall be substantiated with valid documentary evidence otherwise the requirement will not be considered as complied. The Employer reserves the right to obtain information regarding performance of the Bidder on their previously awarded contracts/ works and verify the same, provided that such verification is limited to the disclosed qualification and evaluation criteria in this Section and Section IV (Bid Forms).

Wherever a Bidder is required to state a monetary amount, the Bidder should indicate the equivalent PKR using the rate of exchange determined as follows:

- a. for construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amount for that year is to be converted) was originally established; or
- b. value of single contract - Exchange rate prevailing on the date of the contract.

The source of exchange rate shall be:

TT Selling rate as published by the State Bank of Pakistan provided on the following website:

www.sbp.org.pk

Any error in determining the exchange rates in the Bid may be corrected by the Employer.

The values for construction turnover, financial data and value of single contract shall further be escalated @10% per annum up to the deadline for submission of the Bids, as a project-specific adjustment factor, solely for the purpose of meeting the qualification criteria Sub-Factors 3.1, 3.2 and 4.2

Qualification

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
1. Eligibility							
1.1 (a)	Pakistan Engineering Council (PEC) Licensing	Licensing by Pakistan Engineering Council (PEC) in accordance with ITB 4.2	Must meet requirement	N/A	Must meet requirement	N/A	Provisional/Standard PEC License. Foreign firm must submit JV Agreement with Pakistani firm
1.1 (b)	Private Power and Infrastructure Board (the "PPIB")	Registered with the PPIB in accordance with ITB 4.2.	Must meet requirement	N/A	N/A	Must meet requirement	For Local Firms Only
1.2	Pakistani Firm Tax Registration	Requirement of Pakistani firm on Active Taxpayer List (ATL) in accordance with ITB 4.3	Must meet requirement	N/A	Must meet requirement	N/A	Foreign firms must submit proof of registration for income tax in

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
							their home jurisdiction and an undertaking to comply with Pakistani tax laws upon award of contract
1.3	Conflict of Interest	No conflicts of interest in accordance with ITB 4.4	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Bid
1.4	Nationality	Nationality in accordance with ITB 4.6	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI 1.1 and 1.2, with attachments
1.5	Eligibility w.r.t Debarment/ Blacklisting	Not having been debarred/blacklisted in accordance with ITB 4.7	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid
1.6	State-owned Entity of the	Bidder is required to meet the conditions of ITB 4.8	Must meet requirement	N/A	Must meet requirement	N/A	Forms ELI 1.1 and 1.2, with attachments

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
	Employer's Country						
2. Historical Contract Non-Performance							
2.1	History of Non-Performing Contracts	Non-performance of a contract ¹ did not occur as a result of Contractor's default since during the last ten (10) years prior to the bid submission deadline	Must meet requirement ¹	N/A	Must meet requirement ²	N/A	Form CON 2
2.2	Suspension Based on Execution of Bid/Bid Securing Declaration by the Employer	Not under suspension based on execution of a Bid/Bid Securing Declaration pursuant to ITB 4.9.	Must meet requirement	N/A	Must meet requirement	N/A	Letter of Technical Bid

¹ Non-performance, as decided by the Employer, shall include all contracts where (a) non-performance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Non-performance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Non-performance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

² This requirement also applies to contracts executed by the Bidder as JV member.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
2.3	Pending Litigation	Bidder's financial position and prospective long-term profitability still sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON 2
2.4	Litigation History	No consistent history of court/arbitral award decisions against the Bidder ³ during the last ten (10) years prior to the bid submission deadline	Must meet requirement	N/A	Must meet requirement	N/A	Form CON 2
3. Financial Situation and Performance							
3.1	Financial Capabilities	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN 3.1, with attachments

³ The Bidder shall provide accurate information on the related Form about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last ten years. A consistent history of awards against the Bidder or any member of a joint venture may result in rejection of the Bid.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
		<p>cash flow requirements of Eq. PKR 155 million for the subject contract net of the Bidder's other commitments.</p> <p>(ii) The Bidder shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.</p> <p>(iii) The audited balance sheets acceptable to the Employer, for the last three (03) years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.</p>	<p>Must meet requirement</p> <p>Must meet requirement</p>	<p>Must meet requirement</p> <p>N/A</p>	<p>N/A</p> <p>Must meet requirement</p>	<p>N/A</p> <p>N/A</p>	
3.2	Average Annual Turnover	Minimum average annual turnover of Eq. PKR 400 million calculated as total certified payments received for	Must meet requirement	Must meet requirement	N/A	Must meet 40% of the requirement	Form FIN 3.2

Eligibility and Qualification Criteria			Compliance Requirements			Document / Form	
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
		contracts in progress and/or completed within the last three (03) years.					
4. Experience							
4.1	Bidder's Experience ⁴	The bidder must have registered his firm in Securities and Exchange Commission of Pakistan (SECP) on or before January 01, 2023. The Bidder shall have successfully completed projects, in the role of prime contractor or joint venture member, for each category below. For the purposes of this qualification, "single location" means works executed entirely within the same site boundary. Capacities achieved at multiple locations, even if under the same contract, shall not be aggregated to meet the requirement.					

⁴To substantiate the above, Bidder shall submit authenticated user's certificate / Taking-Over / Performance / Defects Liability certificates or other relevant documents.

Eligibility and Qualification Criteria			Compliance Requirements				Document / Form
No	Subject	Requirement	Single Entity	Joint Venture (existing)			Submission Requirement
				All Members Combined	Each Member	One Member	
		a) Successful execution and completion of at least one single-location solar PV project with capacity $\geq 250 \text{ KW}_{\text{DC}}$ and cumulative PV installation capacity of $> 1 \text{ MW}_{\text{DC}}$.	Must meet Requirement	Must meet Requirement	NA	NA	Form EXP 4.1
		b) Successful execution and completion of at least one single-location Battery Energy Storage System (BESS) installation of $\geq 100 \text{ kWh}$ and cumulative BESS installation capacity of $> 350 \text{ kWh}$.	Must meet Requirement	Must meet Requirement	NA	NA	Form EXP 4.1

5. Proposed Manufacturers

The capabilities of the manufacturers proposed by the Bidder for the following Major Equipment shall be evaluated for acceptability against the minimum criteria specified in Form TECH 6. The Bidder shall submit Manufacturer's Authorization as per format provided in **Section IV (Bid Forms)** from each proposed manufacturer confirming their participation. Failure to propose at least one compliant manufacturer for any Major Equipment Category shall render the Bid non-responsive and subject to rejection.

Sr. No	Name of Major Equipment
1	PV Modules
2	Battery Energy Storage System
3	Hybrid Inverters

6. Key Personnel

The Bidder must demonstrate that it will have a suitably qualified (and in adequate numbers) minimum Key Personnel, as described in the table below.

The Bidder shall provide an organization chart which shall include the names of all Key Personnel. A separate site organisation chart shall clarify the site organization; The Bidder shall complete the relevant Form (Form PER-2) provided in **Section IV (Bid Forms)**.

No.	Position	Minimum Qualification	Total Work Experience [years]	Experience In Similar Work/ Position [years]
1	Project Manager/ Construction Manager	BSc Engineering (Elect/Mech)	15	10
2	Design Team Leader	BSc Engineering (Elect/Electronics)	12	10
3	Quality Control Engineer	BSc Engineering (Civil/Elect/Mech)	10	10
4	Civil / Structure Engineer	BSc Engineering (Civil/Structure)	10	5
5	Electrical Engineer	BSc Engineering (Elect)	10	5
6	PV Engineer	BSc Engineering (Elect)	8	5

SECTION IV - BID FORMS

1. Technical Forms and Schedules (To be Submitted with Technical Bid)

(a) Letter of Technical Bid

(b) Technical Bid Forms

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|------|-------------|--|
| i. | Form TECH 1 | Design Methodology |
| ii. | Form TECH 2 | Schedule of Technical Data |
| iii. | Form TECH 3 | Methods Statement for Key Construction Activity |
| iv. | Form TECH 4 | Mobilization Schedule |
| v. | Form TECH 5 | Contractor's Personnel Detail & Organizational Chart |
| vi. | Form TECH 6 | Subcontractors & Manufacturers |

(c) Qualifications forms

- | | | |
|------|--------------|---|
| i. | Form ELI 1.1 | Bidder Information Form |
| ii. | Form ELI 1.2 | Bidder JV Information Form |
| iii. | Form CON 2 | Historical Contract Non-Performance, Pending
Litigation and Litigation History |
| iv. | Form FIN 3.1 | Financial Situation and Performance |
| v. | Form FIN 3.2 | Average Annual Turnover |
| vi. | Form EXP 4.1 | General Experience |
| vii. | Form EXP 4.2 | Specific Experience |

(d) Form of Bid Security (Bank Guarantee)

2. Financial Forms and Schedules (To be Submitted with Financial Bid)

(a) Letter of Financial Bid

(b) Schedules to Bid

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|----|--------------|------------------------------|
| i. | Schedule – A | Schedule of Rates and Prices |
|----|--------------|------------------------------|

Letter of Technical Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

Place this Letter of Bid in the first envelope “TECHNICAL BID”.

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission:

Bidding Documents No: _____

To:

**Project Director,
100 MW Distributed Solarization of Gilgit Baltistan Project,
Water and Power Department Gilgit Baltistan,
Near K.I.U, Gilgit, Pakistan
Telephone No.: +92-5811-922609,
Fax No.: +92-5811-922619, 922185,
Email: pd100mwpvsolar@gmail.com**

Sir:

We, the undersigned Bidder, hereby submit our Bid, in two parts, namely:

- (a) the Technical Bid, and
- (b) The Financial Bid.

Having examined the Bidding Documents, including any Addenda issued in accordance with **ITB 8**, we, the undersigned, offer to execute the Works on an EPC/Turnkey basis, in full conformity with the said Bidding Documents and any Addenda.

We undertake, if our Bid is accepted, to commence the Works and achieve Completion within the respective times stated in the Bidding Documents.

We hereby submit as security for due performance of the undertakings and obligations of this Bid Security in the amount of PKR 5 million drawn in the favour of, or made payable to the Employer, Water and Power Department, Gilgit Baltistan, Pakistan and valid for a period of twenty-eight (28) days beyond the period of validity of Bid.

We hereby certify that we,

1. including any subcontractors or manufacturers for any part of the contract, meet the eligibility requirements and have no conflict of interest in accordance with **ITB 4**.
2. We are not participating, as a Bidder in more than one Bid in this Bidding process.

3. We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that appear in the list of debarred/blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and have not been declared debarred/blacklisted by foreign country, international organizations or other foreign institutions.;
4. We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption.
5. We confirm, if our Bid is accepted, that all members of the JV shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the JV shall not be altered without the prior consent of the Employer.
6. State-owned enterprise or institution: [select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of **ITB 4.8**];

We agree to abide by this Bid, which, in accordance with **ITB 12** and **ITB 13**, consists of this letter (Letter of Technical Bid) and enclosures as required in the Bidding Documents, until [insert day, month and year in accordance with **BDS 20.1**], and it shall remain binding upon us and may be accepted by you at any time on or before this date.

Until the formal final Contract is prepared and executed between us, this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us.

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

Name of the person duly authorized to sign the Bid on behalf of the Bidder:

** [insert complete name of person duly authorized to sign the Bid]

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

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

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

*: In the case of the Bid submitted by a Joint Venture, specify the name of the Joint Venture as Bidder.

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

Letter of Financial Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

Place this Letter of Bid in the second envelope “FINANCIAL BID”.

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission:

Bidding Documents No: _____

To:

**Project Director,
100 MW Distributed Solarization of Gilgit Baltistan Project,
Water and Power Department Gilgit Baltistan,
Near K.I.U, Gilgit, Pakistan,
Telephone No.: +92-5811-922609,
Fax No.: +92-5811-922619, 922185,
Email: pd100mwpsolar@gmail.com**

Dear Sir:

We, the undersigned, hereby submit the second part of our Bid, namely the **Financial Bid**, in accordance with the Instructions to Bidders and the requirements set forth in the Bidding Documents and Addenda

Having examined the Bidding Documents in their entirety, we offer to execute and complete the Works on an **EPC/Turnkey basis** for the following Bid Price, **exclusive of any discounts**,

Bid Price: [insert the Bid Price of in words and figures, indicating the various amounts and the respective currencies];

The discounts offered and the methodology for their application is:

- (i) The discounts offered are: [Specify in detail each discount offered]
- (ii) The exact method of calculations to determine the net price after application of discounts is shown below: [Specify in detail the method that shall be used to apply the discounts];

If our Bid is accepted, we undertake to provide an advance payment security and a Performance Security in the forms, in the amounts, and within the times specified in the Bidding Documents.

Undertakings

1. If our Bid is accepted, we undertake to provide an **Advance Payment Security** and **Performance Security** in the prescribed forms, amounts, and timelines specified in the Bidding Documents.

2. We agree to keep this Bid valid until [insert date as per BDS 20.1], and it shall remain binding upon us unless rejected or expired in accordance with the Bidding Documents.
3. We confirm that:
 - We, including our subcontractors, manufacturers, and suppliers, meet the **eligibility requirements** and are free of any conflict of interest in accordance with ITB 4.
 - Neither we nor any associated party are debarred/blacklisted under the laws of Pakistan or by any foreign or international organization.
 - We have not paid, and will not pay, any commissions, gratuities, or fees in connection with this Bid, **except as disclosed below in compliance with the Integrity Pact:**

Name of Recipient

Address Reason Amount

[Insert, if applicable; otherwise state “None”]

Acknowledgement

We acknowledge that the Employer is not bound to accept the lowest or any Bid it receives.

Until the formal Contract Agreement is executed, this Bid, together with your written acceptance (Letter of Acceptance), shall constitute a binding commitment between us, **subject to submission of the required Performance Security.**

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

Authorized Signatory: [insert complete name]

Title/Designation: [insert title of authorized person]

Signature: [insert signature]

Date: [insert date]

* In the case of a Joint Venture, specify the name of the JV as Bidder.

** The person signing the Bid must hold a valid Power of Attorney (attached with the Bid Schedules).

Schedules to Bid

1. Schedule-A Schedule of Rates and Prices

Schedule-A

Schedule of Rates and Prices

PREAMBLE

1. The Schedule of Prices shall be read in conjunction with the Instructions to Bidders, the Conditions of Contract, and the Employer's Requirements.
2. The Bidder shall submit prices for all items of the Works on an EPC/Turnkey basis, covering the complete scope of Work as described in, or implied from, these Bidding Documents. These include but are not limited to: engineering and design, procurement, manufacture, supply, transport, insurance, storage, installation, construction, civil works, testing, commissioning, documentation, training, provision of mandatory spare parts, obligations during the Defects Notification Period, operation and maintenance services for the durations specified in the Employer's Requirements, insurances, taxes and duties, performance security, and any other obligations necessary to execute and complete the Works and perform the Services in accordance with the Contract and the Employer's Requirements, whether or not specifically mentioned under an individual item.
3. The prices shall be fixed and firm and deemed to be included:
 - a. Contractor's overheads and profit, all applicable duties, taxes, levies, insurances, and other obligations of the Contractor as applicable on the Base Date, except where adjustments are expressly provided for under the Contract.
 - b. All costs of temporary works, site preparation, and construction facilities.
 - c. All obligations during the Defects Notification Period (DNP) including but not limited to rectification of defects, warranty obligations, and related support as per the Contract.
4. Each item in the Schedule of Prices shall be priced. Items unpriced shall be deemed included in other items.
5. The **Contract Price** shall mean the sum of:
 - a. the EPC Price (comprising all Rooftop Solar items, together with Mandatory Spare Parts);
 - b. the O&M Price (for Operation and Maintenance of Rooftop Solar, in accordance with the Contract and the Employer's Requirements);
 - c. the Provisional Sums.
6. **Mandatory Spare Parts:** The Contractor shall supply the Mandatory Spare Parts as defined in the designated Schedule. Their cost shall be included in the EPC Price, and no separate payment shall be made.
7. **Recommended Spare Parts:** The Bidder shall provide in the designated schedule a list of Recommended Spare Parts, including itemized prices. These prices shall not be included in the Grand Summary. The Employer may, at its sole discretion, procure such spares.
8. For the purpose of bid evaluation, the **Total Evaluated Price = EPC Price + O&M Price** shall be considered. For Contract award and execution, the Contract Price shall be the sum of the EPC Price, the O&M Price and the Provisional Sums.
9. A Provisional Sum is included in the Grand Summary for Employer's use at its discretion. The Provisional Sum shall be expended in whole or in part only on the instruction of the Employer's Representative in accordance with Sub-Clause 13.4 of the Conditions of Contract.

10. In case of discrepancy between a unit rate and its extended total, the unit rate shall prevail, subject to the lump-sum nature of the Contract.
11. In the event that the Employer determines that the distribution of prices is significantly unbalanced, either within a category of Works or across categories (including Rooftop Solar, and O&M), the Employer may:
 - a. require the Contractor to provide a detailed justification and itemized breakdown of any item of the Works; and/or
 - b. adjust the valuation and certification of interim payments so as to reflect the actual value of the Works executed.

Schedule No. A1 – EPC Works for Rooftop Solar

Item No.	Description (Design, Supply, Installation, Testing and Commissioning)	Price (PKR)
LOT III		
Item No.	Description	Price (PKR)
1	ROOFTOP SOLAR – DISTRICT ASTORE	
a	Distributed Solar PV – Cumulative 1.246 MWp (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
b	Battery Energy Storage System (BESS) – Cumulative ≥ 0.722 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
c	LV Equipment –switchgear, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
d	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
e	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-01	Subtotal – Rooftop Solar – District Astore	
2	ROOFTOP SOLAR – DISTRICT CHILLAS	
a	Distributed Solar PV – Cumulative 2.097 MWp (600 Wp modules or higher, inverters, DC distribution boxes, PV mounting structure, junction boxes, cabling, lightning arresters, synchronization, termination, earthing, etc., across multiple rooftops) including all civil & Structure works and AMI meter as defined under the technical specifications	
b	Battery Energy Storage System (BESS) – Cumulative ≥ 1.547 MWh (battery packs, PCS, auxiliaries, cabling, termination, earthing, etc., for rooftop systems) as defined under the technical specifications	
c	LV Equipment –switchgear, control panels, protection, cabling, termination, earthing, etc., for integration of distributed rooftops with the grid as defined under the technical specifications	
d	Mandatory Spare Parts – Supply of all mandatory spare parts as listed / specified in the Employer’s Requirements and Schedule A4.	
e	Miscellaneous Works – Any other rooftop-related works and obligations under the Employer’s Requirements not specifically included in Items a–d above as defined under the technical specifications	
RS-02	Subtotal – Rooftop Solar – District Diامر	
	Total Price for LOT III (Sum of RS-01 and RS-02) to be carried to Schedule A3 – Grand Summary	

Schedule No. A2 – O&M Works and Services

Item No.	Description	Period	Price (PKR)
LOT I			
1	O&M of Rooftop Solar – District Astore	36 months	
2	O&M of Rooftop Solar – District Chillas	36 months	
	Total Price For O&M of LOT I (Sum of Sr. 1 to Sr. 2)		

Schedule No. A3 – Grand Summary

Reference	Description	Price (PKR)
EPC Price LOT III	Total Price of EPC Works for LOT III (Sum of RS-01 to RS-02 from Schedule No. A1)	
O&M Price LOT III	Total Price of O&M of Rooftop Solar for LOT III from Schedule No. A2	
PS for LOT III	Provisional Sum (as defined in Preamble)	7,856,500
Total	EPC Price + O&M Price + PS	

Schedule No. A4 – Mandatory Spare Parts

Sr. No.	Item Description	Quantity
1	PV modules	1% of the quantity installed for the Project
2	Inverter(s)	5% of the total of each type of inverter installed (rounded up to nearest whole number) or 1 inverter of each type, whichever is greater. 2% of the total of Wifi / Remote Monitoring Dongles installed for the Project
3	Batteries	1% of the quantity installed for the Project
4	PV Module Mounting structure	5% of the nut/ bolts / Rawal bolts / fasteners / Clamps / Washers etc. installed for the Project
5	Electrical system (LV). i.e. contactors/accessories	2% of the quantity installed for the Project
6	DC and AC cabling	4 mm² : 2% of the total DC Cable length installed for the Project 2% of the total AC Cable length for each size installed for the Project
7	DC & AC Breakers	25 A : 2% of the total DC Breakers installed for the Project 250 A : 2% of the total AC Breakers installed for the Project
8	Grounding Materials (Rods, Earthing Wire, Clamps, Connectors etc.)	2% of the quantity required for the Project.

Note:

- The Bidder shall price the Mandatory Spare Parts for each Rooftop Solar under the relevant EPC Price section of the Schedule of Rates and Prices.
- All spare batteries shall be delivered with a full manufacturer’s warranty period identical to that of the originally installed batteries. Any spare batteries with reduced warranty coverage shall not be counted toward the mandatory requirement.
- The mandatory spare parts listed herein are in addition to, and shall not reduce or replace, the Contractor’s obligations to rectify defects through manufacturer warranties or to replace damaged equipment through insurance claims. The Contractor shall not utilize the mandatory spare parts listed in this Schedule to discharge such warranty or insurance obligations. However, if such spares are used to meet an urgent requirement, the Contractor shall replenish them immediately so that the mandatory spare inventory remains complete throughout the O&M period.
- The Contractor shall maintain the mandatory spare parts in good, unused, and serviceable condition, properly stored and protected against deterioration, until the end of the O&M period. The inventory shall be handed over to the Employer at the end of the O&M period in the same serviceable condition as supplied.
- The condition and completeness of the mandatory spare parts inventory shall form an essential part of the final inspection of the Plant. Satisfactory handover of the inventory shall be a prerequisite for issuance of the Performance Certificate.

Schedule No. A5 – Recommended Spare Parts

Sr. No.	Item Description	Quantity	Unit Rate (PKR)	Total Price (PKR)
1				
2				
3				
4				
5				
	Total Price for Recommended Spare Parts <u>(NOT TO BE CARRIED TO A3 – GRAND SUMMARY)</u>			

Note:

List here above (or append a list in the form above) the prices for the recommended additional spare parts, which are recommended by the Bidder for purchase with the Plant. The recommended spare parts shall include any expendable and wear items for all new components furnished by Contractor. These shall be in addition to those specified and will not be considered for evaluation. Provide description for each recommended additional spare part, recommend a quantity and provide pricing. The cost of such additional recommended spare parts will not be considered in the evaluation of Bids.

It shall be understood that the purchase of any or all of the recommended additional spare parts will be at the option of the Employer. The option will be exercised at the time of Contract award, unless indicated otherwise.

Technical Bid Forms

1. Form TECH 1 Design Methodology
2. Form TECH 2 Schedule of Technical Data
3. Form TECH 3 Method Statement for Key Construction Activities
4. Form TECH 4 Mobilization Schedule
5. Form TECH 5 Contractor's Personnel Detail & Organizational Charts
6. Form TECH 6 Subcontractors & Manufacturers

Form TECH 1

Design Methodology

The Bidder shall provide a Design Philosophy and Operational Methodology for implementing the Rooftop Solarization. The submission shall demonstrate the Bidder's technical approach, and operational planning.

The Design Philosophy shall, at a minimum, cover the following:

1. Explanation of how the Employer's Requirements will be achieved.
2. Configuration, integration with PV and grid, and control.
3. Design approach for foundations and cable trenches.
4. Preventive and corrective O&M strategy, and training plan for local operators.
5. Fire safety, battery hazard management

Form TECH 2

'A'- Employer's Specified Data/Parameters

'B'- Bidder's Proposed Data/Parameters

'C'- Remarks Supporting the Proposed Deviation in Column 'B'

SPECIFIC PLANT DATA PHOTOVOLTAIC MODULES			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Rated Power: ≥ 600 Wp	Yes		
Tolerance: 0 ~ +3%	Yes		
Module Efficiency: ≥ 22%	Yes		
Operating Temperature: -40°C to +85°C	Yes		
Max System Voltage: 1500 V DC	Yes		
Fire Rating: IEC Class C, UL Type 29	Yes		
12-year product, 25 years performance	Yes		
IEC 61215, IEC 61730, IEC 62941, UL 61730	Yes		
Application/ Safety Class II as per IEC 61730	Yes		
Barcode Identification	Yes		
N type, half-cut, Topcon/HPBC	Yes		
≥ 50 mm Diameter Hail Resistant	Yes		

SPECIFIC PLANT DATA HYBRID INVERTER			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Battery Voltage: 24 V or above	Yes		
Battery Compatibility: Lithium-ion (LFP), Lead-acid	Yes		
Maximum Efficiency: ≥96.5%	Yes		
European Weighted Efficiency: ≥96%	Yes		
Grid Modes: Grid-tied, Off-grid, Backup	Yes		
Communication: Wi-Fi, Ethernet, RS485	Yes		
Protection Features: SPD, AFCI, GFDI, Anti-islanding, BMS	Yes		
Enclosure Protection: IP65	Yes		
Operating Temperature Range: -30°C to +60°C	Yes		
Warranty: 10 years	Yes		

SPECIFIC PLANT DATA AMI METER			
Information Required	'A'	'B'	'C'
GENERAL			
Manufacturer			

Model No.			
Country of Origin			
Specifications As Per PEPCO Standards	Yes		

SPECIFIC PLANT DATA FOR BATTERY			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cell Chemistry: Lithium Iron Phosphate (LFP)	Yes		
Depth of Discharge (DoD): ≥ 90%	Yes		
Round-trip Efficiency: ≥ 90%	Yes		
Cycle Life: ≥ 6000 cycles @ 80% DoD	Yes		
Operating Voltage: 24 V or above	Yes		
Maximum Charge/Discharge Rate: ≥ 1 C	Yes		
Ambient Operating Temperature Range: -30°C to +50°C	Yes		
Ambient Charging Temperature: -30°C to +50°C (self-heating for sub-zero charging)	Yes		
Relative Humidity: 0–95% RH (non-condensing)	Yes		
Ingress Protection: IP65	Yes		
Noise Emission: ≤ 65 dB(A)	Yes		
Monitoring: BMS, mobile app, cloud-enabled	Yes		

SPECIFIC PLANT DATA DC CABLES			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cable Type: XLPO, Halogen free	Yes		
Conductor: Copper, ≥99.9% purity	Yes		
Earthing: Copper conductor/strip	Yes		
Flame Retardance	Yes		

SPECIFIC PLANT DATA AC CABLES			
Information Required	‘A’	‘B’	‘C’
GENERAL			
Manufacturer			
Model No.			
Country of Origin			
Cable Type: XLPE/PVC, UV & Flame Retardant	Yes		
Conductor: Copper, ≥99.9% purity	Yes		
Earthing: Copper conductor/strip	Yes		
Flame Retardance	Yes		

Form TECH 3

Method Statement for Key Construction Activities

The Bidder shall provide detailed method statements for the following key construction activities. Each method statement shall clearly describe:

- The proposed approach and sequence of works.
- The quality control and inspection regime.

The method statements shall demonstrate how the Bidder intends to complete the Works in accordance with the Employer's Requirements and international best practices.

Key Activities

The Bidder shall submit methodology for, but not limited to, the following:

- Submission of a detailed project schedule (using renowned project management software such as MS Project / P6) covering engineering, procurement and construction phases linked with work breakdown structure, milestones, and resources.
- Mobilization plan including logistics, safe transportation, and site establishment.
- Rooftop surveys
- Temporary site facilities, laydown areas, and storage.
- Foundations for PV modules, BESS, inverters, and switchgear.
- Delivery, handling, and storage of PV modules, mounting structures, BESS, and inverters.
- Erection and alignment of module mounting structures.
- Module installation, string wiring, and combiner boxes.

Form TECH 4

Mobilization Schedule

[Insert Mobilization Schedule]

Form TECH 5

Contractor’s Personnel Detail & Organizational Chart s

The Bidder shall provide an organization chart illustrating the proposed management structure and reporting lines for delivery of the Contract. For this organization chart, the Bidder must confirm deployment of atleast 08 no. of teams on site for timely / early completion of the works.

The Bidder shall also provide the names of Experts listed below.

No.	Position	Minimum Qualification	Total Work Experience [years]	Experience In Similar Work/ Position [years]
1	Project Manager/ Construction Manager	BSc Engineering (Elect/Mech)	15	10
2	Design Team Leader	BSc Engineering (Elect/Electronics)	12	10
3	Quality Control Engineer	BSc Engineering (Civil/Elect/Mech)	10	10
4	Civil / Structure Engineer	BSc Engineering (Civil/Structure)	10	5
5	Electrical Engineer	BSc Engineering (Elect)	10	5
6	PV Engineer	BSc Engineering (Elect)	8	5

Form PER-2
Resume and Declaration
Contractor’s Representative and Key Personnel

Name of Bidder

Position [#1]: [title of position]		
Personnel information	Name	Date of Birth
	Address	E-mail
	Professional Qualifications	
	Academic Qualifications	
	Language Proficiency: [language and levels of speaking, reading and writing skills]	
Details	Address of Employer	
	Telephone	Contact (Manager / Personnel Officer)
	Fax	
	Job Title	Years with Present Employer

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

Project	Role	Duration of involvement	Relevant experience
[main project details]	[role and responsibilities on the project]	[time in role]	[describe the experience relevant to this position]

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	Details
Commitment to Duration of Contract	[insert period (start and end dates) for which this Key Personnel is available to work on this contract]
Time Commitment	[insert the number of days/week/months/ that this Key Personnel will be engaged]

I understand that any misrepresentation or omission in this Form may:

- (a) be taken into consideration during Bid evaluation;
- (b) result in my disqualification from participating in the Bid;
- (c) result in my dismissal from the contract.

Name of Key Personnel: [insert name] _____

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Form TECH 6

Subcontractors & Manufacturers

a. Proposed Subcontractors

The following Subcontractors are proposed for carrying out the activity/sub-activity indicated. For any additional subcontractor (that is subsequently approved by the Employer), Bidders are free to propose but not more than three Subcontractors for each activity/sub-activity.

The bidder will submit the completed project of his proposed sub-contractors & Manufacturer.

Activity/Sub-Activity	Proposed Subcontractor's Name and Address	Nationality

b. Proposed Manufacturer

The Bidder shall propose up to three (3) manufacturers for each category of Major Equipment and Other Equipment listed below. The Employer will evaluate the acceptability of proposed manufacturers against the minimum criteria stated.

The Bidder shall provide credentials and supporting documents (such as manufacturer’s company profile, reference lists of similar projects, supply records, completion certificates, and any other relevant evidence) to establish that each proposed manufacturer meets the minimum requirements stated herein.

(I) Major Equipment

Sr. No.	Equipment	Minimum Manufacturer’s Requirement	Proposed Manufacturers
Proposed Manufacturer of Major Equipment			
1.	PV Modules	At least 05 Years of experience in manufacturing and supply of PV modules; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1. 2. 3.
2.	Battery Energy Storage System (BESS)	The proposed manufacturer of BESS shall have a minimum of five (05) years’ experience in the manufacturing and shall have successfully supplied at least 2 GWh of BESS during the last two (02) years Or At least 03 Years experience in manufacturing and supply of BESS; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1. 2. 3.
3.	Hybrid Inverters	The proposed manufacturer of inverters shall have a minimum of five (05) years’ experience in the manufacturing and shall have successfully supplied at least 2 GW of inverters during the last two (02) years Or At least 03 Years experience in manufacturing and supply of Hybrid Inverters; recognized as Tier 1 manufacturer in the Q2 or Q3 of 2025 BNEF listing	1. 2. 3.

Note: Each Major Equipment Category listed above must include at least one proposed manufacturer that fully meets the corresponding minimum requirements. Failure to propose at least one compliant manufacturer for any Major Equipment Category shall render the Bid non-responsive and subject to rejection.

(II) Other Equipment

Proposed Manufacturer for Other Equipment			
1	LV/MV Panels	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.
2	LV/MV Cables	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.
3.	Distribution Boxes	Manufacturer has at least 5 years of design and manufacturing experience of similar equipment as per Technical Specifications	1.
			2.
			3.

Note:

In case any proposed Manufacturer for Other Equipment is determined to be non-compliant with the specified minimum requirements, then the Bidder will be required to propose, without changing its Bid Price, an acceptable substitute manufacturer meeting the criteria for that Equipment prior to award of Contract.

Qualification Forms
Form ELI 1.1
Bidder Information Form

Date: _____
Page__ of __pages

Bidder's Name:
In case of Joint Venture (JV), name of each member:
Bidder's country of registration:
Bidder's year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <ul style="list-style-type: none"><input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.6.<input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 4.1.<input type="checkbox"/> Tax Department Registration in accordance with ITB 4.3.<input type="checkbox"/> PEC Registration in accordance with ITB 4.2.<input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.8 documents establishing:<ul style="list-style-type: none">(a) Legal and financial autonomy(b) Operation under commercial law(c) Establishing that the Bidder is not under supervision of the Employer
2. Included are the organizational chart and a list of Board of Directors. All the Bidders shall also provide information on beneficial ownership using the Beneficial Ownership Disclosure Form.

Form ELI 1.2

Bidder's JV Information Form

[To be completed for each member of Bidder's JV]

[Bidder will attach an executed JV Agreement according to PEC format on Stamp paper of worth Rs. 100 duly notarized]

Date: _____
Page __ of __ pages

Bidder's JV Name:
JV Member's name:
JV Member's country of registration:
JV Member's year of constitution/incorporation:
JV Member's legal address in country of constitution:
JV Member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.6. <input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 4.1. <input type="checkbox"/> Tax Department Registration in accordance with ITB 4.3. <input type="checkbox"/> PEC Registration in accordance with ITB 4.2. <input type="checkbox"/> In case of state-owned enterprise or institution, in accordance with ITB 4.8 documents establishing: (a) Legal and financial autonomy (b) Operation under commercial law (c) Establishing that the Bidder is not under supervision of the Employer
2. Included are the organizational chart and a list of Board of Directors. All the Bidders shall also provide information on beneficial ownership using the Beneficial Ownership Disclosure Form.

Form CON 2

Historical Contract Non-Performance, Pending Litigation and Litigation History

[This Form shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]

Bidder's Name: _____

Date: _____

Joint Venture Member's or Subcontractor's Name: _____

Page __ of __ pages

Non-Performed Contracts (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> Contract non-performance did not occur since 1 st January 2015 as specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.1.			
<input type="checkbox"/> Contract non-performance in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3 as indicated below.			
Year	Non-performed portion of Contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
	[Insert amount and percentage]	Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Reason(s) for non-performance: _____	
Pending Litigation (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> No pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3			
<input type="checkbox"/> Pending litigation in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.3.			

Year of Dispute	Amount in Dispute (currency)	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in Dispute: _____ Party who initiated the dispute: ____ Status of dispute: _____	
Litigation History (in accordance with Section III, Evaluation and Qualification Criteria)			
<input type="checkbox"/> No Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4. <input type="checkbox"/> Litigation History in accordance with Section III, Evaluation and Qualification Criteria, Sub-Factor 2.4 as indicated below.			
Year of Award	Outcome as Percentage of Net Worth	Contract Identification	Total Contract Amount (current value, currency, exchange rate and Equivalent PKR)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in Dispute: _____ Party who initiated the dispute: ____ Reason(s) for Litigation and award decision: _____	

Form FIN 3.1

Financial Situation and Performance

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page ___ of ___ pages

1. Financial Data

Type of Financial information in (currency)	Historic information for previous three (03) years, (amount in currency, currency exchange rate,		
	Year 1	Year 2	Year 3
Statement of Financial Position (Information from Balance Sheet)			
Total Assets (TA)			
Total Liabilities (TL)			
Total Equity/Net Worth (NW)			
Current Assets (CA)			
Current Liabilities (CL)			
Working Capital (WC)			
Information from Income Statement			
Total Revenue (TR)			
Profits Before Taxes (PBT)			
Cash Flow Information			
Cash Flow from Operating Activities			

2. Sources of Finance

[The following table shall be filled in for the Bidder and all members combined in case of a Joint Venture]

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

No.	Source of Finance	Amount (Equivalent PKR)	Escalated Amount (Equivalent PKR)
1			
2			
3			

3. Financial documents

The Bidder and its JV members shall provide copies of financial statements for the last three (03) years pursuant to Section III, Evaluation and Qualification Criteria, Sub-factor 3.1. The financial statements shall:

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

Attached are copies of financial statements⁵ for the last three (03) years required above; and complying with the requirements. In case of local Bidder or local partner of a JV, his financial statements must stand authenticated through the Unique Document Identification Number (UDIN).

⁵ If the most recent set of financial statements is for a period earlier than 12 months from the date of Application, the reason for this should be justified sufficiently.

Current Contract Commitments / Works in Progress

Bidders and each member to a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Current PKR Equivalent]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [Eq. PKR / month)]
1					
2					
3					
4					
5					

Form FIN 3.2

Average Annual Turnover

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page ___ of ___ pages

Annual Turnover Data				
Year	Amount Currency	Exchange Rate	Equivalent PKR	Escalated Equivalent PKR
Average Annual Turnover *				

* Total equivalent PKR for all years divided by the total number of years. See Section III, Evaluation and Qualification Criteria, Sub-factor 3.2.

Form EXP 4.1

Bidder's Experience

[This Form shall be filled in for the Bidder and each member of a Joint Venture]

Bidder's Name: _____

Date: _____

Joint Venture Member's Name: _____

Page __ of __ pages

Similar Contract No.	Information		
Contract Identification			
Award date			
Completion date			
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			Eq. PKR _____ Escalated Eq. PKR _____
If member in a JV or Subcontractor, specify share in value in total Contract amount and roles and responsibilities	_____%	_____ [insert total Contract amount in local currency]	Eq. PKR _____ Escalated Eq. PKR _____
	_____ _____ [Insert roles and responsibilities]		
Employer's Name:			
Address: Telephone/fax number E-mail:			

Form EXP 4.1 (cont.)

Bidder’s Experience

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2 of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

9. Information about Board of Directors (details shall be provided regarding number of shares in the capital of the company as set opposite respective names)

1	2	3	4	5	6	7	8
Name and surname (In Block Letters)	CNIC No. (in case of foreigner, Passport No)	Father' s / Husband' s Name in Full	Current Nationality	Any other Nationality(ies)	Occupation	Residential address in full or the registered / principal office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)
			Total Number of Shares taken (in figure and words)				

10. Any other information incidental to or relevant to Beneficial Owner(s).

Name & Signature
 (Person authorized to issue notice on behalf of the company)

**Form of Bid Security
(Bank Guarantee)**

Bank Guarantee Executed on _____
(Date)

Expiry on _____
(Date)

Name of Guarantor with Address: _____

Name of Bidder with Address _____

Sum of Guaranteed amount in PKR _____ (Pak Rupees _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Bidder we, the Guarantor above named, are held and firmly bound unto _____ (hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated for _____ (Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum to the Employer, conditioned asunder:

- (1) that the Bid Security shall remain in force for a period twenty-eight (28) days beyond the Bid Validity date i.e., upto _____.
- (2) that in the event of;
 - a) the principal withdraws his Bid during the period of validity of Bid, or
 - b) the principal does not accept the correction of his Bid price, pursuant to sub-clause 36.3 of Instructions to Bidder, or
 - c) failure of the successful Bidder to
 - i. furnish the required Performance Security, in accordance with Clause-45 of Instructions to Bidders, or
 - ii. sign the proposed Contract Agreement, in accordance with Clause-44 of Instructions to Bidder,

then the entire sum be paid immediately to the said Employer as liquidated damages and not as penalty for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within Fourteen (14) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified or its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith unconditionally and irrevocably, pay the Employer the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer shall be the sole and final judge to decide, whether the Bidder has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security with in the time stated above, or has defaulted in fulfilling said requirements and the Guarantor shall pay without objection the said upon sum first written demand from the Employer forthwith and without any reference to the Bidder or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

GUARANTOR
(Schedule Bank)

WITNESS:

Signature _____

d) Name _____

Corporate Secretary (Seal)

Title _____

Corporate Guarantor (Seal)

2. _____

Name, Title &Address

Manufacturer's Authorization

Date: [insert date (as day, month and year) of bid submission]

ICB No.: [insert number of bidding process]

To: [insert complete name of the employer]

WHEREAS

We [insert complete name of the manufacturer or manufacturer's authorized agent], who are official manufacturers or agent authorized by the Manufacturer of [insert type of goods manufactured], having factories at [insert full address of manufacturer's factories], do hereby authorize [insert complete name of the bidder] to submit a bid which includes the supply of the following goods, manufactured by us and to subsequently negotiate and sign the Contract.

Goods to be supplied are:

- 1). ----- [Insert name and/or brief description of the goods]
- 2). -----

We hereby extend our full guarantee and warranty in accordance with the respective Provisions of the Contract, with respect to the goods offered by the above firm.

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

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

Title: [insert title]

Duly authorized to sign this Authorization on behalf of [insert complete name of the manufacturer]

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

-- Note --

The bidder shall require the manufacturer to fill out this form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the manufacturer.

**POWER OF ATTORNEY FOR SIGNING OF BID
POWER OF ATTORNEY**

[shall be on stamp paper of PKR 100]

Know all men by these presents, we _____(name and address of the registered office of the Bidder) do hereby constitute, appoint and authorize Mr. / Ms. _____R/o _____(name and address of residence) who is presently employed with us and holding the position of _____, as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to the bid of the (please state the name and address of the bidder) for Bidding Document No. _____: 3.34 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN, including signing and submission of all documents and providing information / responses to WATER AND POWER DEPARTMENT, GILGIT BALTISTAN, representing us in all matters in connection with our bid for the said Bidding Process.

We hereby agree to ratify all acts, deeds and things done by our said attorney pursuant to this Power of Attorney and agree that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

For
(Signature)
(Name, Title, Email ID and Address)

Accepted
..... (Signature)
(Name, Title, Email ID and Address of the Attorney)

ACKNOWLEDGMENT

Before me, a Notary Public for and in the city of _____, this _____ of _____ 2025 personally came and appeared:

NAME IDENTIFICATION DOCUMENT

Known to me to be the same person/s who executed the foregoing Special Power of Attorney in Favor of _____ and acknowledged to me the same is/are his/her/their free and voluntary act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal, the date and place above written.

NOTARY PUBLIC

PART-II: CONDITIONS OF CONTRACT, STANDARD FORMS AND SCHEDULES

SECTION V - GENERAL CONDITIONS (GC)

Silver Book

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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for EPC/Turnkey Projects (“Silver book”) Second Edition 2017, reprinted 2022 with amendments” published by the Federation Internationale Des Ingenieurs Conseils (FIDIC) and the following “Particular Conditions” which are the amendments and additions to such General Conditions.

An original copy of the above FIDIC publication i.e. “Conditions of Contract for EPC/Turnkey Projects” must be obtained from FIDIC.

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Telephone: +41 22 799 49 01

E-mail: fidic@fidic.org

Website: www.fidic.org

FIDIC Code : ISBN13 : 978-2-88432-083-2

The successful Bidder after award of contract shall provide two (02) copies of above said “General Conditions” for incorporation in the Contract.

SECTION VI - PARTICULAR CONDITIONS

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

Part A - Contract Data

Sr. No.	Data Required	Sub-Clause	Data
1.	Defects Notification Period (DNP)	1.1.24	1,095 days
2.	Employer's Name and Address	1.1.27	Water and Power Department, Gilgit Baltistan, Pakistan 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com
3.	Employer's Representative (s)	1.1.30	Project Director
4.	Time for Completion	1.1.76	150 days for whole of the Works
5.	Agreed methods of electronic transmission:	1.3 (a)(ii)	Official email: pd100mwpsolar@gmail.com
6.	Address of Employer for communications	1.3(d)	100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185,
7.	Address of Employer's Representative (s) for communications	1.3(d)	Project Director 100 MW Distributed Solarization of Gilgit Baltistan Project, Water and Power Department Gilgit Baltistan, Near K.I.U, Gilgit, Pakistan, Telephone No.: +92-5811-922609, Fax No.: +92-5811-922619, 922185, Email: pd100mwpsolar@gmail.com
8.	Address of Contractor for communications	1.3(d)	(to be added later)
9.	Contract shall be governed by the law of:	1.4	Islamic Republic of Pakistan

10.	Ruling Language	1.4	English
11.	Language for Communications	1.4	English
12.	Number of additional paper copies of Contractor's Documents	1.8	Three (03)
13.	Total liability of the Contractor to the Employer under or in connection with the Contract	1.14	1.15 times of the Contract Price
14.	After the Contract comes into full force and effect, the Contractor shall be given right of access, and possession of all of the Site	2.1	The Employer shall give possession of the relevant part(s) of the Site to the Contractor as per requirements in accordance with the Programme submitted under Sub-Clause 8.3 [Programme], following the issuance of a written notice.
15.	Employer's Financial Arrangements	2.4	The Employer has received funds from the Government of Pakistan through PSDP towards the cost of the Project.
16.	Other Employer's Personnel	3.2	The Employer has appointed NESPAK Consultants to assist the Employer's Representative in the implementation of the contract. NESPAK shall act as the Employer's Delegated Assistant and shall perform such duties and exercise such authorities as are delegated to it under Part-B Special provisions.
17.	Performance Security (as percentages of the Contract Price in Currency/ies) percent: currency:	4.2	The Performance Security shall be maintained at ten percent (10%) of the Contract Price until expiry until issuance of the Performance Certificate.
18.	Maximum allowable	4.4(a)	20%

	accumulated value of work subcontracted (as a percentage of the Contract Price)		
19.	Parts of the Works for which subcontracting is not permitted:	4.4(b)	None
20.	Number of additional paper copies of progress reports	4.20	Eight (8)
21.	Normal working hours on site	6.5	Eight (08) hours per day under normal circumstances
22.	General Design Obligations	5.1 (b)	Clause 4 of Section II of Employer's Requirements is the essential obligation of the Contractor among the overall Employer's Requirements
23.	Number of additional paper copies of programmes	8.3	Six (06), including soft copy of the programme
24.	Delay Damages payable for each day of delay	8.8	0.10% of the EPC Price of the respective Section (as stated in the Schedule of Rates and Prices) for each day of delay beyond the Time for Completion of that Section
25.	Maximum amount of Delay Damages	8.8	10% of the EPC Price stated in the Contract Agreement
26.	Taking Over the Works and Sections	10.1	<p>The Works are divided into Sections as identified in Annexure-1 [List of Sections for the Works] to the Contract Data. Each Section shall be deemed to be completed when:</p> <p>(a) it has been executed and completed in accordance with the Contract, including the successful passing of the Tests on Completion applicable to such Section in accordance with Sub-Clause 9.4 [Tests on Completion]; and</p> <p>(b) a Taking-Over Certificate has been issued by the Employer for such Section in accordance with</p>

			<p>Sub-Clause 10.2 [Taking Over of Parts of the Works].</p> <p>The Contractor may apply for a Taking-Over Certificate for any Section, as defined in Annexure-1, upon fulfilment of the foregoing requirements. Upon issuance of the Taking-Over Certificate for a Section, the Defects Notification Period and the Contractor's obligations for operation and maintenance in respect of that Section shall commence from the date specified in such Taking-Over Certificate.</p> <p>Taking Over may be applied for, and granted, on a progressive basis, provided that a minimum of ten (10) buildings (refer to Annexure-1) within the relevant District have been completed, tested, and are ready for safe and reliable use, together with all associated civil, structural, and electrical works required for those buildings.</p> <p>The taking-over of the particular Section after completion of EPC phase does not absolve the Contractor from any liability as the O&M period has commenced immediately after taking-over.</p>
27.	Percentage rate to be applied to Provisional Sums for overhead charges and profit.	13.4(b)(ii)	10%.
28.	Total amount of Advance Payment: (as a percentage of the EPC Price stated in the Contract Agreement, excluding Provisional Sums)	14.2	20%.
29.	Currency/ies of Advance Payment	14.2	Pakistani Rupee (PKR) in which the Contract Price is payable
30.	Period of Payment of Advance Payment to the Contractor	14.2.2	Within 28 days after fulfilling the conditions prescribed in GCC

31.	Percentage deductions for the repayment of the Advance Payment	14.2.3	20% by following the methodology described in GCC
32.	Period of payment	14.3	One month
33.	Number of additional paper copies of Statements	14.3(b)	Four (04)
34.	Percentage of retention	14.3(iii)	Ten percent (10%) shall be deducted from each Interim Payment Certificate. Deductions shall continue until the cumulative total of Retention Money withheld reaches an amount equal to five percent (5%) of the Contract Price. No further deductions on account of retention shall be made thereafter.
35.	Limit of Retention Money	14.3(iii)	Five percent (5%) of the Contract Price.
36.	Plant and Materials for payment when shipped.	14.5(b)(i)	None
37.	Plant and Materials for payment when delivered to the Site	14.5(c)(i)	As per 'Schedule of Payments'
38.	Minimum amount of Interim Payment Certificates (IPC)	14.6.2	PKR 50 million
39.	Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [Interim Payment]	14.7(b)(i)	28 days
40.	Period for the Employer to make final payment to the Contractor	14.7(c)	56 days
41.	Financing charges for delayed	14.8	Not Applicable

	payment (percentage points above the average bank short-term lending rate as referred to under sub-paragraph (a))		
42.	Number of additional paper copies of draft Final Statement	14.11.1(b)	Four (04)
43.	Currencies for payment of Contract Price	14.15	Pakistani Rupee (PKR) only.
44.	Proportions or amounts of Local and Foreign Currencies are: Local: Foreign:	14.15(a)(i)	Local: 100% Foreign: Nil
45.	Currencies and proportions for payment of Delay Damages	14.15(c)	PKR only
46.	Rates of exchange	14.15(g)	The exchange rate parity in respect of seventy percent (70%) of the EPC Price shall be adjusted one-time at the time of issuance of letter of Acceptance using the following formula: Adjustment in the EPC Price = [(EPC Price * 0.70) * ER(Rev)/ER (B.D) + (EPC Price *0.30)] where: ER(Rev) = The revised TT selling rate of US Dollar as notified by the National Bank of Pakistan (NBP) on the date of issuance of letter of Acceptance. ER (B.D) = The TT selling rate of US Dollar as notified by the National Bank of Pakistan (NBP) on the Base Date of the Contract
47.	Forces of nature, the risks of which are allocated to the Contractor	17.2(d)	Climatic Conditions and Changes, Seasonal Rainfall, Thunderstorm, Flooding, Glacial Outbursts, Snowstorm, Land Sliding and Lightning

48.	<p>Permitted deductible limits:</p> <ul style="list-style-type: none"> i. Insurance required for the Works ii. Insurance required for Goods iii. Insurance required for liability for breach of Professional duty. iv. Insurance required against liability for fitness for purpose (if any is required) v. Insurance required for injury to persons and damage to property vi. Insurance required for injury to employees vii. Other insurances required by Laws and by local practice 	19.1	<ul style="list-style-type: none"> i. Ten percent (10%) of loss amount on each & every loss ii. Nil iii. Nil iv. Nil v. Nil vi. Nil vii. Nil
49.	<p>Periods for submission of insurance:</p> <ul style="list-style-type: none"> (a) Evidence of insurance (b) Relevant policies 	19.1.1 (a) & (b)	<ul style="list-style-type: none"> a) Not Later than Commencement Date. b) Within twenty-eight (28) days from the Commencement Date.
50.	Additional amount to be insured (as a percentage of the replacement	19.2.1(b)	Fifteen percent 15% of the replacement value

	value, if less or more than 15%).		
51.	List of risks arising from Exceptional Events which shall not be excluded from the insurance cover for the Works.	19.2.1(b)(iv)	Nil
52.	<ul style="list-style-type: none"> • Extent of insurance required for Goods • Amount of insurance required for Goods 	19.2.2	<ul style="list-style-type: none"> • From Ex-Works (i.e., works, factory, warehouse, etc.) to delivery at the Site. • Full replacement Value.
53.	Amount of insurance required for liability for breach of professional duty	19.2.3(a)	Full replacement value of the Works to be designed by the Contractor
54.	Insurance required against liability for fitness for purpose	19.2.3(b)	Yes
55.	Period of insurance required for liability for breach of professional duty	19.2.3	Until the date of issuance of Performance Certificate
56.	Amount of insurance required for injury to persons and damage to property.	19.2.4	<p>Injury to Person and Fatal case: In accordance with Workmen Compensation Act; and</p> <p>Damage to Property: PKR Five (05) Million</p> <p>without limit to the number of incidents for both of the above.</p>
57.	Other insurances required by Laws and by local	19.2.6	All insurances as applicable, to the extent of execution of the Project, under Federal and Provincial laws of Islamic Republic of Pakistan

	practice (give details.)		
58.	The language of arbitration shall be: The Place of Arbitration shall be: Rules of Arbitration:	21.6	English Gilgit, Pakistan The Arbitration Act 1940 (Pakistan)

Annexure -1 to Contract Data

List of Sections for the Works

1. The Works are divided into distinct Sections, as set out below.
2. For the Rooftop Solar Districts (RS-01 to RS-04), each individual Rooftop Solar District shall be deemed to constitute one Section.
3. Taking Over of each Section shall be carried out in accordance with the provisions of Sub-Clause 10.1 [Taking Over of the Works and Sections] of the Conditions of Contract.

List of Sections – Rooftop Solar

Section Ref.	Description	Location (District)
RS-01	Rooftop Solar – District Astore	Astore
RS-02	Rooftop Solar – District Chillas	Chillas

Note: Detailed Building wise list for above mentioned districts are attached in Employer’s Requirements Section-I i.e. Scope of Work.

Part B - Special Provisions

Following Sub-Clauses are added after Sub-Clause 1.1.80.	
Sub-Clause 1.1.81 EPC Price	“ EPC Price ” means the lump-sum amount quoted by the Contractor for the Engineering, Procurement and Construction (EPC) Works, as set out in the Schedule of Rates and Prices (Schedule A), and subject to adjustments in accordance with the Contract.
Sub-Clause 1.1.82 ES	“ ES ” means environmental and social.”
Sub-Clause 1.1.83 O&M Price	“ O&M Price ” means the lump-sum price quoted separately by the Contractor for the Operation and Maintenance works and services as set out in the Schedule of Rates and Prices, subject to adjustments (if any) in accordance with the Contract.
Sub-Clause 1.1.84 Operation and Maintenance	“ Operation and Maintenance ” means the operation and maintenance of the Works as set out in the Contract and the Employer’s Requirements.”
Sub-Clause 1.2 Interpretation	“and” is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j). Sub-paragraph (k) is added: (k) “The word “Tender” is synonymous with “Bid”, the word “Tender” or “Bidder” with “Bidder” and the words “Tender documents” and “request for bids documents” with “bidding document(s)”, as applicable.”
Sub-Clause 1.5 Priority of Documents	Replace the list of documents from (a) to (i) with the following: a) the Contract Agreement; b) the Letter of Acceptance; c) the Letters of Technical and Financial Bids; d) the Particular Conditions Part A - Contract Data; e) the Particular Conditions Part B - Special Provisions; f) the General Conditions (GC); g) the Employer’s Requirements; h) the Schedule of Rates and Prices; i) the completed Schedules other than the Schedule of Rates and Prices; j) the Bid; k) the JV Agreement (if the Contractor is a JV); l) Code of Conduct for Contractor’s Personnel; m) any other document forming part of the Contract.

<p>Sub-Clause 1.6 Contract Agreement</p>	<p>In the last line of the 1st paragraph the text “shall be borne by the Employer” is substituted by “shall be reimbursed by the Employer to the Contractor”.</p>
<p>Sub-Clause 2.2 Assistance</p>	<p>Following paragraph is added at the end: Provided always that the Contractor shall have the sole responsibility for carrying out his obligations under this Sub-Clause.</p>
<p>Sub-Clause 3.2 Other Employer's Personnel</p>	<p>Following paragraph is added at the end of this Sub-Clause: In addition to providing assistance to the Employer's Representative, (Employer's Delegated Assistant) is delegated to exercise the following specific powers and authorities on behalf of the Employer's Representative:</p> <ul style="list-style-type: none"> (a) Sub-Clause 3.6 [Meetings] - convening and conducting progress meetings; (b) Sub-Clause 4.1 [Contractor's General Obligations] – monitor ongoing construction activities to verify compliance with approved design, specifications, quality standards, and good engineering practices. (c) Sub-Clause 4.4 [Subcontractors] - reviewing and providing consent for Subcontractors; (d) Sub-Clause 5.2 [Contractor's Documents] – review and comment on Contractor's design documents, drawings, specifications, and manuals for conformity with the Employer's Requirements within three (03) working days after the receipt of Contractor's submittals; (e) Sub-Clause 7.3 [Inspection] – witness, verify, and report on the inspection and testing of equipment and material at manufacturer's works and at the Site; (f) Sub-Clause 8.3 [Programme] - reviewing, commenting on, and providing consent to the Programme; (g) Sub-Clause 8.7 [Rate of Progress] - monitoring and reporting on the rate of progress; (h) Sub-Clause 9.1 [Tests on Completion] – witness and verify the Tests on Completion, review results, and provide recommendations to the Employer's Representative regarding Taking-Over; (i) Sub-Clause 10.1 [Taking Over of the Works and Sections] – review the Contractor's application for Taking-Over and advise the Employer's Representative regarding compliance with contractual requirements;

	<p>(j) Sub-Clause 11.9 [Performance Certificate] – review the Contractor’s application for Performance Certificate and advise the Employer’s Representative regarding compliance with contractual requirements;</p> <p>(k) Sub-Clause 14.6 [Interim Payments] - reviewing, certifying, and processing applications for Interim Payment Certificates; and</p> <p>(l) Sub-Clause 14.9 [Release of Retention Money] - determining and certifying the release of Retention Money.</p> <p>The Employer's Representative reserves the right to, at any time and by written notice to the Contractor:</p> <ul style="list-style-type: none"> • delegate additional authorities or powers to the Employer’s Delegated Assistant; or • withdraw or modify any delegated authorities or powers previously granted to the Employer’s Delegated Assistant, <p>as may be necessary for the efficient administration and implementation of the Contract.</p> <p>Any action taken by the Employer’s Delegated Assistant within their delegated authority shall be deemed to have been taken by the Employer's Representative.</p>
<p>Sub-Clause 3.4 Instructions</p>	<p>Following is added at the end:</p> <p>"If the Employer's Representative or a delegated assistant:</p> <p>(a) gives an oral instruction;</p> <p>(b) receives a written confirmation of the instruction, from the Contractor, within two working days after giving the oral instruction; and</p> <p>(c) confirms the instruction within two working days after receiving the confirmation</p> <p>then the Contractor's confirmation shall constitute the written instruction of the Employer's Representative or delegated assistant (as the case may be)."</p>
<p>Sub-Clause 4.2 Performance Security</p>	<p><u>4.2.1 Contractor’s Obligations</u></p> <p>The first paragraph is substituted with the following:</p> <p>“The Contractor shall deliver the Performance Security, in the amount stated in the Contract Data, to the Employer within 14 days after the receipt of the Letter of Acceptance. The Performance Security shall be in the form of bank guarantee</p>

	<p>issued by, at the option of the Bidder, either (a) any scheduled bank in Pakistan with a branch in Gilgit or (b) a bank located outside Pakistan duly counter-guaranteed by a scheduled bank in Pakistan with a branch in Gilgit and shall be in the prescribed form.”</p> <p><u>4.2.2 Claims under the Performance Security</u></p> <p>Following paragraph is added at the end of bullet (e):</p> <p>“(f) failure by the Contractor to duly perform the Operation and Maintenance obligations as defined in the Contract and the Employer’s Requirements.”</p>
<p>Sub-Clause 4.3 Contractor’s Representative</p>	<p>The following sentence is added at the end of the Sub-Clause:</p> <p>“If any of these persons is not fluent in this language the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their delegated powers, functions and/or authority.”</p>
<p>Sub-Clause 4.4 Subcontractors</p>	<p>The following is added at the beginning of the second paragraph:</p> <p>“The Contractor shall require in all subcontracts relating to the Works that Subcontractors execute the Works in accordance with the Contract, including complying with the relevant ES requirements and the SEA/SH Prevention and Response Obligations.</p> <p>All subcontracts relating to the Works shall include a provision stipulating that the Subcontractor accepts that the Employer may disqualify the Subcontractor from being awarded a Government of Pakistan financed contract for a period of two years if the Subcontractor is determined to have failed to comply with its SEA/SH Prevention and Response Obligations.”</p> <p>The following is added at the end of the last paragraph of Sub-Clause 4.4:</p> <ul style="list-style-type: none"> i. “All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under subparagraph (a) of Sub-Clause 15.2.3 [After Termination]. ii. “All subcontracts relating to the Works shall include provisions which entitle the Employer to terminate the subcontract upon termination of the Contract Agreement”

	<p>Where practicable, the Contractor shall give fair and reasonable opportunity for contractors from the Islamic Republic of Pakistan to be appointed as Subcontractors.” Provided further that the Subcontractor shall not have any claim, cause of action, suit, etc. for compensation, loss or damage against the Employer arising out of or in relation to the Contract Agreement</p> <p>Provided further that the Subcontractor shall be obligated and liable to perform and discharge all the obligations and liabilities owed by the Contractor to the Employer under the Contract Agreement to the extent of the Scope of Works or Services assigned to the Subcontractor.</p> <p>Provided further that the Subcontractor Scope of Works or Services shall not be deemed completed until and unless such Scope of Works or Services is completed to the satisfaction of the Employer under the Contract Agreement.</p>
<p>Sub-Clause 4.5 Nominated Subcontractors</p>	<p>This Sub-Clause is not applicable under this Contract.</p>
<p>Sub-Clause 4.6 Co-operation</p>	<p>On the second-last line of the first paragraph before “Contractor’s”, add “of the”.</p> <p>The following is added after the first paragraph: “The Contractor shall also, as stated in the Employer’s Requirements or as instructed by the Employer, cooperate with and allow appropriate opportunities for the Employer’s Personnel to conduct any environmental and social assessment.”</p>
<p>Sub-Clause 4.8 Health and Safety Obligations</p>	<p>The following are included after deleting “and” at the end of (f) and replacing “.” with “; and” at the end of (g):</p> <ul style="list-style-type: none"> (h) where a health service provider for the Contract is stated in the Employer’s Requirements, provide all reasonable assistance (room, accommodation, water etc.) to enable the service provider to perform its functions; (i) provide health and safety training of Contractor’s Personnel as appropriate and maintain training records; (j) actively engage the Contractor’s Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor’s Personnel, training on occupational safety

	<p>and health, and provision of personal protective equipment without expense to the Contractor's Personnel;</p> <p>(k) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health.</p> <p>(l) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;</p> <p>(m) subject to Sub-Clause 4.6, where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and</p> <p>(n) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment."</p> <p>The second and third paragraphs are replaced with the following:</p> <p>"Subject to Sub-Clause 4.1, the Contractor shall submit to the Employer for Review a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works. The procedures for Review of the health and safety manual and its updates shall be as described in Sub-Clause 5.2 (Contractor's Documents).</p> <p>The health and safety manual shall set out all the health and safety requirements under the Contract,</p> <p>(a) which shall include at a minimum:</p> <p>(i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control</p>
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	<p>measures for chemical, physical and biological substances and agents;</p> <ul style="list-style-type: none"> (ii) details of the training to be provided, records to be kept; (iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning); (iv) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, (v) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labour; (vi) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation and welfare facilities are provided by the Contractor in accordance with Sub-Clause 6.6; and <p>(b) any other requirements stated in the Employer's Requirements.”</p> <p>The paragraph starting with: “In addition to the reporting requirement of...” is deleted and is further addressed in Sub-Clause 4.20 of the Special Provisions.</p>
<p>Sub-Clause 4.15 Access Route</p>	<p>The following is added at the end of Sub-Clause 4.15:</p> <p>“The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party</p>

	<p>associated with the use of, if any, Contractor’s Equipment on public roads or other public infrastructure.</p> <p>The Contractor shall monitor and use road safety incidents and accidents reports to identify negative safety issues and establish and implement necessary measures to resolve them.”</p>
<p>Sub-Clause 4.16 Transport of Goods</p>	<p>The following is added at the end:</p> <p>The Contractor shall duly consider the nature, volume and weight of the Goods for the safe inland transportation up to the Site. After consultation with the Employer, the Contractor shall, at its own risk and cost, use the most appropriate route for transporting the Goods without causing the impediments to the public transport and without causing any delay to the approved Programme of the Works.</p>
<p>Sub-Clause 4.18 Protection of the Environment</p>	<p>The sub-paragraph (b) is deleted, and the following paragraph is added at the end of Sub-Clause:</p> <p>“In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor’s operations, the Contractor shall agree with the Employer the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its own cost to the satisfaction of the Employer.”</p>
<p>Sub-Clause 4.20 Progress Reports</p>	<p>At the end of sub-paragraph (g) the word “and” is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with “;”, and the following new sub-paragraphs are added as:</p> <ul style="list-style-type: none"> (i) planned programme for the execution of the Works for next 56 days to enable Employer’s Representative to determine its programme of inspection and testing; (j) monthly summary of daily job record indicating weather conditions, deployment of Contractor’s Equipment, labour employment, local material procurement and material import, if any; and (k) salient contractual and project information.
<p>Sub-Clause 4.21 Security of the Site</p>	<p>Following is added at the end of the Sub-Clause:</p> <p>“Subject to Sub-Clause 4.1, the Contractor shall submit for the Employer’s No-objection a security management plan that sets out the security arrangements for the Site.</p> <p>The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor’s</p>

	<p>Personnel, Employer’s Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Employer’s Requirements.</p> <p>The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.</p> <p>In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 4.23 Archaeological and Geological Findings</p>	<p>The first paragraph is replaced with the following:</p> <p>“All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:</p> <ul style="list-style-type: none"> (a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor’s Personnel or other persons from removing or damaging any of these findings; (b) train relevant Contractor’s Personnel on appropriate actions to be taken in the event of such findings; and (c) implement any other action consistent with the requirements of the Employer’s Requirements and relevant Laws.”
<p>The following Sub-Clauses 4.24 to 4.26 are added at the end of Sub-Clause 4.23</p>	
<p>Sub-Clause 4.24 Suppliers (other than Subcontractors)</p>	<p>4.24.1 Forced Labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labour including trafficked persons as described in Sub-Clause 6.21. If forced labour/trafficking cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.2 Child labour</p> <p>The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labour as described in Sub-Clause 6.22. If child labour cases</p>

	<p>are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.3 Serious Safety Issues</p> <p>The Contractor, including its Subcontractors, shall comply with all applicable safety obligations, including as stated in Sub-Clauses 4.4, 4.8 and 6.7. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to adopt procedures, and mitigation measures adequate to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.</p> <p>4.24.4 Obtaining natural resource materials in relation to supplier</p> <p>The Contractor shall obtain natural resource materials from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from riverbeds or beaches.</p> <p>If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats</p>
<p>Sub-Clause 4.25 Code of Conduct</p>	<p>The following is added as Sub-Clause 4.25:</p> <p>“The Code of Conduct for Contractor’s Personnel (ES) signed by the Contractor will apply to Contractor’s Personnel (as defined in Sub-Clause 1.1.14 of the General Conditions), to ensure compliance with the Contractor’s Environmental and Social (ES) obligations under the Contract. The Contractor shall take all necessary measures to ensure that each Contractor’s Personnel is made aware of the Code of Conduct including specific behaviours that are prohibited and understands the consequences of engaging in such prohibited behaviours.</p>

	<p>These measures include providing instructions and documentation that can be understood by the Contractor’s Personnel and seeking to obtain that person’s signature acknowledging receipt of such instructions and/or documentation, as appropriate.</p> <p>The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project-affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor’s Personnel, Employer’s Personnel and the local community.</p> <p>The Contractor’s Management Strategy and Implementation Plans shall include appropriate processes for the Contractor to verify compliance with these obligations”</p>
<p>Sub-Clause 5.4 Technical Standards and Regulations</p>	<p>The following is added as a second paragraph after first paragraph:</p> <p>“If so, stated in the Employer’s Requirements, the Contractor shall:</p> <ul style="list-style-type: none"> (a) take into account climate change considerations in the design of structural elements of the Works and new buildings if any; and (b) apply the concept of universal access to the design and construction of structures and new buildings if any (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances.)
<p>Sub-Clause 6.1 Engagement of Staff and Labour</p>	<p>The following is added at the end of the Sub-Clause</p> <p>Contractor shall employ 30 % of project staff and labour from sources within Pakistan, particularly labour from the towns and villages directly affected”</p>
<p>Sub-Clause 6.5 Working Hours</p>	<p>The following is added at the end of the Sub-Clause</p> <p>“The Contractor shall provide the Contractor’s Personnel annual holiday and sick, maternity and family leave, as required by applicable Laws or as stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 6.6 Facilities for Staff and Labor</p>	<p>The following is added as the last paragraph:</p> <p>“If stated in the Employer’s Requirements, the Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the Contractor’s Personnel. The Contractor shall also provide similar facilities</p>

	<p>for the Employer’s Personnel as stated in the Employer’s Requirements.”</p>
<p>Sub-Clause 6.7 Health and Safety of Personnel</p>	<p>In the second paragraph, replace “The Contractor” with: “Except as otherwise stated in the Employer’s Requirements, the Contractor...”</p> <p>The following paragraph is added at the end of the Sub-Clause: “In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Employer’s Representative may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Employer’s Representative may determine to be reasonably necessary for such purpose. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Employer’s Representative immediately by the quickest available means.”</p>
<p>Sub-Clause 6.8 Contractor’s Superintendence</p>	<p>Insert at the end of sub-paragraph (a) of this Sub-Clause: "Or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"</p> <p>The following text is added at the end of this Sub-Clause: “The Contractor’s authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council. The Contractor’s authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.”</p>
<p>Sub-Clause 6.9 Contractor’s Personnel</p>	<p>The following is included after deleting “or” at the end of (e) and replacing “.” with “; or” at the end of (f): “(g) undertakes behaviour which breaches the Code of Conduct for Contractor’s Personnel (ES).”</p> <p>The last paragraph is deleted and is replaced with the following: If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience. In the case of replacement of the</p>

	<p>Contractor’s Representative, Sub-Clause 4.3 [Contractor’s Representative] shall apply. In the case of replacement of Key Personnel (if any), Sub-Clause 6.12 [Key Personnel] shall apply.</p> <p>Subject to the requirements in Sub-Clause 4.3 [Contractor’s Representative] and 6.12 [Key Personnel], and notwithstanding any requirement from the Employer to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor’s Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above.”</p>
<p>Sub-Clause 6.12 Key Personnel</p>	<p>The following is inserted at the end of the last paragraph:</p> <p>“If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available at its own cost during all working hours in a number deemed sufficient by the Employer.”</p>
<p>The following Sub-Clauses 6.13 to 6.28 have been added after Sub-Clause 6.12.</p>	
<p>Sub-Clause 6.13 Foreign Personnel</p>	<p>The Contractor may bring into the Islamic Republic of Pakistan any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national or government permission required for bringing in the Contractor’s personnel.</p> <p>The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.</p>
<p>Sub-Clause 6.14 Supply of Foodstuffs</p>	<p>The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Employer’s Requirements at reasonable prices for the Contractor’s Personnel for the purposes of or in connection with the Contract</p>
<p>Sub-Clause 6.15 Supply of Water</p>	<p>The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor’s Personnel.</p>

<p>Sub-Clause 6.16 Measures against Insect and Pest Nuisance</p>	<p>The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.</p>
<p>Sub-Clause 6.17 Alcoholic Liquor or Drugs</p>	<p>The Contractor shall not, otherwise than in accordance with the Laws of the Islamic Republic of Pakistan, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.</p>
<p>Sub-Clause 6.18 Arms and Ammunition</p>	<p>The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so</p>
<p>Sub-Clause 6.19 Festivals and Religious Customs</p>	<p>The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs</p>
<p>Sub-Clause 6.20 Funeral Arrangements</p>	<p>The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.</p>
<p>Sub-Clause 6.21 Forced Labour</p>	<p>The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.</p> <p>No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harbouring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.</p>
<p>Sub-Clause 6.22 Child Labour</p>	<p>(a) The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in the Islamic Republic of Pakistan.</p>
<p>Sub-Clause 6.23 Employment Records of Workers</p>	<p>The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Employer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Contractor's Records].</p>

<p>Sub-Clause 6.24 Workers Organization</p>	<p>The Contractor shall comply with the relevant labour laws of Islamic Republic of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.</p>
<p>Sub-Clause 6.25 Non-Discrimination and Equal Opportunity</p>	<p>The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.</p> <p>Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (in accordance with Sub-Clause 6.22).</p>
<p>Sub-Clause 6.26 Training of Contractor's Personnel</p>	<p>The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training referred to in Sub-Clause 4.8.</p> <p>As stated in the Employer's Requirements or as instructed by the Employer's Representative, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be trained on ES aspects of the Contract by the Employer's Personnel.</p> <p>The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.</p>
<p>Sub-Clause 6.27 Compliance by Subcontractors</p>	<p>The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.</p>
<p>Sub-Clause 6.28 Epidemics</p>	<p>In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.</p>

<p>Sub-Clause 7.3 Inspection</p>	<p>The following is added in the first paragraph after “Employer’s Personnel” “(including the consultants, referred in Sub-Clause 3.2, and third parties, such as independent experts)”</p> <p>The following is added as (b) (iv):</p> <p>“(iv) carryout environmental and social audit, and”</p>
<p>Sub-Clause 7.4 Testing by the Contractor</p>	<p>The second paragraph is modified to start as: “Except as otherwise specified in the Contract, the Contractor shall perform all the required tests of all the Equipment and Plant installed under the scope of the Works as specified in the Employer’s Requirements and/or as directed by the Employer’s Representative.”</p>
<p>Sub-Clause 7.7 Ownership of Plant and Materials</p>	<p>The following is added before the first paragraph: “Except as otherwise provided in the Contract,”</p> <p>The following is added at the end of the Sub-Clause: “No Plant and/or Materials that is the property of the Employer shall be removed from the Site. If it becomes necessary to:</p> <ul style="list-style-type: none"> (i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Employer Representative requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or (ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Employer Representative clearly identifying the item(s) of Plant and/or Materials to be replaced and giving details of the due date of delivery to the Site of the replacement item(s). <p>Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure that such an item is not moved except for its delivery to the Site.</p> <p>The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or</p>

	Materials that has become the property of the Employer under this Sub-Clause."
The following Sub-Clauses 7.9 to 7.10 are added after Sub-clause 7.8	
Sub-Clause 7.9 Use of Pakistani Materials and Services	The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.
Sub-Clause 7.10 Factory Acceptance Test	Factory acceptance tests (FATs) shall be witnessed by the Employer's Personnel (including the Employer's Representatives, referred in Sub-Clause 3.2, and third parties, such as independent experts). All cost in connection with witnessing of the factory acceptance tests by the Employer's Personnel shall be borne by the Contractor. These shall include costs of air travel from Pakistan to place of inspection / testing and back, hotel accommodation / boarding / lodging, inland transportation and USD 200 and PKR 10,000 daily allowance per day per person for inspection, testing to be conducted outside and inside Pakistan respectively for each visit of every person to witness these tests.
Sub-Clause 8.1 Commencement of Work	The Commencement Date shall be the date notified by the Employer to the Contractor in writing after: a. The Contract Agreement has been signed and has come into full force and effect in accordance with Sub-Clause 1.6 [Contract Agreement]; and b. The Employer has granted the Contractor reasonable access and possession of the Site necessary for the commencement of the Works. Such notice shall be given not later than twenty-eight (28) days after the Contract Agreement comes into full force and effect. The Employer shall give this notice at least fourteen (14) days before the Commencement Date.
Sub-Clause 8.5 Extension of Time for Completion	Society of Construction Law Delay and Disruption Protocol 2 nd Edition February 2017 governing guideline for determining the EOT and EOT related cost claims. Or PEC Guidelines for EOT
Sub-Clause 11.7 Right of access after Taking Over	In the first paragraph, the text "the date 28 days after" is deleted.
Sub-Clause 11.9 Performance Certificate	The following are included after deleting "and" at the end of (a) and replacing "." with "; and" at the end of (b):

	<p>“(c) upon successful completion of the Operation and Maintenance by the Contractor to the satisfaction of the Employer’s Representative.”</p>
<p>Sub-Clause 12.1 Procedure for Tests after Completion</p>	<p>The 2nd para of this Sub-Clause is modified as follows: The section-wise “Tests after Completion” of the Works shall be carried out upon expiry of the Operation and Maintenance (O&M) Period and prior to the issuance of the Performance Certificate, as defined in Section II (General Project Requirements) of Volume 2 of the Employer’s Requirements.</p>
<p>Sub-Clause 13.6 Adjustments for Changes in Laws</p>	<p>The following is added at the end of the Sub-Clause: “All taxes, duties and other levies payable by the Contractor/Subcontractor under the Contract, as per the Law of Islamic Republic of Pakistan, shall be dealt as per the following:</p> <p>a) Local Direct Taxes</p> <p>It is implied that the Contractor has taken all the risks into account while submitting the rates and prices and the Bid Price. The Employer shall not be responsible for any present or future direct taxes (Income Tax/Corporate Tax WHT. Turnover Tax, Super Tax etc) payable by the Contractor and the Contractor’s Personnel.</p> <p>Any change (increase/decrease) in the rate of Direct Taxes i.e., Income Tax/WHT. Turnover Tax. Super Tax etc shall be the liability of the Contractor and the Contract Price shall not be adjusted.</p> <p>b) Local Indirect Taxes</p> <p>If rate of indirect taxes i.e., sales taxes, custom duties, VAT levies, other charges or similar Taxes levied on the Contractor’s invoice which are to be borne by the Employer are increased or decreased, a new tax or duty is introduced, an existing tax or duty is abolished or any change in interpretation or application of any tax or duty occurs after the Base Date during the course of performance of the Contract, an equitable adjustment/ compensation of the Contract Price will be made to the Contractor by the Employer.</p> <p>Notwithstanding the foregoing, the Contractor shall not be entitled to an Extension of Time if the relevant delay has already been taken into account in the determination of a</p>

	<p>previous Extension of Time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].</p>
<p>Sub-Clause 13.7 Adjustments for Changes in Cost</p>	<p>In the first paragraph, the text “the Particular Conditions” is replaced by “the Contract”.</p>
<p>Sub-Clause 14.1 The Contract Price</p>	<p>The following is added at the end of paragraph (b) the Sub-Clause:</p> <p>“Notwithstanding the provisions of subparagraph (b), the taxation shall be dealt as follows:</p> <p>Foreign Taxation</p> <p>The Contractor shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside Pakistan.</p> <p>Local Taxation</p> <p>All taxes, duties and other levies payable by the Contractor/Subcontractor under the Contract, as per the Law of Pakistan, shall be dealt as per the following:</p> <p><u>a) Local Direct Taxes</u></p> <p>It is implied that the Contractor has taken all the risks into account while submitting the Bid Price. The Employer shall not be responsible for any present or future direct taxes (Income tax/Corporate Tax WHT, Turnover Tax, Super Tax etc.) payable by the Contractor and the Contractor’s Personnel.</p> <p><u>b) Local Indirect Taxes</u></p> <p>All local indirect taxes i.e. sales taxes, custom duties, VAT levies other charges or similar taxes levied on the Contractor’s invoice prevailing at the Base Date as per the Laws of Islamic Republic of Pakistan are included in the Contract Price. The Contractor shall be responsible to provide the evidence to the Employer upto his satisfaction that all the applicable local indirect taxes has been paid by the Contractor, while submitting application for interim payment under Sub-Clause 14.3 [Application for Interim Payment].</p> <p>Nothing in the Contract shall relieve the Contractor from his liability to bear and pay any tax under this Contract as per the law of land.</p>

	<p>Withholding of Advance Income Tax</p> <p>All payments (gross) as payable to the Contractor/Subcontractor will be subject to Withholding Tax/Advance Tax at prescribed rate at the time of payment. The deduction of advance income tax from the gross payable bills shall be made in accordance with prevalent income tax laws of the Government of Pakistan. These deductions shall be deposited in the Government Treasury by the Employer to the account of the Contractor within prescribed period.</p> <p>The Employer shall within 28 days of making any such deduction provide to the Contractor a certificate of tax deducted and deposited in the Government Treasury.</p> <p>Provincial Sales Tax on Services</p> <p>Subject to the relevant provisions of the Provincial Sales Tax Act on Services, all payments (gross) as payable to the Contractor/Sub-contractor in relation to Works/services will be subject to withholding sales tax at the prevalent rates at the time of payment.</p>
<p>Sub-Clause 14.2 Advance Payment</p>	<p><u>14.2.1 Advance Payment Guarantee</u></p> <p>The entity issuing the Advance Payment Guarantee and its form shall be asunder:</p> <p>The Advance Payment Guarantee shall be in the form of Guarantee issued by (a) a Scheduled Bank in Pakistan with branch in Gilgit or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan with branch in Gilgit.</p> <p>In case of Joint Venture, the Advance Payment Guarantee(s) shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.</p> <p><u>14.2.2 Advance Payment</u></p> <p>The period of advance payment of “14 days” is replaced by “as stated in the Contract Data”.</p>
<p>Sub-Clause 14.4 Schedule of Payments</p>	<p>The entire text of this Sub-Clause is replaced with the following; The Contract Price will be paid according to the Schedule of Payments included in the Contract.</p>
<p>Sub-Clause 14.7 Payment</p>	<p>Following is added at the end of the Sub-Clause after the words “specified in the Contract”: “Or through crossed cheque in Favor of the Contractor or JV partners. The Payment to JV partners may be made at the</p>

	request of the Joint Ventures in the ratio of their shares specified by them.”
Sub-Clause 14.8 Delayed Payment	In the third line of first paragraph, the words “compounded monthly” are deleted. The text of second paragraph is replaced with the following: “The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data.”
Sub-Clause 15.1 Notice to Correct	“and” is deleted from (b) and “.” is replaced by: “; and” in (c). The following is then added as (d) “(d) specify the time within which the Contractor shall respond to the Notice to Correct.” In the third para, “shall immediately respond” is replaced with: “shall respond within the time specified in (d)”. Further, in the third para., “to comply with the time specified in the Notice to Correct.” is replaced with: “to comply with the time specified in (c).”
Sub-Clause 15.2 Termination for Contractor’s Default	<u>15.2.1 Notice</u> Sub-paragraph (h), following is added after the words “corrupt, fraudulent, collusive or coercive practice”: “as defined in Gilgit Baltistan Public Procurement Rules, 2022”
Sub-Clause 15.4 Payment after Termination for Contractor’s Default	The following text is added at the end of this Sub-Clause: “The Employer shall be entitled to sell any of the Contractor’s Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors.”
The following Sub-Clauses 17.7 is added after Sub-Clause 17.6	
Sub-Clause 17.7 Use of Employer’s Accommodation/Facilities	“The Contractor shall take full responsibility for the care of the items of the Employer’s facilities and/or accommodation, if any, as detailed in the Employer’s Requirements, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer. If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor’s risk and cost.”

<p>Sub-Clause 18.1 Exceptional Events</p>	<p>The words “or disorder” are replaced with “, disorder or sabotage” in sub-paragraph (c).</p>
<p>Sub-Clause 19.1 General Requirements</p>	<p>Following text is added at the end of first paragraph: “The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer’s consent.”</p> <p>Following text is added at the end of third paragraph: “The Contractor shall, within the respective periods stated in the Contract Data submit to the Employer Representative a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5.”</p>
<p>The following Sub-Clause 19.2.7 is added after Sub-Clause 19.2.6:</p>	
<p>Sub-Clause 19.2.7 Insurance Company</p>	<p>“The Contractor shall be obliged to place all insurances described in this Clause with any reputable/reliable insurers, acceptable to the Employer, rated by PACRA/VIS of minimum rating AA.</p>
<p>Sub-Clause 20.1 Claims</p>	<p>In sub-paragraph a), and b) the words “any additional payment” are replaced with “payment”.</p>
<p>Sub-Clause 21.6 Arbitration</p>	<p>The word “international” is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following: “The Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;”</p>
<p>The Following new Clauses 23, 24, 25 and 26 are added.</p>	
<p>Clause 23 Integrity Pact</p>	<p>If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to:</p> <ul style="list-style-type: none"> (a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder’s fee or kickback given by the Contractor or any of his Subcontractors, agent or servants; (b) terminate the Contract; and (c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other

	<p>corrupt business practices of the Contractor or any of his Subcontractors, agent or servants.</p> <p>The termination under sub-paragraph (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub-paragraph (a) and (c) of this Sub-Clause.</p>
<p>Clause 24</p> <p>Operation and Maintenance Obligations</p>	<p><u>24.1 General Requirements</u></p> <p>The Contractor shall perform the Operation and Maintenance (“O&M”) obligations in accordance with the Employer’s Requirements (Section V), the Contract, and any revisions agreed in writing between the Parties. The Contractor shall also comply with the approved Operation and Maintenance Manuals. No material modification to O&M methods or arrangements shall be made without the prior written consent of the Employer’s Representative.</p> <p>During the O&M period, the Contractor shall ensure that the Works remain fit for their intended purpose and shall carry out all preventive, corrective, and routine maintenance necessary to achieve this. The Contractor shall deploy adequately qualified and experienced operations and maintenance personnel. The names, qualifications, and experience of such personnel shall be submitted for the Employer’s Representative’s approval prior to engagement.</p> <p><u>24.2 Commencement and Period of Operation and Maintenance</u></p> <p>(a) The O&M obligations shall commence from the date stated in the Taking-Over Certificate issued under Clause 10 [Taking Over of the Works and Sections] of the Conditions of Contract in parallel with the DNP. For this purpose:</p> <ul style="list-style-type: none"> • Each District shall be considered a Section, provided that a minimum of ten (10) buildings have been taken over in that District. <p>(b) Unless otherwise stated in the Employer’s Requirements:</p> <ul style="list-style-type: none"> • O&M period shall be Thirty-Six (36) months for each District. <p>(c) The Contractor shall carry out O&M in full compliance with the Employer’s Requirements, Sub-Clause 5.6 [As-Built Records], and Sub-Clause 5.7 [Operation and Maintenance Manuals].</p>

	<p>(d) Any proposed modification to approved O&M documents shall be submitted with a written justification to the Employer’s Representative and shall not be implemented until written consent is provided. Such consent shall not relieve the Contractor from any responsibility under the Contract.</p> <p><u>24.3 Delivery of Spare Parts</u></p> <p>The Contractor shall supply and maintain on Site (or at such location as designated by the Employer) the mandatory spare parts, consumables, and tools specified in the Employer’s Requirements and Schedule A5. The Contractor shall ensure that such items are new, fit for purpose, and compliant with the Contract.</p> <p>Mandatory spare parts shall be maintained in original condition throughout the O&M period and handed over to the Employer at its completion. These mandatory spare parts are in addition to, and shall not replace, the Contractor’s obligations to rectify defects through manufacturer warranties or replace damaged equipment through insurance claims. If any mandatory spare is utilized to meet an urgent requirement, the Contractor shall immediately replenish it with an equivalent item meeting the Contract requirements.</p> <p><u>24.4 Training</u></p> <p>The Contractor shall conduct training of the Employer’s personnel in accordance with the programme, scope, and schedule specified in the Employer’s Requirements. The Contractor shall provide suitably qualified training staff, all training materials, and practical on-site sessions to enable the Employer’s personnel to operate and maintain the Works after the expiry of the O&M period.</p>
<p>Clause 25</p> <p>Contractor’s Obligations Regarding Performance Guarantees</p>	<p><u>25.1 Performance Guarantees</u></p> <p>The Contractor shall achieve the Performance Guarantees specified in the Schedule C [Schedule of Performance Guarantees] upon completion of the Tests on Completion of the Works.</p> <p>During the O&M Period, the Contractor shall operate and maintain the Works in accordance with the Employer’s Requirements and shall ensure that the Works meet or exceed the operational performance benchmarks stated in Schedule C.</p> <p><u>25.2 Failure to Achieve Performance Guarantees</u></p> <p>Failure by the Contractor to achieve any of the Performance Guarantees, either during the Tests on Completion or during</p>

	<p>the O&M Period, shall entitle the Employer to recover Performance Damages in the amounts and manner set out in Schedule C, without the need to prove actual loss.</p> <p>The application of Performance Damages shall be without prejudice to the Employer’s other rights under the Contract, except that the Employer’s entitlement to compensation for such failure shall be limited to the amounts expressly stated in Schedule C.</p>
<p>Clause 26 Incentives for Early Completion</p>	<p>If the Contractor achieves completion of the Works prior to the Time for Completion stated in the Contract Data, the Contractor shall be entitled to an early completion bonus.</p> <p>The amount of the bonus shall be calculated at 0.085% of the EPC Price (as stated in the Schedule of Rates and Prices) for each calendar day of early completion, subject to a maximum aggregate cap of 5% (five percent) of the EPC Price.</p> <p>The following conditions shall apply to the payment of the bonus under this Clause:</p> <ul style="list-style-type: none"> (a) For the purpose of determining early completion, the Time for Completion stated in the Contract Data shall be considered fixed and shall not be adjusted due to any extension of time granted under the Contract. (b) If the Contractor fails to achieve Taking-Over of all Sections within the Time for Completion, no early completion bonus shall be payable, regardless of whether one or more Sections were completed ahead of time.

SECTION VII - CONTRACT FORMS AND SCHEDULES

1. Form of Letter of Acceptance
2. Form of Contract Agreement
3. Form of Performance Security (Bank Guarantee)
4. Form of Mobilization Advance Bank Guarantee
5. Form of Code of Conduct for Contractor's Personnel (ES) Form
6. Form of Integrity Pact
7. Schedule-A: Schedule of Rates and Prices
8. Schedule-B: Schedule of Payments
9. Schedule-C: Schedule of Performance Guarantees

Form of Letter of Acceptance

[Letterhead paper of the Employer]

Ref:

[Date]

NAME OF CONTRACT: _____

CONTRACT NUMBER: _____

To: [name and address of the Contractor]

Letter of Acceptance

This is to notify you that your Bid dated [date] for execution of the [name of the Contract and identification number, as given in the Contract Data] for the Contract Price [amount in numbers and words] [name of currency], which amount includes the Provisional Sums of [amount in numbers and words] [name of currency], as corrected and modified in accordance with the Instructions to Bidders, is hereby accepted by [Name of the Employer].

You are hereby required to furnish the Performance Security in the form and the amount in accordance with ITB 45.1 within a period of fourteen (14) days after the receipt of Letter of Acceptance.

You shall depute your authorized representative with Power of Attorney to sign the Contract Agreement in the office of the undersigned within seven (07) days from the date of furnishing of acceptable Performance Security in accordance with ITB 45.1.

Please acknowledge receipt and confirm your acceptance of this Letter of Acceptance being sent in duplicate, by affixing your signature and stamp at the space provided below and return one copy thereof as soon as possible but not later than three (3) days from the date of receipt of this Letter of Acceptance.

We acknowledge that this Letter of Acceptance creates a binding Contract between us, and we undertake to fulfil all our obligations and duties in accordance with the terms of this Contract.

Authorized Signature: _____

Name and Title of Signatory: _____

Name of the Employer: _____

Received and Accepted:

For and on behalf of

(the Contractor)

Signature: _____

Name: _____

Designation: _____

Stamp: _____

Date: _____

Form of Contract Agreement

THIS CONTRACT AGREEMENT (herein after called the “Agreement”) is made the _____ day of _____, _____, between _____ of _____ (hereinafter “the Employer”), of the one part, and _____ of _____ (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works, viz., _____ should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of such Works on EPC/Turnkey basis, remedying of any defects therein and performing the operation and maintenance works and services, for the total Contract Price of _____ [currency and amounts in figures] _____ [currency and amounts in words], comprising the following components:

- a. the EPC Price of _____ [currency and amounts in figures] _____ [currency and amounts in words];
- b. the O&M Price of _____ [currency and amounts in figures] _____ [currency and amounts in words];
- c. the Provisional Sums of _____ in _____ [currency and amounts in figures] _____ [currency and amounts in words].

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:
 - (a) the Contract Agreement;
 - (b) the Letter of Acceptance;
 - (c) the Letters of Technical and Financial Bids;
 - (d) the Particular Conditions Part A - Contract Data;
 - (e) the Particular Conditions Part B - Special Provisions;
 - (f) the General Conditions (GC)
 - (g) the Employer’s Requirements;
 - (h) the Schedule of Rates and Prices;
 - (i) the completed Schedules other than the Schedule of Rates and Prices;
 - (j) the Bid;
 - (k) the JV Agreement (if the Contractor is a JV);
 - (l) Code of Conduct for Contractor’s Personnel;
 - (m) any other document forming part of the Contract.

The addenda/corrigenda, if any, (excluding part relating to Instructions to Bidders along with Bid Data Sheet) shall be deemed to have been incorporated at the appropriate places in the “Documents forming the Contract”.

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and to remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the Parties hereto have caused this Agreement to be on the day, month and year first before written in accordance with their respective laws.

Signature of Contactor

Signature of Employer

(Seal)

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness

Witness

(Name, Title and Address)

(Name, Title and Address)

**Form of Performance Security
(Bank Guarantee)**

Guarantee No. _____

Executed on _____

Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor with address: _____

Name of Contractor with address: _____

Guaranteed Amount (express in words and figures) _____

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Request for Bid including Contract Agreement, GCC, PCC and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Contractor we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the Guaranteed Amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Contractor has accepted the Employer's above said Letter of Acceptance for _____ (Name of Contract) for the _____ (Name of Project).

NOW THEREFORE, if the Contractor shall well and truly perform and fulfil all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfil all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 11, Defects After Taking Over, of Conditions of Contract and Clause 24, Operation and Maintenance Obligations are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____ (the Guarantor), waiving all objections and defense under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Contractor has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall decide whether the Contractor has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above

upon first written demand from the Employer forthwith and without any reference to the Contractor or any other person.

IN WITNESS WHEREOF, the above-bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Guarantor

(Scheduled Bank in Pakistan / Gilgit)

WITNESS:

1. _____

Corporate Secretary (Seal)

Signature _____
Name _____
Title _____
Corporate Guarantor (Seal)

2. _____

Name, Title & Address

Form of Mobilization Advance Bank Guarantee

Guarantee No. _____ Date _____

WHEREAS _____ (hereinafter called the 'Employer')

has entered into a Contract for _____

(Particulars of Contract)

with _____ (hereinafter called the "Contractor").

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of _____ (_____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____ (hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above-mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____ whichever is earlier.

(Date)

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of _____ (_____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above-mentioned date, the advance payment is not fully adjusted.

Guarantor
(Scheduled Bank)

WITNESS:

Signature _____

1. _____

Name _____

Corporate Secretary (Seal)

Title _____

2. _____

Corporate Guarantor (Seal)

Name, Title & Address

Form of Code of Conduct for Contractor's Personnel (ES) Form

[Note to the Bidder: The minimum content of the Code of Conduct form as set out by the Employer shall not be substantially modified. However, the Bidder may add requirements as appropriate, including to take into account Contract-specific issues/risks.]

Code of Conduct for Contractor's Personnel

We are the Contractor, [enter name of Contractor]. We have signed a contract with Water and Power Department, Gilgit Baltistan, Pakistan for _____ [enter description of the Works]. These Works will be carried out at _____ [enter the Site and other locations where the Works will be carried out]. Our contract requires us to implement measures to address environmental and social risks related to the Works.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, labourers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "**Contractor's Personnel**" and are subject to this Code of Conduct.

This Code of Conduct identifies the behaviour that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behaviour will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

Required Conduct

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;
2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
 - a. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
 - b. wearing required personal protective equipment;
 - c. using appropriate measures relating to chemical, physical and biological substances and agents; and
 - d. following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;

6. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract
7. report violations of this Code of Conduct; and
8. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor’s Personnel or the project’s Grievance Redress Mechanism.

Raising Concerns

If any person observes behaviour that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [enter name of the Contractor’s Social Expert with relevant experience] in writing at this address [_____] or by telephone at [_____] or in person at [_____]; or
2. Call [_____] to reach the Contractor’s hotline (if any) and leave a message.

The person’s identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behaviour prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

Consequences of Violating the Code of Conduct

Any violation of this Code of Conduct by Contractor’s Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR’S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor’s contact person(s) with relevant experience] requesting an explanation.

Name of Contractor’s Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

Form of Integrity Pact

[To be filled and signed by the Bidder]

Contract No. _____

Dated _____

Contract Value: _____

Contract Title: _____

_____ (Name of Bidder) 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 Bidder) 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 Bidder) 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 Bidder) 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 Bidder] 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 times the sum of any commission, gratification, bribe, finder's fee or kickback given by [name of Bidder] 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 Employer:

Name of Bidder:

Signature:

Signature:

[Seal]

[Seal]

Schedule-B

Schedule of Payments

1. This Schedule of Payment shall be read in conjunction with the Schedule of Prices, the Conditions of Contract, and the Employer's Requirements.
2. Separate Schedules of Payment shall apply to the following phases of the Contract:

a) EPC Works – Rooftop Solar (per District)

Payments shall be made as percentages of the EPC Price of each District (RS-01, RS-02 ... RS-04), as defined in the Schedule A1 and Schedule B1. Percentages shall be applied to the lump-sum EPC Price of each District, irrespective of the number of individual buildings in that District. While Taking-Over Certificates may be issued progressively in accordance with Sub-Clause 10.1 [Taking Over of the Works and Sections] of the Particular Conditions, payments shall remain linked to the achievement of District-wise milestones as set out in this Schedule.

b) Operation and Maintenance (O&M) – Rooftop Solar (per District):

Payments shall be made in respect of the O&M Price quoted for each District, as set out in the Schedule A2 and Schedule B2.

3. The milestone percentages in this Schedule shall aggregate to one hundred percent (100%) of the respective EPC or O&M Price for each Section of Rooftop District, exclusive of the Advance Payment, which shall be recovered in accordance with Sub-Clause 14.2 [Advance Payment]. All milestone payments shall be subject to deductions for Advance Recovery and Retention.
4. An Advance Payment equivalent to twenty percent (20%) of the EPC Price shall be made. It shall be released against submission of an Advance Payment Guarantee in accordance with Sub-Clause 14.2 and shall be recovered from milestone payments as provided therein.
5. Retention Money shall be deducted at the rate as specified in Sub-Clause 14.3, from each gross milestone payment. Retention shall be released in the manner as specified in Sub-Clause 14.9 of the Particular Conditions of the Contract.
6. Payments under each milestone shall only become due following certification by the Employer's Representative confirming that the corresponding milestone has been achieved and shall be subject to the fulfilment of all stated prerequisites and conditions.

B1: EPC Works - Roof Top Solar (per District)

Milestone No.	Milestone Description	Payment (% of EPC Price for that District)	Pre-requisites / Conditions
1	Completion of Site Surveys and Approval of Design (cumulative for district)	10%	Reports and design package approved by Employer's Representative.
2	Delivery of PV, Inverter and BESS Equipment ($\geq 70\%$ of cumulative district capacity delivered at site or Employer's designated store after FAT)	50%	Equipment inspected, delivery certificates countersigned by the Employer's Representative.
3	Completion of Mechanical/Electrical Installation ($\geq 70\%$ cumulative PV capacity installed across district buildings)	10%	Site inspection and certification.
4	TOCs issued for at least 50% of the total PV System Rating for the District.	15%	For each building included: all tests passed, associated civil/structural works finished, Employer's Representative issues TOC.
5	TOCs issued for 100% of the buildings in the District.	15%	For each building included: all tests passed, associated civil/structural works finished, Employer's Representative issues TOC.
	Total excluding Advance Payment	100%	

B2: Operation and Maintenance – Rooftop Solar (per District)

- The O&M Price for each District shall be paid in **Six equal bi-annual instalments** over the 36-month O&M period.
- The first instalment shall become due upon completion of six months of O&M of at least 50% of the buildings in the district, reckoned from the date of issuance of the last Taking-Over Certificate in that District.
- The second instalment shall become due upon completion of twelve months of O&M of 50% buildings in the district and so on. (two invoices for 50% and two invoice for next 50% means four invoices per years and twelve invoices for 03 years till completion of O&M.)
- Each instalment shall be subject to certification by the Employer's Representative confirming satisfactory O&M performance for the relevant period.

Schedule-C

Schedule of Performance Guarantees

1. General

- 1.1 This Schedule shall be read in conjunction with the Conditions of Contract, the Employer’s Requirements, and the Schedules of Prices and Payments.
- 1.2 The Contractor guarantees that the Works shall achieve the performance levels defined herein.
- 1.3 Failure to achieve the guaranteed performance levels shall subject the Contractor to the Performance Damages in accordance with this Schedule, without prejudice to the Employer’s other rights under the Contract.
- 1.4 The aggregate liability for the Performance Damages under this Schedule shall not exceed ten percent (10%) of the Contract Price, unless otherwise stated in the Particular Conditions.

2. EPC Works – Rooftop Solar

2.1 Guaranteed Performance Parameters:

- (a) For PV systems the Contractor guarantees that the **Actual PV Output (kW)** shall not be less than the **Ideal PV Output (kW)**.
- (b) The installed nameplate capacity shall match the approved capacity.
- (c) The outputs shall be assessed as follows:

$$\text{Actual PV Output} = \sum_{k=1}^n \text{Measured Voltage of string } k \times \text{Measured Current of string } k$$

$$\text{Ideal PV Output} = \sum_{k=1}^n \text{Adjusted Voltage of string } k \times \text{Adjusted Current of string } k$$

Where n = total nos. of strings on a site

2.2 Performance Damages for EPC Works of Rooftop Solar:

If the Actual PV Output is more than **10% lower** than the Ideal PV Output, the Contractor shall provide additional installed capacity equal to:

$$\text{Additional Capacity} = \frac{(\text{Ideal PV Output} - \text{Actual PV Output})}{\text{Ideal PV Output}} \times 2$$

The Contractor shall install the shortfall capacity at the same building. If sufficient space is not available, the shortfall shall be installed at another rooftop within the same district, at the Contractor’s cost.

The Contractor shall rectify the shortfall within **30 days**. If rectification is not achieved within this period, then the Contractor shall pay Performance Damages (PD) equal to:

$$\text{PD} = \frac{(\text{Ideal PV Output} - \text{Actual PV Output})}{\text{Ideal PV Output}} \times \frac{(\text{EPC Price of Rooftop Solar in the relevant District}) \times (\text{kWp rating of Building})}{\text{Total kWp in that District}} \times 1.5$$

3. O&M Works and Services – Rooftop Solar

3.1 Guaranteed Performance Parameters:

For rooftop solar systems the Contractor guarantees that installed systems shall maintain performance levels consistent with the approved EPC benchmarks and that no installed capacity shall be out of service for more than the permissible downtime defined in the Employer’s Requirements Section V.

3.2 Performance Damages for O&M Works and Services of Rooftop Solar:

During the contractual year of the O&M phase, the onsite Measured Annual Outage (MAO) shall be

$$\text{MAO (kWh)} = \sum_{k=1}^n \text{Duration of Outage of String } k \text{ in no. of days} \times 3.5 \times \text{STC Rating of Outaged String } k$$

Where n = total nos. of outaged strings on a site

Whereas Measured Annual Outage Permissible Limit (MAOPL) shall be

$$\text{MAOPL (kWh)} = 3.5 \times 18.25 \times \text{STC Rating of Installed PV Modules}$$

In case of measured annual outage > measured annual outaged permissible limit, the Contractor shall pay Performance Damages (PD) equal to:

$$\text{PD} = (\text{MAO} - \text{MAOPL}) \times \text{Rs. } 50/\text{kWh}$$



WATER AND POWER DEPARTMENT, GILGIT
BALTISTAN



3.34 MW_{DC} ROOFTOP SOLARIZATION OF GILGIT BALTISTAN (LOT – III)

**BIDDING DOCUMENTS
ON EPC/TURNKEY BASIS
(SINGLE STAGE TWO ENVELOPE)**

**VOLUME – II
EMPLOYER'S REQUIREMENTS**



November 2025



National Engineering Services Pakistan (Pvt.) Ltd. (NESPAC)

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3.34 MWDC ROOFTOP SOLARIZATION OF GILGIT BALTISTAN LOT – III

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LIST OF ABBREVIATIONS

Abbreviation	Definition
AC	Alternating Current
ACB	Air Circuit Breaker
AFCI	Arc-Fault Circuit Interrupter
AMI	Advanced Metering Infrastructure
ASTM	American Society for Testing and Materials
BOQ	Bill of Quantities
BESS	Battery Energy Storage System
BMS	Battery Management System
BS	British Standard
DC	Direct Current
DHO	District Health Officer
DMS	Document Management System
DNP	Defects Notification Period
DoD	Depth of Discharge
ECC / CPC	Earth Continuity Conductor / Circuit Protective Conductor
EES	Electrical Energy Storage
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement & Construction
ER	Employer's Requirements
FAT	Factory Acceptance Test(s)
GB	Gilgit-Baltistan
GFDI	Ground-Fault Detection Interruption
GI	Galvanized Iron
HMI	Human-Machine Interface
HRC	High Rupturing Capacity
HSE	Health, Safety & Environment
I&T	Inspection & Testing
IBC	International Building Code
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEE	Initial Environmental Examination
IP	Ingress Protection
ITP	Inspection & Test Plan
KPI	Key Performance Indicator
LAA	Land Acquisition Act
LFP / LPF	Lithium Iron Phosphate
LID	Light-Induced Degradation
LV	Low Voltage
MCCB	Moulded Case Circuit Breaker
MCB	Miniature Circuit Breaker
MPPT	Maximum Power Point Tracking
MPR	Monthly Progress Report
MV	Medium Voltage
NADRA	National Database & Registration Authority
NEC	National Electrical Code

NEQS	National Environmental Quality Standards
O&M	Operation & Maintenance
OHS	Occupational Health & Safety
OEM	Original Equipment Manufacturer
PCAP	Pakistan Clean Air Program
PEPCO	Pakistan Electric Power Company
PID	Potential-Induced Degradation
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PR	Performance Ratio
PT (VT)	Potential (Voltage) Transformer
PV	Photovoltaic
RCC	Reinforced Cement Concrete
RF	Radio Frequency
RMS	Remote Monitoring System
SCADA	Supervisory Control and Data Acquisition
SIL	Safety Integrity Level
SOC	State of Charge
SOH	State of Health
SPD	Surge Protective Device
STC	Standard Test Conditions
TCP/IP	Transmission Control Protocol / Internet Protocol
TOPCon	Tunnel Oxide Passivated Contact
UL	Underwriters Laboratories
UV	Ultraviolet
VCB	Vacuum Circuit Breaker
XLPE	Cross-Linked Polyethylene
XLPO	Cross-Linked Polyolefin
CGI	Corrugated Galvanized Iron
HDPE	High-Density Polyethylene
PVC / UPVC	(Unplasticized) Polyvinyl Chloride
SWG	Standard Wire Gauge
DHQ	District Headquarters Hospital
FG/GPS/BHS/GHS/GMS/BPS	Federal/Government Primary/High/Model/ Boys'/Girls' Schools
KIU	Karakoram International University
LG&RD	Local Government & Rural Development
MI	Military Intelligence
NAB	National Accountability Bureau
PHE	Public Health Engineering
SE	Superintending Engineer
SP	Superintendent of Police
XEN	Executive Engineer

SECTION – I: SCOPE OF WORKS

1. INTRODUCTION

The Government of Gilgit-Baltistan (GB) is implementing a renewable energy initiative involving the installation of Rooftop Solarization with a cumulative capacity of 3.34 MWp across two districts: Chillas and Astore.

The Project comprises:

- Rooftop Solar PV Systems on selected public-sector buildings across all four districts.

The Project also includes associated Battery Energy Storage Systems (BESS) and all related civil, electrical, and mechanical works required for a complete, operational, and grid-integrated system.

The Contractor shall deliver the Works on an EPC / Turnkey basis, including three (03) year Defects Notification Period (DNP) as well as carry out the post-commissioning Operation & Maintenance (O&M).

These Employer’s Requirements (ER) form an integral part of the Contract and shall be read in conjunction with the Conditions of Contract (CoC), the Schedule of Prices, and all other documents forming the Contract.

The purpose of these Employer’s Requirements is to define the scope, standards, and performance expectations of the Works, while allowing the Contractor flexibility in detailed design and execution, provided that the Contractor complies with the requirements set out herein.

The Contractor shall be fully responsible for the engineering, procurement, manufacturing, supply, construction, installation, testing, and commissioning of all equipment and systems to deliver a fully operational facility that meets the performance requirements of the Employer.

The Employer’s Requirements are organized in the following parts:

Section I – Introduction and Scope of Works

Section II – General Project Requirements

Section III – DC Systems

Section IV – AC Systems

Section V – Civil & Structure Works

Section VI – Operation and Maintenance Requirements

Annexure I – Drawings

This Section I provides overall description of the Project and also stipulate general and specific scope of the Works.

2. GENERAL SCOPE OF WORKS

The Contractor shall be responsible for the design, engineering, procurement, construction, installation, testing, commissioning, training, and handover of the complete Works. The scope shall include, but not be limited to, the following:

2.1 Site Preparation and Development

- Clearing, grading, compaction, slope stability, and drainage of project areas.
- Site leveling and stabilization to suit foundations and structures.

- Temporary construction facilities, storage yards, utilities, and construction power/water arrangements.

2.2 Civil Works

- Foundations for PV modules, inverters, and BESS units (where ever Required).
- Civil structures designed by local codes and international standards (ASTM, ACI, ISO), suitable for seismic, wind, and snow load conditions.

2.3 Solar PV and Mechanical Works

- Design, supply, and installation of PV modules, mounting structures, and auxiliaries.
- Rooftop mounting systems including ballast or non-penetrative types.
- Earthing and lightning protection.

2.4 Electrical Works

- AC systems: inverters, switchgear and protection.
- DC cabling, AC cabling, protection devices, synchronization, and control equipment.
- Modifications in existing LV systems for integration with solar plants where required.
- Rewiring for Fans, Lights and other serviceable loads as listed under Table-01.

2.5 Battery Energy Storage Systems (BESS)

- Supply, installation, testing, and commissioning of BESS integrated with PV and grid.
- BESS charge/discharge control and protection.

2.6 Centralized and De-Centralized Monitoring

- Remote monitoring system for PV and BESS.
- Centralized monitoring system at location designated by the Employer.

2.7 Testing, Commissioning, and Handover

- Factory Acceptance Tests
- Material Delivery Verification
- Submission of commissioning reports for Employer’s review under Sub-Clause 5.2 of CoC.
- Delivery of as-built drawings, O&M manuals, test certificates, spare parts, and warranties.

2.8 Operation & Maintenance (O&M)

- Three (03) years of O&M services post-commissioning, including preventive and corrective maintenance, system monitoring, and reporting for Rooftop Solar.
- Training of Employer’s personnel: detailed technical training before completion of O&M, covering PV operations, troubleshooting, preventive maintenance, and reporting.
- Provision of all O&M tools, consumables, and software necessary for smooth operation.

2.9 Compliance and Standards

- All works and equipment shall comply with IEC, IEEE, ISO, NEC, ASTM, and Pakistan Grid Code requirements.

- Implementation Health, and Safety Management Plan during construction and commissioning.
- Health, and safety protection including fire systems.

2.10 Permits and Approvals

- The Contractor shall obtain all necessary approvals, inspections, and permits from authorities, in coordination with the Employer.

3. SPECIFIC SCOPE OF WORKS

The following briefly provides an overview of specific Works involved in the Project. This Scope of Works shall be read together with the Technical Specifications, Drawings, and Schedule of Prices. In case of conflict or omission, the more stringent or technically superior requirement shall apply. No part of the Works shall be excluded on the grounds that it is not expressly mentioned in this Scope if it is included in the Technical Specifications and Drawings or is necessary for safe and reliable operation of the Project.

3.1 Rooftop Solar PV

The details of rooftop installations are provided in **Table 1 – Rooftop Solar PV Installations**, including building names, PV and BESS capacities, and specific requirements, if any.

The Contractor shall be responsible for the design, supply, installation, and commissioning of hybrid rooftop solar PV systems with dedicated Hybrid Inverter and battery backup on selected government and public sector buildings, including but not limited to hospitals, schools, and administrative facilities as defined in technical specifications.

The works shall include structural surveys, supply and installation of PV modules, battery storage, charge controllers, inverters, mounting frames, cabling, protection devices, and energy management systems, all in compliance with IEC and IEE standards. In case Genset is available at Site, the system shall synchronize with the same.

Systems shall be designed for safe, reliable, and autonomous operation, with appropriate protection against overcharge, deep discharge, and islanding, supported by centralized and remote monitoring capabilities. The Contractor shall provide complete as-built documentation, user manuals, training for building staff, and post-commissioning services including defect liability and preventive maintenance to ensure sustainable long-term operation.

Table 1 – Rooftop Solar

RS-01: District Astore 41 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.352576N, 74.859287E	Astore	PWD Rest House Astore	38	48	25	Roof Mounted CGI Sheet	0	212	4"	1	16.81
2	35.357447N, 74.865541E	Astore	Excise & Taxation Office Astore	15	19	5	Roof Mounted	10	182	6"	1	3.22
3	35.346203N, 74.857919E	Astore	DD Office Education	20	25	10	Roof Mounted CGI Sheet	0	216	4"	1	6.04
4	35.346372B, 74.858116E	Astore	Forest Department Office Astore	15	19	5	Roof Mounted CGI Sheet	0	132	4"	1	3.17
5	35.346415N, 74.858401E	Astore	AGPR (District Accounts Officer) Eidgah Astore	21	27	7	Ground Mounted & Roof Mounted CGI Sheet	15 & 0	230	6" & 4"	1	4.50
6	35.345575N, 74.857556E	Astore	SP Office Astore	25	32	7	Ground Mounted & Roof Mounted CGI Sheet	15 & 0	225	6" & 4"	1	4.25
7	35.345207N, 74.856914E	Astore	Deputy Commissioner Office Astore	50	63	15	Ground Mounted	15	210	6"	0	-

¹ PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
8	35.347062N, 74.854934E	Astore	NADRA Office Astore	27	34	10	Roof Mounted	10	160	6"	0	-
9	35.355786N, 74.861494E	Astore	AC Office Astore Headquarters	30	38	12	Parking Shed	5	180	10'	0	-
10	35.343009N, 74.855636E	Astore	PPHI Office Astore	14	18	6	Parking Shed	5	182	10'	1	3.69
11	35.289880N, 74.846898E	Astore	W&P Office Gorikot Astore	20	25	13	Roof Mounted CGI Sheet	0	198	4"	0	-
12	35.287682N, 74.847366E	Astore	Session Court Office & Residence	13	16	7	Ground Mounted	15	187	6"	1	4.10
13	35.351032N, 74.858714E	Astore	Medical Hostel Astore	50	63	40	Ground Mounted	15	220	6"	0	-
14	35.346382N, 74.857295E	Astore	DHQ Hospital Astore	230	288	140	Roof Mounted & Roof Mounted CGI Sheet	10 & 0	214	6" & 4"	1	94.20
15	35.289183N, 74.846791E	Astore	DHO Office Gorikot Astore	12	15	5	Roof Mounted CGI Sheet	0	135	4"	1	3.12
16	35.349750N, 74.856771E	Astore	DD Livestock Office Astore	17	22	5	Roof Mounted CGI Sheet	0	170	4"	1	3.17
17	35.277680N, 74.840038E	Astore	DD LG & RD Residence Gorikot Astore	20	25	20	Roof Mounted CGI Sheet	0	208	4"	1	13.94
18	35.355539N, 74.860933E	Astore	City Police Station/Lines HQ Astore	25	32	7	Roof Mounted	0	195	4"	1	4.40

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
							CGI Sheet					
19	35.356125N, 74.859503E	Astore	AEE E&M/Billing Office HQ Astore	20	25	6	Ground Mounted & Roof Mounted CGI Sheet	15 & 0	135	6" & 4"	1	3.69
20	35.356847N, 74.860849E	Astore	Tehsil Office Astore	15	19	4	Roof Mounted CGI Sheet	0	186	4"	1	2.06
21	35.355671N, 74.859284	Astore	GB PWD & B&R Office Astore	15	19	9	Ground Mounted	15	168	6"	1	4.93
22	35.289526N, 74.846921E	Astore	LG & RD Office Gorikot Astore	16	20	6	Roof Mounted CGI Sheet	0	204	4"	1	3.84
23	35.289897N, 74.847081E	Astore	CSO Offie Gorikot Astore	9	12	4	Roof Mounted CGI Sheet	0	205	4"	1	2.36
24	35.286031N, 74.845747E	Astore	Civil Court Office/Residence Gorikot Astore	19	25	13	Ground Mounted & Roof Mounted CGI Sheet	15 & 0	213	6" & 4"	1	8.69
25	35.289354N, 74.846871E	Astore	DD Agriculture office Gorikot Astore	13	17	6	Roof Mounted CGI Sheet	0	204	4"	1	3.84
26	35.652555N, 74.626433E	Astore	Pakistan Meteorological Depa	16	20	5	Ground Mounted	15	187	6"	1	2.82

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
27	35.28165666N, 74.84896344E	Astore	Govt Girls High School Gorikot	22	28	10	Roof Mounted CGI Sheet	0	172	4"	1	6.14
28	35.2104932, 74.7945001	Astore	Rehman Pur Hospital Astore	8	10	5	Roof Mounted CGI Sheet	0	220	4"	0	-
29	35.22849124, 74.77839075	Astore	10 Bed Hospital Chorit, Astore	15	19	10	Ground Mounted	15	209	6"	1	7.14
30	35.23751513, 74.72846658	Astore	RHU Trishang, Astore	8	10	8	Ground Mounted	15	176	6"	0	-
31	35.26628622, 74.84391343	Astore	AC Shounter and Tehsil office, Astore	45	57	15	Ground Mounted	15	178	6"	0	-
32	35.64936359, 74.62737132	Astore	Tehsil Office bunji, Astore	8	10	4	Ground Mounted	15	153	6"	1	2.56
33	35.54461511, 74.70379516	Astore	Police Check Post- Doyia	3	4	1	Roof Mounted CGI Sheet	0	150	4"	1	0.51
34	35.65293989, 74.62715507	Astore	25 Bed Hospital Bunji, Astore	90	113	70	Roof Mounted CGI Sheet	0	176	4"	0	-
35	35.64794005, 74.63874154	Astore	Govt Girls High Bunji Astore	35	44	18	Roof Mounted CGI Sheet	0	191	4"	1	11.61
36	35.64963467, 74.62710511	Astore	Rest House Bunj	11	14	6	Roof Mounted CGI Sheet	0	201	4"	1	3.89
37	35.29281219, 74.84954573	Astore	Jail Building	45	57	30	Ground Mounted	15	198	6"	0	-

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ¹	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
38	35.29440184, 74.85219944	Astore	50 Bed Hospital Gorikot	97	122	95	Ground Mounted	15	162	6"	0	-
39	35.44942863, 74.79466707	Astore	BHU Harcho Hospital	30	38	20	Ground Mounted	15	157	6"	1	13.74
40	35.47404519, 74.77535114	Astore	BHU Dashkin	51	64	30	Ground Mounted	15	148	6"	1	20.98
41	35.19333367, 74.94558491	Astore	Rest House Gudai	14	18	8	Ground Mounted	15	148	6"	1	5.41

RS-02: District Chillas 47 Rooftop Building Minimum Technical Requirements

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
1	35.41137821, 74.1024382	Chillas	City Park Chillas	12	15	15	Ground Mounted	15	194	6"	0	-
2	35.40979359, 74.1015856	Chillas	SE C&W Circle Office	43	52	10	Roof Mounted	10	199	6"	1	5.54
3	35.41554988, 74.09879845	Chillas	DD Water Management Office	27	33	10	Roof Elevated	5	198	6'	0	-
4	35.418816313, 74.0859673	Chillas	Director Health Office	21	26	9	Ground Mounted	15	206	6"	1	5.74
5	35.41826802, 74.09361172	Chillas	Social Welfare Office	20	24	5	Roof Elevated	5	196	6'	1	2.03
6	35.41794506, 74.08656154	Chillas	BSIP Office	9	11	3	Roof Mounted	10	194	6"	1	1.57
7	35.41205506, 74.10048489	Chillas	1122 Rescue (Rented Building)	46	56	50	Roof Mounted	10	180	6"	0	-
8	35.42054838, 74.07974504	Chillas	1122 Rescue (Under Construction Building)	55	66	48	Roof Elevated	5	209	6'	0	-
9	35.4193511, 74.09379344	Chillas	AD Disaster Office	22	27	6	Roof Mounted & Roof Elevated	10 & 5	198	6" & 6'	0	-
10	35.41332321, 74.10397176	Chillas	XEN CED Office	31	38	8	Parking Shed	5	199	10'	1	3.83
11	35.41051336, 74.1025351	Chillas	IMU Office Diamer	32	39	9	Parking Shed	5	208	10'	1	5.57
12	35.63762062, 73.4553821	Chillas	AC Office Tangir	8	10	3	Roof Mounted CGI Sheet	0	201	4"	1	1.57

² PV Module mounting structure shall have at least 85 microns of zinc coating for rooftop and ground mounted whereas 120 micros for parking sheds.

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
13	35.6614941, 73.61651883	Chillas	AC Office Darrel	44	53	11	Roof Elevated	5	225	6'	0	-
14	35.6610630, 73.6183130	Chillas	NADRA Office Darrel	18	22	5	Roof Mounted	10	193	6"	0	-
15	35.40997996, 74.10322007	Chillas	Chief Court Registry Office	17	21	6	Roof Mounted	10	184	6"	1	3.43
16	35.432233, 74.08808	Chillas	KKH Police Station	14	17	30	Parking Shed	5	203	10'	0	-
17	35.42583179, 74.10005841	Chillas	Girls Primary School Shaheen Kote	6	8	4	Roof Mounted	10	186	6"	1	2.51
18	35.41335819, 74.10435162	Chillas	Chief Engineer W&P Office	27	33	10	Roof Mounted	10	207	6"	1	6.57
19	35.40658163, 74.14716337	Chillas	0 Point Choki	20	24	30	Roof Elevated	5	206	6'	0	-
20	35.3062566, 74.12970487	Chillas	Middle School Jall Thack Niat	12	15	8	Ground Mounted	15	150	6"	1	3.89
21	35.41303657, 74.10389833	Chillas	XEN W&P Office	20	24	5	Roof Mounted	10	167	6"	1	2.43
22	35.41751499, 74.08728506	Chillas	RHQ Laboratory Block	79	95	70	Roof Mounted	10	205	6"	1	47.71
23	35.41839245, 74.08812402	Chillas	RHQ Hospital(OPD, Male and Female Ward, Admin Block)	500	600	500	Roof Mounted & Roof Elevated	10 & 5	194	6" & 6'	0	-
24	35.6378743, 73.45325377	Chillas	THQ 30 Bed Hospital Tangir	95	114	100	Roof Mounted & Parking Shed & Roof Mounted CGI Sheet	10 & 5 & 0	195 & 192	6" & 10' & 4"	0	-

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
25	35.66176841, 73.61608665	Chillas	THQ 30 Bed Hospital Darel	100	120	100	Parking Shed & Roof Mounted CGI Sheet	5 & 0	145 & 167	10' & 4"	0	-
26	35.48202498, 74.51607171	Chillas	BHU Darrang	60	72	80	Roof Mounted & Ground Mounted	10 & 5	207 & 216	6" & 6"	0	-
27	35.4121960, 74.10398182	Chillas	Girls High School Chillas	16	20	18	Roof Mounted	10	211 & 125	6"	1	7.66
28	35.41338496, 74.10271984	Chillas	Boys Model High School	30	36	33	Parking Shed	5	207	10'	1	18.71
29	35.41185394, 74.10241809	Chillas	Boys High School Satellite Town	18	22	14	Roof Elevated	5	208	6'	1	6.17
30	35.4276199, 74.09758508	Chillas	Boys High School Shaheen Kote	18	22	12	Parking Shed	5	206	10'	0	-
31	35.41768167, 74.10379171	Chillas	Boys High School Takia Chillas	15	18	10	Parking Shed	5	204	10'	0	-
32	35.52995956, 74.5074082	Chillas	Boys High School Gorabad	8	10	8	Roof Mounted CGI Sheet	0	216	4"	0	-
33	35.419186662, 74.32829496	Chillas	Boys High School Gias	11	14	9	Ground Mounted	15	149	6"	1	5.86
34	35.41105659, 74.38190494	Chillas	Boys High School Goner Farm	20	24	11	Roof Mounted	10	180	6"	0	-
35	35.66357910, 73.616669	Chillas	Boys High Secondary School Gumari Darrel	39	47	21	Roof Mounted & Ground Mounted	10 & 15	167	6" & 6"	1	12.89

Sr. No	Coordinates	City	Building Name	PV Capacity	Inverter Rating	BESS Capacity	Structure Details ²	Tilt Angle (Degree)	Azimuth from North (Degree)	Minimum Clearance	Re-Wiring	Serviceable Load other than Fans and Lights (kW)
				(kW _{DC})	(kVA)	(kWh)						
36	35.76428009, 73.67663484	Chillas	Boys High School Gabbar	17	21	10	Parking Shed	5	223	10'	1	7.03
37	35.63724677, 73.45397495	Chillas	Boys High School Juglot Tangir	11	14	5	Roof Mounted CGI Sheet	0	199	4"	1	1.57
38	35.66605509, 73.43622845	Chillas	Boys High School Gali Bala Tangir	7	9	3	Ground Mounted	15	118	6"	1	0.60
39	35.4127483, 74.10302829	Chillas	Special Education School	12	15	16	Roof Mounted	10	180	6"	1	11.03
40	35.463842620, 74.4817553	Chillas	Cadet College (Admin/Academic Block)	112	134	59	Roof Mounted	10	207	6"	1	31.43
41	35.42083335, 74.08726662	Chillas	Public School & College Chillas (Girls Block)	14	17	7	Roof Mounted	10	138	6"	1	1.74
42	35.41957843, 74.08885349	Chillas	Public School & College Chillas (Boys Block)	13	16	8	Roof Mounted	10	185	6"	1	2.51
43	35.419238736, 74.0888721	Chillas	Public School & College Chillas (Admin Block)	8	10	2	Roof Mounted	10	196	6"	1	0.00
44	35.41268654, 74.10425339	Chillas	Girls Inter College Chillas	22	27	17	Roof Mounted	10	196	6"	0	-
45	35.4135612, 74.10405524	Chillas	SE W&P Office	21	26	7	Roof Mounted	10	206	6"	1	4.94
46	35.4205808, 74.0921412	Chillas	KIU Main Campus	301	361	112	Ground Mounted	15	209	6"	1	44.29
47	35.41985493, 74.09473155	Chillas	DIG Office	47	56	30	Roof Elevated	5	200	6'	0	-

SECTION – II: GENERAL PROJECT REQUIREMENTS

1. INTRODUCTION

This Part of the Employer’s Requirements sets out the general obligations of the Contractor in relation to the execution of the Works. It shall be read in conjunction with the Contract, Technical Specifications, Drawings, and other parts of the Employer’s Requirements.

The Contractor shall be responsible for the complete design, engineering, procurement, construction, installation, testing, commissioning, training, operation and maintenance (O&M), and handover of the Works. The requirements in this Part establish the minimum standards to be achieved. In the event of any conflict, the more stringent or technically superior requirement shall prevail.

2. SITE CONDITIONS

The Project sites are located in various districts of Gilgit-Baltistan, characterized by mountainous terrain, high seismicity, and diverse climatic conditions. The Contractor shall take full account of these conditions in planning, design, procurement, construction, testing, commissioning, and maintenance of the Works.

Key site considerations include:

- **Topography and Access:** Sites are generally in hilly and mountainous areas with limited access roads, steep gradients, and restricted working space. The Contractor shall arrange safe and efficient transport and erection of equipment under these conditions.
- **Seismic Conditions:** Gilgit-Baltistan is classified as a high seismic risk zone. All structures and foundations shall be designed to relevant international codes (e.g., IBC/Eurocode/UBC) and Pakistani standards for seismic resilience.
- **Temperature:** The region experiences wide variations, with summer highs up to +45 °C and winter lows down to –30 °C, depending on site altitude and location. Equipment shall be designed for continuous operation within these extremes.
- **Wind Conditions:** Maximum wind speeds can reach 100 mph. PV structures shall be designed to withstand these loads, including gusts.
- **Rainfall and Snowfall:** Annual precipitation is moderate but may include heavy rain and snow, particularly in winter. Roof loading shall be designed accordingly.
- **Altitude:** Several sites exceed 2,800 m above sea level. Equipment shall be rated and de-rated as necessary for reliable high-altitude performance.
- **Corrosion:** Site specific conditions shall be taken into account.

The Contractor shall confirm and supplement this information by carrying out detailed site-specific investigations at its own cost. No claim for additional payment or extension of time shall be made due to difficulties arising from these conditions.

3. DRAWINGS AND DESIGN RESPONSIBILITIES

3.1 Bid Drawings

- The drawings provided in Volume II, Annexure 1 are issued as Bid Drawings for reference only. These reflect only the Employer’s preliminary design concept based on available information.
- The Contractor shall conduct all required site surveys, and meteorological assessments (including rain & hailstorm risks) and shall develop detailed designs accordingly to achieve the required capacity.
- Bid Drawings shall not be used for construction. The Contractor bears full responsibility for preparing and submitting construction drawings based on proposed equipment and verified site conditions.
- Final as-built drawings shall be submitted at completion as part of the Project Handover documentation.

3.2 Contractor’s Design

- The Contractor shall prepare in accordance with Sub-Clause 5.2 of CoC and submit detailed design reports, drawings, calculations, and method statements in accordance with the Contract.
- Submissions shall include, at minimum: design assumptions, methodologies, calculations, test reports, geotechnical data, construction method statements, quality assurance plans, and equipment manufacturer drawings.
- Permanent Works shall not commence until relevant design submissions have been reviewed by the Employer’s Representative or his Delegated Assistant under the provisions of the Contract.
- All drawings, reports, and data prepared by the Contractor shall become the property of the Employer.

Wherever applicable, the solution shall incorporate mechanical structure design considerations, taking into account factors such as wind, snow, thermal expansion, flooding, seismic activity, and corrosion.

4. QUALITY MANAGEMENT SYSTEM

The Contractor shall implement a Quality Management System in accordance with Sub-Clause 4.9 of the Conditions of Contract.

4.1 Quality Assurance and Control

- The Contractor shall prepare a comprehensive Quality Assurance and Quality Control (QA/QC) Plan based on ISO 9001 principles.
- The Plan shall include: quality policy, organization, responsibilities, inspection and testing procedures, NCR/DR management, internal audits, and document control.

- The outline QA/QC Plan shall be submitted within 15 days of the Commencement Date. The detailed Plan shall follow within another 15 days and shall be updated throughout the Project.
- A dedicated QA Manager shall be appointed on Site with authority and responsibility for implementing the Plan.

5. USE OF SITE

5.1 Boundary of the Site

The Project sites are indicated in the Part-I (Table-01) of the Employer’s Requirements, including coordinates. The Contractor shall arrange, at his own cost, any additional land required for temporary facilities such as camps, workshops, offices, and storage areas. Quarries, borrow pits, disposal areas, and any other external areas used by the Contractor shall not be considered part of the Site.

5.2 Setting Out of Site Installations

All setting out shall be carried out strictly in accordance with approved drawings. Any discrepancy between drawings and actual site conditions (topography, geology, etc.) shall be reported immediately to the Employer’s Representative or his Delegated Assistant, and alternative proposals submitted for approval.

5.3 Storage Areas

The Contractor shall establish and maintain temporary storage areas at the Site and any off-site location. These shall include drainage, sumps, oil traps, separators, and containment for chemicals and oils. Secure, ventilated warehouses for PV modules, inverters, and auxiliaries shall be constructed or rented by the Contractor, in consultation with the Employer’s Representative or his Delegated Assistant.

6. TEMPORARY WORKS AND FACILITIES

The Contractor shall arrange temporary land and design, construct, operate, and maintain all temporary works and facilities necessary for execution of the Works at its own cost.

6.1 Camps and Offices

- The Contractor shall establish its own camps, offices, workshops, and storage facilities to support Project execution.
- Temporary camps shall include adequate boundary walls, fencing, lighting, access control, and utilities.
- Accommodation, catering, and welfare facilities for Contractor’s staff shall comply with health and safety standards.

6.2 Removal and Restoration

- Upon completion, all temporary facilities not handed over to the Employer shall be dismantled and removed by the Contractor.
- The Contractor shall restore the affected areas to an acceptable condition to the Employer’s satisfaction.

7. CONTRACTOR’S RESPONSIBILITIES

7.1 General

- The Contractor may propose changes to layout, methodology, or design, subject to Employer’s approval, provided that the Contract requirements, Time for Completion, and Contract Price remain unaffected.
- All designs shall consider site-specific risks such as seismicity and hailstorms.

7.2 Procurement

- The Contractor shall procure all labor, materials, equipment, and services in his own name, warranting that all supplied items are new, reliable, and consistent with best international practice.

7.3 Standardization of Equipment

- SI units shall be used for all documentation and instrumentation.
- Parts and components shall be standardized across the buildings to maximize interchangeability.
- All indicators and labels shall be in English and SI units.

7.4 Testing and Material Delivery Verification Program

- The Contractor shall provide competent staff and facilities for material and PV testing.
- Factory acceptance tests (FAT), material delivery verifications, and other standard tests shall be performed in accordance with specifications, with certificates submitted to the Employer’s Representative or his Delegated Assistant.
- Employer’s participation in tests shall not relieve Contractor of responsibility.

7.5 Health, Safety, and Security

- The Contractor shall comply with national HSE laws, prepare a full HSE plan, and conduct regular training under Sub-Clause 4.8 of the Conditions of the Contract.
- PPE (helmets, safety shoes, insulated gloves etc.) shall be supplied for all Contractor staff.
- First Aid: Fully equipped first-aid Kits shall be provided at each under construction site.
- Emergency: Proof of arrangements with local hospitals for evacuation and treatment shall be provided.

7.6 Noise

- Noise measurement and limits shall comply with ISO and IEC standards applicable to PV Solar Systems.

7.7 Utilities and Site Services

- The Contractor shall protect all existing utilities and, if damaged, shall restore them at his own cost.

- Relocation of utilities shall be coordinated with the concerned authorities, without interruption of service.

8. GENERAL CONSTRUCTION REQUIREMENTS

8.1 General

- The Contractor shall be fully responsible for the specification, quality, and performance of all materials incorporated in the Works.
- Local materials may be used where they meet the Employer’s Requirements and approved standards.

8.2 Standards and Service Life

- All materials and workmanship shall comply with relevant International (IEC, ISO, IEEE, ASTM) or National Standards. Where alternatives are proposed, the Contractor shall demonstrate equivalence to the satisfaction of the Employer’s Representative or his Delegated Assistant.
- Minimum service life requirements:
 - 25 years: PV modules; 10 years: Inverters; 10 years: BESS (excluding replaceable components).

8.3 Commissioning Plan Development

The development of a comprehensive commissioning plan is fundamental to the successful execution of all testing and acceptance activities. This plan serves as the roadmap for all commissioning activities and must be developed with meticulous attention to detail, incorporating lessons learned from similar projects and site-specific considerations that may impact testing procedures or safety requirements.

The commissioning plan must demonstrate a thorough understanding of the system design, potential risks, and mitigation strategies. It should provide clear guidance for all testing personnel and establish protocols for handling unexpected situations or test failures. The plan must be submitted well in advance to allow for thorough review and any necessary modifications before commencement of testing activities.

Commissioning Plan Requirements:

- Submit detailed plan minimum 15 days before commissioning commencement
- Include comprehensive methodology and detailed sequence of all tests
- Provide thorough risk analysis with identified mitigation strategies
- Develop contingency plans for equipment failures or adverse conditions
- Specify all instrumentation requirements with valid calibration certificates
- Define clear acceptance criteria for each individual test
- Include weather contingency plans for outdoor testing activities

8.4 Tolerances

- Construction tolerances shall conform to international practice for solar PV and associated works, subject to Employer’s Representative’s or his Delegated Assistant’s approval.

8.5 Protection of Works

- All completed Works shall be protected against damage from construction activities and weather.
- Safety signage, fire protection, and hazard prevention measures shall be implemented throughout.

9. HEALTH, SAFETY, AND ENVIRONMENT

9.1 Occupational Health and Safety

- Contractor shall maintain a certified OHS management system aligned with national laws and ISO 45001.
- Work permits shall be issued for all hazardous activities.
- Monthly safety meetings shall be conducted, and incident investigations reported.

9.2 Emergency and Medical Services

- Fully equipped first aid stations shall be provided at each site.
- Contractor shall maintain agreements with approved hospitals for emergency treatment.

9.3 PPE

- PPE (helmets, harnesses, safety shoes, raincoats, jackets, etc.) shall be supplied to all workers, Consultants, and Employer staff, and replaced at least every four (4) months.

9.4 Regulatory Requirements and Applicable Standards

- The GB Environmental Protection Act, 2014 should be followed which was enacted in 2014 by repealing the Pakistan Environmental Protection Act.
- Other project related national environmental laws, regulations, policies and guidelines are as follows:
 - National Conservation Strategy (NCS), 1992.
 - National Environment Policy, 2005.
 - Pakistan Labor Policy, 2010.
 - Pak-EPA (Review of IEE and EIA Regulations, 2000).
 - Pakistan EIA Procedures.
 - National Environmental Quality Standards (NEQS).
 - Land Acquisition Act (LAA), 1894.
 - Cutting of Trees (Prohibition) Act, 1975.
 - Antiquities Act, 1975.
 - The Forest Act 1927, and the Forest (Amended Act) 2010.
 - The Explosion Act 1884.
 - GB Wildlife Preservation Act 1975.

- GB Fisheries Act 1975.
- Pakistan Penal Code, 1860.
- Pakistan Clean Air Program (PCAP); and
- Guidelines for Public Consultation.

10. CONTRACTOR’S DOCUMENTS

10.1 General

- Notwithstanding the time periods listed in the construction schedule by the Contractor shall submit all documents as early as reasonably practical to mitigate any possibility of delays arising from review by the Employer’s Representative or his Delegated Assistant or by third parties.
- It is intended that Employer’s Representative or his Delegated Assistant shall have a review and comment opportunity for each construction document, for each submittal or re-submittal.
- Prior to the Commencement Date, the Contractor shall prepare and submit a “Design Management Plan” outlining the procedures to be used for control of design activities, schedule for design, coordination of the main Project design with the activities of subcontractors, design quality control procedures, authorizations for review and approval of design, description of design documents such as design criteria, and design reports, and other information necessary to demonstrate that the Contractor can effectively manage the design of the Works.
- All specifications, drawings, reports, design calculations and other essential data are subject to the Employer’s Representative’s or his Delegated Assistant’s review. Comments shall be given in writing by the Employer’s Representative or his Delegated Assistant within twenty-one (21) days after receiving such documents, unless otherwise stipulated. Any work carried out prior to such approval shall be at the Contractor’s own risk and expense. The number of drawings and documents to be submitted for information or approval shall be limited to the required minimum for the purposes of the Employer’s Representative or his Delegated Assistant. The exact number and mode of distribution for drawings and documents will be agreed upon between the Contractor and Employer’s Representative or his Delegated Assistant at the work Commencement Date.
- The Contractor shall submit a drawing schedule, which will be subject for the review by the Employer’s Representative or his Delegated Assistant. The drawing schedule shall be consistent with the Contractor’s integrated project schedule. The drawing schedule shall show design phase, structure, drawing number, titles, status, schedule dates and other relevant information. At four (04) week intervals, the Contractor shall submit copies of the revised drawing schedule showing the actual status of the drawings, i.e. preliminary, reviewed by Employer’s Representative or his Delegated Assistant, approved for construction by Contractor, for information only, or as-built, and the date for completion of each phase of the drawings.
- The Contractor shall submit a document control schedule, which will be subject to the review by the Employer’s Representative or his Delegated Assistant. The document control schedule shall be consistent with the Contractor’s integrated project schedule. The document control schedule shall show the number, titles, status, schedule dates and other relevant information. At four-week intervals, the Contractor shall submit copies of the revised document control schedule showing the actual status of the documents, i.e.

preliminary, reviewed by Employer’s Representative or his Delegated Assistant, approved for construction by Contractor, for information only, or as-built, and the date for completion of each phase of documentation.

- The sequence in which documents are submitted shall follow a logical progression such that all information is available to the Employer’s Representative or his Delegated Assistant to facilitate review of each submittal when it is received. The program for detailed design shall allow the required time for review by the Employer’s Representative or his Delegated Assistant.

10.2 Contractor’s Design Documents

- Design Documents means documents of a technical nature provided by the Contractor under the Contract. Design Documents shall include but not be limited to:
 - a. Calculations, analyses and designs.
 - b. Site investigation plans, reports, memoranda
 - c. Construction and manufacturing drawings.
 - d. Type Test Reports
 - e. Any other analysis report and calculations if considered to be necessary by Employer’s Representative or his Delegated Assistant
 - f. Design briefs and design reports.
 - g. Technical specifications and performance curves
 - h. Parts and components list.
- The Contractor shall provide all necessary Design Documents and any other document or information (unless restricted by confidentiality requirements) as may be relevant to the performance, operation and maintenance of the Project and Employer’s operating and maintenance activities and transfer obligations and to satisfy Employer’s requirements.

10.3 Required Documentation

- As-built drawings reflecting actual installation configurations and any field modifications
- Complete component serial number records and warranty certificate compilation
- Operation and maintenance manuals for all major system components
- Safety data sheets (SDS) for all hazardous materials used in the installation
- Commissioning test certificates and calibration records for all testing equipment

10.4 Documents’ Submission and Approval Procedure

- All drawings and documents shall be submitted through the Documents Management System (DMS) for review by the Employer’s representative or his delegated Assistant under Sub-Clause 5.2 of CoC.
- In parallel, the Contractor shall provide four (4) hard copies of each drawing/document to the Employer’s Representative or his Delegated Assistant
- The date of receipt of hard copies by the Employer’s Representative or his Delegated Assistant shall be considered the official date of submission for review.
- The Employer’s Representative shall return comments and approvals through the DMS in accordance with the review period specified under Sub-Clause 5.2 of the CoC.

- In general, electronic copies of design submittals shall be in: -
 - i. MS Word format for all text and reports
 - ii. PDF as well as CAD formats for drawings
 - iii. MS Excel for all calculations
- The Employer’s Representative or his Delegated Assistant will review submittals only for conformance with the design concept of the Project and for compliance with the contract. The contractor shall make any and all corrections required.
- After Employer’s Representative or his Delegated Assistant has performed his review of submittals, he will return one print to the Contractor with one of the following notations:
 - i. Rejected. (R)
 - ii. Revise and resubmit. (RC)
 - iii. Approved Except as Noted.
 - iv. Approved. (A)
- When submittals are returned marked with either (i) or (ii), the Contractor shall make such revisions and/or corrections and resubmit the drawings or other material in the same manner as specified.
- When drawings and submittals are returned with authorization to proceed with the work, Contractor shall provide the number of prints or copies of drawings as is required for field distribution.

10.5 Document Management System (DMS)

- The Contractor shall establish, operate, and maintain a secure, computer-based Document Management System (DMS) for the entire duration of the Contract, including the Defects Notification Period.
- The DMS shall:
 - Track identification, revision, status, and location of all Project Documents at all stages.
 - Provide online access via standard internet browsers without requiring special client software.
 - Allow up to thirty (30) concurrent users worldwide, with password-protected access rights tailored to roles (creation, review, comment, approval, etc.).
 - Support structured workflows for design review, approvals, quality records, correspondence, planning, progress measurement, testing, commissioning, and reporting.
- The DMS shall include all Contractor, Subcontractor, and Vendor documents and correspondence (except financial correspondence, which will be exchanged directly).
- All costs for establishing, licensing, maintaining, and operating the DMS, including user accounts and storage, shall be borne by the Contractor.

10.6 Final Documentation

- At the end of the Contract, including the Defects Notification Period, the Contractor shall provide:

- Electronic sets shall be provided on hard drives or equivalent media, in open and editable formats (MS Word, Excel, AutoCAD, etc.) along with PDF versions for record.
- All as-built drawings, O&M manuals, test reports, and certificates in both hard and soft copy.

11. INSPECTION AND TESTING

11.1 General

This section contains the general requirements for inspection and testing (I&T) of material, parts, equipment and workmanship of the Plant during manufacture, assembling, installation, commissioning and upon completion to demonstrate compliance with the specification, codes and standards to ensure overall reliability of the Plant operation and performance.

The whole of the Works supplied under this Contract shall be subject to visual, dimensional, material, non-destructive, functional, and performance inspection and tests by the Employer’s Representative or his Delegated Assistant during manufacture, construction, installation and commissioning, at the manufacturers’ works and/or on site.

The Contractor shall prove that its material and/or equipment complies with the requirements of the Contract.

Employer’s participation in factory acceptance tests (FATs) or material delivery verification shall not relieve the Contractor of its responsibility to demonstrate compliance

11.2 Calibration and Equipment Standards

The accuracy and reliability of all test results depend fundamentally on the proper calibration and maintenance of testing equipment. All instrumentation used in commissioning activities must meet stringent accuracy requirements and maintain valid calibration certificates traceable to national or international standards. This ensures the integrity of all test data and provides confidence in the commissioning results.

Equipment calibration records must be maintained throughout the commissioning process and made available for review by all stakeholders. Any equipment found to be out of calibration must be immediately removed from service and either re-calibrated or replaced before testing can continue.

Equipment and Calibration Requirements

- All test instruments must have valid calibration certificates within 12 months of use
- Calibration records must be traceable to recognized national or international standards
- Backup equipment must be available for critical measures to prevent delays
- Daily functional checks of equipment before commencement of testing activities
- Secure storage and handling procedures to prevent equipment damage or degradation

11.3 Expenses

All shop and field-testing certifications, reporting, and assuring of engineering quality verification and documentation of the Works in accordance with the technical specifications and the Contractor’s testing programme shall be performed by the Contractor at its expense. If tests

indicate non-compliance with the terms of the Contract, the Contractor shall, at its own expense, make all necessary repairs and perform additional test(s) required to indicate compliance with the terms of the Contract.

11.4 Inspection and Test Program (ITP)

The Contractor shall establish, document and implement a Quality Control Program in accordance with the requirements of the ISO standards.

Implementation of this program shall cover all fabrication, installation, and commissioning activities on and off the Project site.

Inspection and test plans shall be prepared for all major items of equipment, plant and systems defining the Quality Control and inspection activities to be performed to ensure that the design, manufacture, construction, installation, commissioning and completion of the Plant complies with the contract. ITPs shall be submitted defining relevant inspection and test points for all stages of manufacturing, construction, installation, commissioning and completion.

Inspection and Test Plans shall be submitted for the Employer’s Representative or his Delegated Assistant for review in accordance with Sub-Clause 5.2 of CoC. If any operation in ITP requires change, the Contractor shall revise the plan and resubmit for approval as above.

11.5 Factory Acceptance Tests

The Employer’s Personnel (including the Employer’s Representative, Delegated Assistant to the Employer’s Representative or other independent experts), at their discretion, will participate in all or in a selected number of Factory Acceptance Tests (FATs) at manufacturers’ premises. All cost in connection with witnessing the FATs by the Employer’s Personnel shall be borne by the Contractor as per provision of the Contract.

If the Employer’s Personnel do not attend, then the Contractor shall perform the test and submit a certified copy of the results to the Employer’s Representative or his Delegated Assistant.

The Contractor or sub-contractors, as applicable, shall provide labor, materials, water, air, electric power, fuel, shop, apparatus and all necessary equipment for the performance of the said acceptance tests. If the equipment passes the tests, the Employer’s Personnel shall give the Contractor a certificate testifying to this.

All these test documents have to be submitted to the Employer’s Representative or his Delegated Assistant in due time before the tests are performed. Test procedures for FATs shall be submitted not later than 30 days prior to the scheduled tests. The Contractor should notify the Employer’s Representative or his Delegated Assistant well before the FAT dates, giving due consideration to time required by the Employer’s Personnel for their internal approvals as well as the time required by relevant embassies in processing the visa applications.

Factory acceptance tests shall be witnessed by the Employer’s Personnel (including the Employer’s Representative, Assistant to the Employer’s Representative or other independent experts). All costs in connection with witnessing of the factory acceptance tests by the Employer’s Personnel shall be borne by the Contractor. These shall include the costs of air travel from Pakistan to place of inspection/testing and back, visa processing, hotel accommodation/boarding/lodging (as per actual), inland transportation and daily allowance @ US Dollars 200 per day per person for inspection/testing to be conducted outside Pakistan including

two days of travel time and Rs. 10,000 per day per person [besides other costs of travelling and lodging etc. (as above) for inspection/testing to be conducted inside Pakistan for each visit of every person to witness these tests. A minimum of 06 trips and 50-man days are expected for FAT outside Pakistan.

The Factory Acceptance Tests (FATs), of equipment not limited to, shall cover PV modules, inverters, Battery Energy Storage Systems (BESS), AC and DC cables, LV panels, distribution boxes, earthing and lightning protection equipment and module mounting structures.

Sampling for FATs shall be performed in line with ISO 2859 series.

As a minimum the following tests shall be made part of FATs:

1. PV Modules

- Visual Inspection
- Performance at STC
- Performance at low Irradiance
- Thermal Cycling Test
- Humidity Freeze Test
- Static Mechanical Load Test
- Hail test

2. Hybrid Inverters

- Visual Inspection
- Maximum Charge Power
- Maximum Discharge Power
- Voltage test (Dielectric Strength Test)
- Back-feed Test under Normal Conditions
- Back-feed Test under Single Fault Condition

3. Battery Energy Storage System & Battery Management System

- Visual Inspection
- Drop Test
- Control of Voltage
- Control of Current
- Temperature Control

4. PV Module Mounting Structure

- Sections and Plates
 - Visual examination
 - Verification of dimensions and weights
 - Tensile tests
 - Bend tests
 - Galvanizing tests
- Nuts and Bolts
 - Verification of dimensions
 - Visual inspection
 - Proof load tests
 - Ultimate tensile strength tests
 - Galvanizing tests

5. Cables

- Thickness of Insulation

- DC Resistance Test
- Insulation Resistance
- High Voltage Test A.C
- Diameter of Cables
- Standard Formation

6. LV Panels

- Visual Inspections
- Functional Test
- Earthing and Grounding Continuity Test
- Insulation Resistance Test
- Polarity Test

Inspection sheets with subject, attendance, result and comments shall be signed by all parties and distributed immediately after the tests.

11.6 Material Delivery Verification

The equipment to be supplied under the Contract shall be verified at site prior to initiation of construction / installation activities.

Material delivery verification procedures for each site shall be submitted not later than one week prior to the scheduled verification, including all necessary drawings and documents, excerpts of applicable standards, etc. for Employer’s Representative’s or his Delegated Assistant’s approval.

11.7 Tests on Completion

All Tests on Completion required to be carried out under Clause 9 shall conform to international standards, OEM guidelines, and local grid requirements, with full documentation to support QA/QC, warranty claims, and future maintenance.

Commissioning Tests

Commissioning tests shall include visual inspection for mechanical integrity, installation quality, labeling, and cable terminations; insulation resistance testing of all AC and DC cables; and verification of earthing and bonding systems. Functional checks shall cover inverters, energy storage systems, monitoring systems, protection devices, communication networks, and alarms.

Commissioning tests shall validate PV array IV curves, inverter performance, anti-islanding protection, and grid compliance. The storage system shall be tested through charge/discharge cycles to verify SOC and SOH, while genset synchronization shall be evaluated under load for stable integration. Functional tests of lighting, emergency systems, and auxiliary circuits shall ensure full operational readiness.

Commissioning Tests (IEC Standards Compliant) shall include:

- Polarity Test
- String open circuit voltage test
- String circuit current test (short circuit or operational)
- Functional tests
- Insulation resistance of the DC circuits
- String I-V Curve Test
- IR Inspection

- Continuity of earthing and/or equipotential bonding conductors, where fitted

Commissioning Tests (IEC Standards Compliant) for BESS shall include:

1. Cold checks (before operation): insulation, voltage, earthing, safety protection against touch; general functionality, display and interface
2. Operational checks (under operation):
 - Check monitoring parameters: SOC, SOH, cell voltages, cell imbalances, current, and temperature, as well as general functionality and plausibility of monitoring system
 - Check remote monitoring and control as well as integration with SCADA or EMS (whichever the case).
 - Verification of currents and voltages Behavior under operational conditions
 - No overheating of components under operation
 - Functionality of cooling system (if applicable)

Three days (03) days remote monitoring data under operation shall be analyzed by Employer’s Representative or his Delegated Assistant in order to determine the health of the Battery Energy Storage System, and the system shall be accepted if the data conforms with the manufacturer's data sheet and approved system design. In case of any documented deviation from the given specifications (after considering measurement uncertainty), further tests such as Round-Trip Efficiency (RTE), Charge / Discharge and Capacity test shall be carried out at the cost of the Contractor prior to site Taking Over.

11.8 Tests After Completion of O&M Period

Upon completion of O&M period, the Contractor shall perform the tests listed under commissioning tests. In case the PV system corrected output is found to be lower or degraded by more than 3% beyond the commissioning tests results, the Contractor shall, at its own cost, make up for the shortfall in capacity

For the BESS, degradation shall not exceed the limits specified in the manufacturer’s data sheet and the approved system design.

These tests represent the ultimate validation of system performance and reliability after an extended operational period and granted only after the system has demonstrated sustained performance meeting all specifications throughout the three years of operational period

12. ADDITIONAL DOCUMENTATION AND REPORTING REQUIREMENTS

12.1 Erection and Testing Manuals

Detailed erection and testing procedures (method statements), including instructions on handling, installation, and storage of all equipment, shall be submitted at least 28 days before the start of erection.

12.2 Operation and Maintenance Manuals

At least 28 days prior to scheduled commissioning, the Contractor shall provide detailed O&M manuals with drawings and schematics covering all civil, mechanical, and electrical works and equipment. Manuals shall include specifications, data sheets, vendor data, and shop drawings.

12.3 As-Built Drawings

The Contractor shall provide six (6) sets of detailed as-built drawings for the entire Project, covering PV, civil, mechanical, and electrical general arrangements. Drawings shall be based on approved shop drawings and verified field information. Drawings shall be delivered in hard copy and electronic formats, including AutoCAD.

12.4 Commissioning and Testing Reports

Within 28 days after the expiry of the Time for Completion, the Contractor shall issue a Commissioning Report to the Employer’s Representative or his Delegated Assistant, including copies of all test records.

12.5 Insurance and Construction Consents

At least 15 days prior to commencement of construction, the Contractor shall submit evidence that all required insurances under Clause 18 of CoC, permits, and consents have been obtained.

12.6 Photographic Records

The Contractor shall take digital and drone-based photographs of ongoing works. These records shall be included in MPRs and provided on a USB or other approved digital medium approved by the Employer’s Representative or his delegated Assistant.

12.7 Drawings for Construction

The Contractor shall provide six (6) printed copies and one (1) electronic copy of all “Issued for Construction” drawings. All such documents shall also be uploaded to the DMS in accordance with Sub-Clause 10.4.

12.8 Programme of the Works

Prior to the Commencement Date, the Contractor shall submit a Programme of the Works under Sub-Clause 8.3 covering all the activities of the Works but shall not be limited to engineering, procurement, transport, construction, testing and commissioning activities, etc.,. The schedule shall be prepared using Primavera (or another software acceptable to the Employer’s Representative or his Delegated Assistant) based on Critical Path Method (CPM). Monthly Progress Reports shall include such Programme or revised Programme depicting the actual progress of the Works against the Initial accepted Programme of the Works. The Contractor shall not make any amendment/deviation in the Initial Programme of the Works accepted under Sub-Clause 8.3 without the consent of the Employer’s Representative or his Delegated Assistant. The Employer’s Representative or his Delegated Assistant may require the Contractor to revise the initial programme, if found impractical or non-compliant.

13. PROJECT MEETINGS

Monthly project management meetings shall be held at site to review the MPRs. The Contractor shall present his report at each meeting. Weekly site management meetings shall also be held with the Employer’s Representative or his Delegated Assistant to review day-to-day progress and site procedures.

13.1 Monthly Progress Reports (MPRs)

The Contractor shall submit Monthly Progress Reports in a format acceptable to the Employer’s Representative or his Delegated Assistant, including financial status, updated drawings, and photographic evidence. Reports shall include progress photographs, drone aerial images, and stage-sequence progress videos.

13.2 Fortnightly Progress Meetings

Fortnightly meetings shall be held with the Employer’s Representative or his Delegated Assistant to review progress and resolve bottlenecks. The Contractor shall submit the next fortnightly work plan for review under Sub-Clause 5.2 of CoC, alongside reporting on the previous fortnight’s progress

SECTION – III: DC SYSTEMS

Technical Specifications under this section focus on Solar PV Modules to Inverters, DC cables and BESS. However, wherever applicable the same shall be applied for other parts of the Solar systems as well.

1. SOLAR PV MODULES

The PV modules shall be mono crystalline N type, half-cut, Topcon / HPBC or Mono PERC with a rated power of 600 Wp or higher and positive tolerance of 0 to +3%. They must maintain $\geq 95\%$ efficiency at 200 W/m^2 and have a module efficiency of at least 22%. Every PV Module shall be Hail resistant to at least of 50mm Dia or higher for the given tilt with power output equivalent or greater than its nominal power at STC conditions. The module Temperature Coefficient at Pmax shall be $-0.37\% / ^\circ\text{C}$ or lesser.

Modules will withstand impact from hail of $\geq 50 \text{ mm}$ Dia for the given tilt, mechanical loading of $\geq 5400 \text{ Pa}$ front / $\geq 2400 \text{ Pa}$ rear and $\geq 4 \text{ mm}^2$ UV-resistant cables.

1.1 Manufacturer and Material Requirements

Tier 1 PV module manufacturers, as defined by Bloomberg New Energy Finance (BNEF) for Q2 or Q3 of year 2025, shall be acceptable. Each module shall have IP 68 rated Junction Boxes which shall be dust and vermin proof having copper bus bar terminals, EPDM rubber gasket, EVA encapsulant, three reverse blocking diodes and IEC 62790 compliant.

1.2 Certifications:

The PV Module must be Type Tested based on IEC standard 61215 (Terrestrial PV Modules- Design qualification and type approval) and IEC 61730 (Photovoltaic module safety qualification) based insulation of Safety Class II. Modules must be resistant to Potential Induced Degradation (PID). The module shall be S.R.O 604 compliant issued by Government of Pakistan.

1.3 Minimum Specifications Table

No.	Parameter	Specification
1	Rated Power	$\geq 600 \text{ Wp}$
2	Tolerance	$0 \sim +3\%$
3	Module Efficiency	$\geq 22\%$
4	Operating Temperature	-40°C to $+85^\circ\text{C}$
5	System Voltage	1500 V DC
6	Fire Rating	IEC Class C, UL Type 29
7	Warranty	12-year product, 25 years performance
8	Certifications	IEC 61215, IEC 61730, IEC 62941
9	Protection Class	Class II
10	Encapsulant	Ethylene Vinyl Acetate (EVA) or better

1.4 Warranty and Performance

The PV modules shall include a 25-year performance warranty, guaranteeing at least 85% of initial power output for year 25, with a maximum 0.5% annual degradation after the first year. A

minimum 12-year product warranty covering materials and workmanship is also required. Light induced degradation (LID) should not be more than 2%.

2. HYBRID INVERTERS

Hybrid inverters for RTS applications shall be designed for single-phase or three-phase operation, supporting both grid-tied and off-grid modes with seamless transition. These inverters must be compatible with lithium-ion and lead-acid battery technologies, enabling efficient energy storage and backup power functionality. The hybrid inverter must support a wide DC input voltage range to accommodate different PV array configurations and should include a built-in MPPT charger for optimal solar energy utilization.

The inverter must provide intelligent energy management, allowing users to prioritize solar, battery, or grid power according to programmable settings. Remote monitoring and control via Wi-Fi or Ethernet shall be standard, with mobile app support for real-time performance tracking. The inverter must include comprehensive protection features such as anti-islanding, overvoltage, overcurrent, short-circuit, and ground fault protection, as well as battery management functions including overcharge and deep discharge protection.

All hybrid inverters must be compatible with energy management systems and support remote monitoring. Full compliance documentation, test reports, and pre-shipment inspection certificates shall be provided at delivery.

2.1 Manufacturer and Material Requirements

Hybrid inverters must be supplied by reputable manufacturers with proven deployment in residential and commercial installations, certified and compliant with international standards.

2.2 Certifications:

The hybrid inverter must be certified to the following standards:

- IEC 62109-1/2: Safety of power converters
- IEC 61683: Efficiency of power converters
- IEC 61000-6-2/4: EMC immunity and emission
- UL 1741: Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources or equivalent

2.3 Minimum Specifications Table

Parameter	Requirement
Rated Power Output (Min.)	As Specified for each Site
Maximum DC Input Voltage	Compliant with PV Array
Output Voltage & Frequency	Compatible with Point of Interconnection
Power Export Limit Function	Inverter Should have Power Export Limiting Feature
MPPT Voltage Range	Compliant with PV Array
Number of MPPTs	Multiple except for 6 kW or less Inverter
Battery Voltage	24 V or higher (model dependent)
Battery Compatibility	Lithium-ion (LPF), Lead-acid

Parameter	Requirement
Maximum Efficiency	≥96.5%
European Weighted Efficiency	≥96%
Grid Modes	Grid-tied, Off-grid, Backup, Parallel
Communication Mode	Wi-Fi / 4G, Ethernet, RS485
Communication Protocols	Modbus-RTU, Modbus-TCP
Protection Features	SPD, AFCI, GFDI, Anti-islanding, BMS
Ingress Protection	IP65
Operating Temperature Range	-30°C to +60°C
Warranty	10 years

2.4 Warranty and Performance

Hybrid inverters shall include a minimum 10-year standard product warranty. Installation, commissioning, and O&M manuals must be provided in English.

3. BATTERY ENERGY STORAGE SYSTEM (BESS)

BESS shall be designed for ease of installation, user-friendly operation, and integration with PV arrays and inverter. The system features a modular design, enabling capacity expansion if required.

In order to ensure that the hybrid inverter remains operational for extended time during solar hours in the event of load shedding, the Contractor, in consultation with the Client, shall define the load that can be supported by the battery during islanded operation, ensuring the continued operation of the inverter. A joint proforma, duly signed by both the Contractor and the Employer, shall document the load details for the building owner’s awareness to ensure proper operational practices during load shedding.

3.1 Manufacturer and Material Requirements

LiFePO4 batteries of requisite capacity shall be used for the project, which shall be compliant with relevant IEC, IEEE, BS, EU and other international standards.

The Battery energy system and all its components shall meet the following international standards:

- IEC 62619 for lithium battery pack safety
- UL 9540/UL 9540A for fire safety and thermal runaway resistance
- IEC 61000-6-1/2/3/4 for EMC immunity and emissions
- UN38.3 for transport safety certification of lithium battery or equivalent

3.2 Minimum Specifications Table

Parameter	Requirement
Rated Energy Capacity	As Specified for each Site
Cell Chemistry	Lithium Iron Phosphate (LFP)
Depth of Discharge (DoD)	≥ 90%

Parameter	Requirement
Round-trip Efficiency	≥ 90%
Cycle Life	≥ 6,000 cycles @ 80% DoD
Operating Voltage Range	24V and above (model and design dependent)
Maximum Charge/Discharge Rate	≥1 C
Ambient Operating Temperature Range	-30°C to +50°C
Ambient Charging Temperature	-30°C to +50°C (self-heating for sub-zero charging)
Relative Humidity	0–95% RH (non-condensing)
Ingress Protection (Self or Enclosure)	≥ IP65
Noise Emission	≤ 65 dB(A)
Monitoring	BMS, mobile app, cloud-enabled
Safety Integrity Level	SIL-2 or Higher

3.1 Warranty & Performance

The system shall include a minimum 10 – year product warranty and a performance warranty ensuring at least 70% of initial capacity after 10 years or 6000 cycles @ 80% DoD.

3.2 Protection and Safety Requirements

LiFePO4 batteries shall be compliant with relevant IEC, IEEE, BS, EU and other international standards. The Battery backup should be equipped with comprehensive protection features, including Type II DC/AC surge protection, insulation resistance monitoring, and residual current detection. It should also provide cell-level temperature monitoring, emergency stop functionality, and integrated fire suppression for BESS systems. All safety measures shall comply with international standards and industry’s best practices.

3.3 Monitoring & Control

The battery system shall feature an advanced monitoring interface for real-time tracking of SOC, SOH, cell voltages, cell imbalances, current, and temperature. It should support remote monitoring and control via standard communication protocols and integrate with the site SCADA or EMS. The system shall enable charge/discharge scheduling ensuring safe and efficient operation across varying grid and load conditions.

3.4 Documentation & Services

The supplier shall provide complete documentation, including installation, operation, and maintenance manuals in English, along with factory test and type-test certificates. SCADA integration guides, remote monitoring manuals, on-site training, and commissioning support shall be included to ensure smooth deployment. The system must be compatible with energy management platforms and support future expansion and upgrades as required.

4. DC CABLE, EQUIPOTENTIAL BONDING AND DC EARTHING

Copper cables with purity of 99.9% or more with XLPO insulation and rated at 1500 V shall be used for string formation, equipotential bonding and earthing. Cables shall be low smoke Halogen free along with compliance with IEC and British standards. Minimum size for DC cables will be 4 mm². For DC cables, voltage drop shall be less than 1% at STC. Separate DC and AC

earthing each with 5 ohm or lesser resistance shall be achieved using the earthing arrangement.

6 mm² earth wires for equipotential bonding shall be used. In case same earthing is used for PV module equipotential bonding and lightning protection, the minimum cable size shall be 16mm². Relevant building codes and electricity acts shall be complied with.

4.1 Minimum Specifications Table

Parameter	Requirement
Cable Type	XLPO insulated, Halogen Free
Voltage Rating	1500 V DC
Conductor	Copper, ≥99.9% purity
Earthing Type	Rod / Bore type

5. LIGHTNING PROTECTION SYSTEM

Lightning protection system capable to withstand lightning currents of 100 kA with earthing resistance of 10 ohms or less shall be provided.

Lightning protection system include 5 spike on copper ball, copper tape, copper nail, copper staple, sand mortar, copper plate (600 x 600 x 3mm) and Bare conductor with complete erection of accessories as per project specified requirements.

6. CENTRALIZED AND REMOTE MONITORING SYSTEMS

The system shall integrate seamlessly with all plant devices via industry-standard communication protocols, incorporating robust cybersecurity for secure remote access and data integrity. Intuitive HMI dashboards shall provide clear visualization for operators for all roof top systems. The SCADA platform shall be designed in accordance with approved design requirements, supporting real-time data acquisition, command execution, and system optimization including fault detection, alarms and rectification time.

Online and real-time monitoring shall be provided with the following parameters along with the remote power on / off control.

- Energy generation (kWh)
- Power production (kW)
- String-level monitoring of Voltage and Current
- Storage and monitoring data for at least 5 years
- 4 x 55” TV Screens (For Centralized Monitoring)
- Server and accessories

6.1 Minimum Specifications Table

Parameter	Requirement
Communication Protocols	Modbus TCP/IP, IEC 104, IEC 61850
Connectivity	Ethernet, fiber optics, 4G/LTE (optional)
Data Logging	Historical trending, KPI reporting, alarms

Parameter	Requirement
Visualization	Web-based HMI, intuitive dashboards
Control Capability	Remote start/stop, parameter adjustments
Access Management	Multi-user with secure authentication
Cybersecurity	Encryption, firewall protection, role-based access
Integration	Inverters, BESS, Meters
Expandability	Modular for future device integrations
Operating Temperature	-30°C to +60°C
Warranty	≥ 5 years

SECTION – IV: AC SYSTEMS

Technical Specifications under this section focus on the AC network from Inverter to LV panels, however, wherever applicable the same shall be applied for DC Cables, Earthing, Breakers, Distribution Boxes as well.

1. LOW VOLTAGE (LV) DISTRIBUTION BOARDS

1.1.General

The Low Voltage Distribution Boards shall be sheet steel fabricated. These shall be suitable for surface mounting, semi-recessed or recessed in wall mounting. The Low Voltage Distribution Boards shall be totally enclosed, dust and damp proof. The Low Voltage Distribution Boards shall be complete in all respects with material and accessories, factory assembled, tested and finished according to the Specifications and to the normal requirements.

1.2.Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

BS 4752-1	-	Triple Molded Case Circuit Breaker
IEC 947	-	Single and Triple Miniature Circuit Breaker
IEC 947	-	Low Voltage Switch gear and Control gear
IEC 439	-	Factory Built Assemblies of LV Switch gear
IEC 4752		Switch gear and control gear for Voltages
BS 88	-	HRC Fuses
IEC 73	-	Colors for indicator lights and push buttons
IEC 446	-	Identification of insulated/bare conductors

1.3.Components

The Low-Tension Distribution Board shall be provided with components for the satisfactory operation of the electrical system.

Typical component specifications are given below:

1.3.1. Bus Bars

The bus bars shall be made of high conductivity electrolytic copper and shall be completely isolated and mechanically braced for the specified fault level. The phase identification of bus bars shall be by colors applied on bus bars and these shall be red, yellow and blue for phase and white for neutral. The earth bus bar shall be green.

1.3.2. Molded Case Circuit Breaker (MCCB)

The MCCB shall be of molded case type, provided with fixed magnetic short-circuit and fixed thermal overload protections.

1.3.3. Miniature Circuit Breaker (MCB)

The MCBs shall be appropriate current ratings as required. They shall be provided with fixed magnetic short-circuit and fixed thermal overload protections.

1.3.4. Push Buttons

Push buttons shall be momentary make break contact type (normally open/normally close).

1.3.5. AC voltmeters

The AC voltmeters shall be of digital type, suitable for flush mounting on switchboards, and shall provide a clear display for accurate measurement of voltage.

1.3.6. Ammeters

The AC voltmeters shall be of digital type, suitable for flush mounting on switchboards, and shall provide a clear display for accurate measurement of current.

1.3.7. Voltmeter Selector Switch

The voltmeter selector switch shall be complete with front plate, grip handle, and RY-YB-BR-OFF-RN positions.

1.3.8. Current Transformers

The current transformers shall be of air-cooled, ring-type construction and shall be suitable for the intended application. They shall be provided with adequate burden and accuracy class to ensure reliable measurement and protection functions.

1.3.9. Air Break Magnetic Contactors

The contactors shall be air break, suitable for the type of duty to be performed. Contactor shall be provided operating coil and auxiliary contacts wired up to terminals. The number of working auxiliary contacts shall be provided according to the system requirements.

1.3.10. Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, auxiliary transformer and shall have rosettes of suitable color.

1.3.11. Line up Terminals

Line up terminals wherever provided for control of lighting, power and control circuits shall be suitable for voltage and size of conductors. The line-up terminals shall be suitable for channel mounting. All necessary accessories shall be provided.

1.4. Installation

The actual location shall be determined at site, keeping in view the site conditions and in coordination with other equipment.

Low Voltage distribution board for recessed mounting in wall shall be installed such that the door shall finish flush with the surface of wall. The recess mounted distribution board shall be installed before the plastering of walls. The DB shall be protected to avoid any damage due to the civil work.

All loose parts dispatched separately with the DB shall be installed as per manufacturer instructions and all adjustments or setting shall be made, as required. All screws, nuts and bolts used for fixing the distribution board shall be galvanized. The distribution boards installation shall include connecting all incoming and outgoing cables. The cable entry in the boards shall be provided from top or bottom as required.

The distribution board body shall be connected to earth as per instructions described in section "Earthing" of these Specifications. The switchboard shall be tested and commissioned in the presence of the Employer’s Delegated Assistant.

2. LOW VOLTAGE CABLE

2.1.General

The work under this section consists of supplying, installing, testing and commissioning of all material and services of Low Voltage cables and the accessories.

The Contractor shall discuss the electrical layout with the Employer’s Delegated Assistant and coordinate at site with other services for exact route, location and position of the electrical lines.

The cable shall be suitable for nominal service voltage, have an insulated Conductor, shielded and sheathed. It shall be suitable for indoor and outdoor use in the transmission and distribution of electrical energy.

2.2.Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials within the scope of this section:

- BS 6360 - Conductors for insulated cables
- IEC 228 - Conductors for insulated cables
- BS 6500 - Insulated flexible cords
- BS 5467 - XLPE insulated cables

2.3.Material

2.3.1. Phase Identification

All cables shall have phase identification colors on insulation of each core. The color code for three phase circuits shall be;

- Red, Yellow and Blue for phase conductors.
- Black for neutral conductor.
- Green for earth conductor. Where XLPE insulated cable is installed.

Single phase circuits shall have insulation of;

- Red color for phase/line
 - Black color for neutral
 - Green color for earth conductor.
- All DC circuits shall have insulation of;
- Red color for positive conductor
 - Black color for negative conductor
 - Green color for earth conductor.

2.3.2. Cable Accessories

All accessories shall be provided for the complete cabling. These shall include but not limited to items such as saddles, clamps, fixing channels, connectors, cable joints (where necessary and as approved by the Employer’s Delegated Assistant), clips, lugs, tapes, solder, identification tags, bushes, glands, etc.

2.4. Installation

2.4.1. Cables in flexible/rigid pipes on surface

All cables for on surface pipes shall be installed through the pipes without the use of lubricants. The flexible/rigid pipes shall be fixed to wall/ceiling surface by means of cable clamps using Rawal plays and galvanized screws.

2.4.2. Underground Cable

The cables to be installed directly underground shall be laid in trench in single ties. The depth of cable underground, shall be three feet minimum, measured from the top of the largest cable to the general ground level. The burial depth may be increased as required due to site conditions or when crossing other service pipes and roads. Burial depth less than three feet and more than five feet shall require Employer's Delegated Assistant 's approval.

When cables crossroad, paved area, other services or other cables, they shall be laid in protective pipes of required size. Cables entering the buildings shall also be laid in protective pipes. The protective pipe ends, after installation of cables shall be plugged watertight by means of bituminized resin or equivalent method as approved by the Employer's Delegated Assistant. A minimum clearance of ten inches vertically and 20 inches horizontally shall be maintained between cables and other services.

Cable identification tags of corrosion resistant material shall be tied to cables with bronze wire at a maximum of 65 feet interval along the cable length for identification of cable and circuit. Above ground cable markers of 8 SWG (4 mm) sheet steel and 200 mm² shall be erected at 100 feet intervals along the straight trench, and at each bend and joint box for indication of presence of underground cable. For more than three feet wide trenches, cable markers shall be provided at both edges of the trench. The cable marker shall be finished in Gray heavy enamel paint over two base coats of anti-rust red oxide paint, with the necessary instructions indicated in approved colors.

The Contractor shall furnish samples of cable marker for approval of Employer's Delegated Assistant before installation. The marker shall be welded to an angle iron fixed to the ground on a cement concrete base or as directed by the Employer's Delegated Assistant. The earth continuity conductor shall be laid in the trench with the cables. The Contractor shall submit to the Employer's Delegated Assistant for approval, schedule of cable markers showing location of marker and instructions on each.

Before laying of cables in the trench, the bed of the trench shall be leveled and filled with a four-inch-thick layer of fine sand (1/32-inch diameter maximum particles size). The sand layer shall be leveled and the cables placed thereon; the cables shall be covered with a layer of fine sand four-inch thick measured above the top of the largest cable.

The cable protective bricks placed above the top of sand cover shall be of Class - C cement concrete, minimum two-inch thick and 12 inches x 12 inches square or as approved by the Employer's Delegated Assistant. The bricks shall be placed over the sand layer end to end to cover the entire length and breadth of the cable trench, after the concrete bricks are placed, the remainder of the trench shall be backfilled with earth in layer 16 inches thick. Each layer shall be thoroughly tamped and compacted.

Sufficient slack shall be left in cables for which purpose the cut lengths of cables shall also about 3% more in the measured lengths between terminations. At underground joint box, ample slack shall be left to prevent straining of cable joints due to settlement of the cable trench.

The cut lengths of cables wherever stated are only as a guide. The cable shall not be bent to a radius less than that recommended by the cable manufacturers.

Pipes/ pipes/ ducts for electrical, PSD & ITS etc. cables shall be properly sealed with the water proofing material “Plastic Polyurethane Foam” as per relevant ASTM standard to avoid rainwater entry to the pipes. The contractor shall also provide the technical data of the sealant material before the execution of the work.

3. CABLE TRAYS

3.1. General

The Contractor shall discuss the layout with the Employer’s Delegated Assistant and coordinate at Site with other services for exact route, location and position of the cable trays for electrical lines.

3.2. Applicable Standards/Codes

Latest editions of the following standards / codes shall be applicable for the materials in scope of this Section:

BS 729 - Hot dip galvanized coating on iron and steel articles

3.3. Materials

- The whole of the tray work, trays, fittings, supports shall be of mild steel hot dipped galvanized. The thickness of the protective sheath on any element shall not be less than 55 microns.
- Cable trays shall be constructed from mild steel hot dip galvanized and of minimum thickness of 1.5mm.
- Insert elements, bolts, screws, pins, etc., shall be mild steel cadmium plated.
- Tray work shall have oval perforations. Ladder type trays shall be used for vertical runs as approved by the Employer’s Delegated Assistant.
- All trays (straight and fittings) shall be welded construction and be a heavy duty returned-flanged, perforated type, unless specified otherwise. The minimum thickness of heavy duty returned flanged cable trays shall be 1.5mm.
- Tray components shall be accurately rolled or formed to close tolerances and all edges rounded. Flanges shall have full round smooth edges.
- Ladder racks shall be of similar construction. The rungs shall be spaced at maximum 300 mm. The system shall allow for installing additional rungs and for replacement of rungs.
- For all trays, flanges shall be a minimum of 50 mm deep, unless otherwise specified.
- Cable trays and accessories installed in hazardous and extremely corrosive environments shall be heavy duty grade stainless steel.

3.4. Installation

- Drilling, machining or cutting shall not be carried out after application of protective coat, unless previously agreed by the Employer’s Delegated Assistant. If cutting or drilling is necessary, edges shall be cleaned up and painted with zinc-based paint before erection.
- Installation of vertical runs of tray along the line of vertical expansion joints in structure of the facility shall not be allowed.
- Cables shall be fixed to the trays by means of PVC covered saddles or straps secured with brass or cadmium plated bolts, nuts and washers.

- 20% spare capacity shall be maintained once all cables have been installed on trays. Double banking of cables shall not be permitted space between adjacent cables shall be not less than the radius of the bigger cable.

The Contractor shall calculate the size of the tray and submit to the Employer’s Delegated Assistant for approval.

The Contractor shall check the minimum size as specified is large enough for his requirements and provide 20% spare capacity for future use.

3.5. Erection

Cable trays arranged one above the other shall have spacing in relation to their width not exceeding a ratio of 1:2 with a minimum distance of 150 mm.

3.5.1. Supports

Install fixings and supports:

- (a) at 3 meter centers
- (b) 50 mm from bends, tees, intersections and risers
- (c) as close as practicable to joints
- (d) each side of expansion joints.
- (e) Supports shall be selected from the following types, to suit the site conditions:
- (f) M12 steel threaded drop rods fixed to ceilings complete with GI channels or brackets
- (g) wall support brackets cantilever arms
- (h) steel channels

The cable trays shall be fixed in accordance with site conditions and manufacturer’s recommendations. Join cable tray and accessories with hardware per manufacturer’s recommendations. Avoid mid-span joints.

The Contractor shall submit, as required, all calculations relating to tray work and tray supports demonstrating acceptable mechanical stresses and sag. Cable trays installed on roofs shall be supported using GI brackets or concrete blocks. Removable cable tray cover shall be fitted.

3.6. Earthing Of Cable Tray

Cable trays and accessories shall be electrically and mechanically continuous throughout their length.

The entire cable tray system shall be bonded and 12 mm x 2.5 mm tinned copper links shall be bolted across each joint in the system by means of bronze nut and bolts, complete with flat and spring washers.

All cable trays shall be provided with earth continuity copper tape along the whole route of cable trays which shall be bonded to the main earthing system of the facility. The earth continuity copper tape shall be fixed on cable tray by means of PVC covered saddles or by other means approved by the Employer’s Delegated Assistant.

4. PIPES

4.1. General

The work under this section consists of supplying, installing, and commissioning of all material and services of the pipes.

The Contractor shall discuss the layout with the Employer’s Delegated Assistant and coordinate at Site with other services for exact route, location and position of the pipes for electrical lines.

The Contractor shall ensure exact location and route of pipes as per site requirements and as directed by the Employer’s Delegated Assistant.

4.2. Applicable Standard/Codes

Latest editions of the following standards / codes shall be applicable for the materials in scope of this Section:

- BS 6099 - PVC pipes and accessories.
- BS 3595 - PVC pipes & accessories.
- BS 4346 - Cement Solvent for jointing

4.3. PVC Pipe and Accessories

The PVC pipe shall be rigid. All pipes shall be minimum Class D (Working pressure - 12 bar). The buried PVC pipe should be able to withstand the external load acting upon it by continuous movement of heavy duty vehicles such as trucks. Cranes, forklift, etc. Where pipe change direction, manufactured smooth bends shall be used. Bending of pipes by heating or otherwise will be allowed in special cases only. Bending of pipes by heating shall be carried out by first filling the pipe with sand inside and then immediately removing the sand. The use of sharp 90-degree bends and tees will not be allowed. The bends shall conform to same specifications as given for PVC pipes. for joining of pipe all precautions and procedures recommended by manufacturer shall be followed.

4.4. Installation

4.4.1. PVC Pipe

Rigid PVC pipes shall be installed under roads and paved areas, at crossing with other services. The depth of the pipe shall vary according to the conditions at site, and approval of Employer’s Delegated Assistant shall be obtained prior to installation. In general the pipes shall be installed underground at the following depths measured from the top of the pipe:

- a) Under roads and paved surface 900 mm below the finished surface
- b) When crossing other services 250-mm vertical clearance. for the crossing length.
500 mm horizontal clearance with CC protective cover.

The trench of required dimensions shall be excavated and the bottom of trench cleaned and levelled. A Four-inch-thick bed of fine sand shall be provided over which the PVC pipes installed after proper alignment. Where two or more pipes are installed in the same trench the clearance

between pipes shall not be less than Two inches. After laying of pipe the trench shall be backfilled with clean-screened earth in layer of Four inches. Each layer shall be properly compacted.

Where underground cables enter connection terminal boxes the PVC pipe shall be installed on surface by means of PVC clamps at a maximum interval of 18 inches.

After installation, the ends of the pipe shall be plugged with material impervious to water and chemicals. All joints shall be sealed adequately to prevent entry of foreign elements.

The installation of pipes shall be completed in all respects including its fixing at terminations,

before cabling work is started. All sharp edges and burrs shall be removed by using reamer or any approved device. The pipe shall be thorough cleaned of dirt and dust from inside. the pipes shall be installed in proper co-ordination with other works.

5. EARTHING

5.1. General

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories of the complete earthing system

The Contractor shall discuss the electrical layout with the Employer’s Delegated Assistant and Coordinate at Site with other services for exact route, location and position of the electrical lines and equipment.

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

5.2. Applicable Standards/Codes

The latest editions of following standards/codes shall be applicable for the materials in scope of this section: -

- BS 951 - Earthing Clamps
- CP 1013 - Earthing
- BS 2874 - Nuts, bolts, washers, screws & rivets fixing.
- BS 1433 - Hard drawn bare copper conductor for earthing.

5.3. Material

5.3.1. Earth Electrode (Rod Type)

The earth electrode shall comprise ten feet long, 5/8 inch dia. copper deposited steel rod having flat head at drive end and pointed conical tip at the driven end. The tip shall be hardened to facilitate driving. At the top of the rod, a clamp for bolted connections shall be provided suitable for connection to the down conductor.

5.3.2. Earth Electrode (Bore Type)

The earth electrode shall comprise of Tinned copper earth spike. At the top of the pipe, a clamp for bolted connections shall be provided suitable for connection to the down conductor.

5.3.3. Earthing Lead

The earthing lead shall connect the earth electrode to earth connecting point and on the metallic part. It shall be round hard drawn bare electrolytic copper.

5.3.4. Earth Continuity Conductor

Earth continuity conductor (ECC) shall be hard drawn bare copper wire or single core XLPE insulated copper conductor cable of sizes.

The specifications for single core XLPE insulated or PVC/PVC cables used as ECC shall be same as those in relevant sections of Technical Specifications.

5.3.5. Earth Connecting Point

Earth connecting points shall comprise tinned copper bar, rectangular in shape, having dimensions of 350 x 50 x 6 mm. At least, six terminals for connection shall be arranged on the bar, which can be increased or decreased as required by the Employer’s Delegated Assistant.

The terminals shall have brass or tinned copper bolts, nuts and washers for protection against corrosion. Two holes shall be provided off Centre of the copper bar for fixing to the wall by means of 10 mm dia. nut and bolt/ Rawal bolt and shall be insulated by means of rubber gaskets/washers/ insulators.

5.4. Installation

5.4.1. General

The earthing system shall have earth resistance, including the resistance of soil, earth leads and ECC shall not be greater than five (05) ohms.

At all connections of earth continuity conductor to high mast or any other metallic body, proper size copper or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or terminations shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket.

5.4.2. Earth Electrode (Bore Type)

The earth electrode/spike shall be placed after bore at site. The bore shall be made up to permanent water level of 80 feet which ever is less. The earth electrode shall be connected to the earthing conductor of suitable size. The earthing conductors shall be laid in a perforated GI pipe of suitable size.

In case the soil conditions at site permit, the earth electrodes may be installed by hammering the electrode in soil, until the top of the rod is about 12 inches below the proposed ground level. If hammering down is not possible due to site conditions, a pit shall be first excavated in bare ground up to the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 20 inches, each layer tamped and compacted. The inspection chamber shall have a cover supported on angle iron frame. The cover shall be approved by the Employer’s Delegated Assistant and shall finish flush with the ground level.

5.4.3. Earth Electrode (Rod Type)

In case the soil conditions at site permit, the earth electrodes may be installed by hammering the electrode in soil, until the top of the rod is about 12 inches below the proposed ground level. If hammering down is not possible due to site conditions, a pit shall be first excavated in bare ground up to the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 20 inches, each layer tamped and compacted.

5.4.4. Earth Continuity Conductor

The body of all switchboards shall also be connected to earth by specified size of ECC. All other metal work shall also be connected to earth by specified size of ECC.

At any joint or terminations, the ECC shall be connected using proper accessories. No connection shall be made by twisting of earth conductors.

5.4.5. Earth Connecting Point

The earth connecting point shall be fixed on wall surface by means of brass screws.

6. LOW VOLTAGE SWITCHBOARDS

6.1. General

The work under this section consists of design, manufacturing, fabricating, supplying, installing, testing, and commissioning of all material and services of the complete LV (LV) switchboard for indoor installation.

The Contractor shall discuss the electrical equipment and power & control cables layout with the Employer’s Delegated Assistant and coordinate at site with other services for exact locations and positions of the electrical lines and equipment.

6.2. Low Voltage Switchboard

The LV switchboard shall be sheet steel fabricated. The LV switchboard shall be totally enclosed, dust and damp proof. The LV switchboard shall be complete in all respects with material and accessories, factory assembled, tested and finished. The enclosures of LV switchboards and Bus Tie Duct shall be provided with rubber gasket and a lockable hinged door with cam fastener.

6.3. Applicable Standards/Codes

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope of this Section:

- IEC 947 - Triple pole Air Circuit Breakers
- BS 4752-1 - Triple pole Molded Case Circuit Breaker
- VDE 0641 - Single and Triple pole Miniature Circuit IEC 947 Breaker.
- IEC 947 - LV Switch gear and Control gear
- IEC 439 - Factory Built Assemblies of LV Switchgear
- IEC 4752 - Switch gear and control gear for Voltages up to and including 1 kV
- BS 88 - HRC Fuses
- IEC 73 - Colors for indicator lights and push buttons.
- IEC 446 - Identification of insulated/bare conductors

6.4. Components

The LV switchboard shall be provided with components as specified in these specifications.

Typical component specifications are given below: -

6.4.1. Bus Bars

The bus bars shall be made of high conductivity electrolytic copper and shall be completely isolated and mechanically braced for the specified fault level. The phase identification of bus bars shall be by colors applied on bus bars and these shall be red, yellow and blue for phases and white for neutral. The earth bus bar shall be green.

6.4.2. Moulded Case Circuit Breaker (MCCB)

The MCCB shall be molded case. The MCCBs shall have fixed Magnetic Short circuit and fixed Thermal Overload protections. All incoming circuit breakers shall be MCCBs.

6.4.3. Air Circuit Breaker (ACB)

Air Circuit Breaker (ACB) shall be of withdrawable metal-clad, flush mounted. Horizontal draw-out isolation and air break type suitable for installation on cubicle type of switchboard. They shall be three or four poles as specified. They shall consist of quick-make, quick-break, mechanically and electrically trip free mechanism to give double break in all poles simultaneously. The closing mechanism shall be of stored energy type, either manually or electrically charged.

6.4.4. Miniature Circuit Breaker (MCB)

These shall have fixed magnetic short circuit and fixed thermal overload protections. The miniature circuit breakers shall have a short circuit breaking capacity as per international standards. These Circuit Breakers shall be suitable for working on lighting and power circuits.

6.4.5. Air Break Magnetic Contactors

The contactors shall be of air-break type, suitable for the duty required. The main contacts shall be silver-tipped, butt-type with double break per pole. Each contactor shall be provided with an AC operating coil and shall have a minimum of two normally open (NO) and two normally closed (NC) auxiliary contacts wired up to terminals. Additional auxiliary contacts shall be provided as required to meet the system requirements.

6.4.6. Push Buttons

Push buttons shall be momentary make break contact type (normally open/normally close). These shall be suitable for flush mounting on switchboard, plastic faceplate etc. Push buttons shall have round/square head. These shall be of red color for 'ON' and green color for 'OFF' operations.

6.4.7. AC voltmeters

AC voltmeters shall be digital type and shall be suitable for flush mounting on front door of the switchboards.

6.4.8. Ammeters

AC ammeters shall be digital type and shall be suitable for flush mounting on front door of the switchboards.

6.4.9. Voltmeter Selector Switch

The voltmeter selector switch shall be complete with front plate, grip handle, and RY-YB-BR-OFF-RN positions.

6.4.10. Ammeter Selector Switch

The ampere meter selector switch shall be complete with front plate, grip handle, and R-Y-B-OFF positions.

6.4.11. Indicating Lamps

Indicating lamps shall be suitable for flush mounting, complete with base, neon lamp and shall have rosettes of suitable color.

6.4.12. Current Transformers

Air-cooled, ring type current transformers shall be provided having transformation ratio. The current transformers shall be of suitable burden having accuracy class.

6.4.13. Line up Terminals

Line up terminals wherever provided for control of lighting, power and control circuits shall be suitable for voltage and size of conductors. The line-up terminals shall be suitable for channel mounting. All necessary accessories such as end-plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

6.5. Installation

The location shall be determined at site, keeping in view the site conditions and in coordination with other equipment.

LV switchboard for floor mounting shall be installed on already prepared CC cable trenches. The LV switchboards shall be protected to avoid any damage due to civil work.

All loose parts dispatched separately with the switchboard shall be installed as per manufacturer instructions and all adjustments or setting shall be made as required. All screws, nuts and bolts used for fixing the switchboard shall be Galvanized.

7. AMI Meters

AMI meters to be deployed at RTS should comply with relevant WAPDA/PEPCO specifications and applicable IEC standards for metering accuracy, performance, safety, and data communication. The meters shall support two-way communication, remote reading, load profiling, tamper detection, and remote connect/disconnect functionality. They should include integrated GSM/GPRS or RF communication modules, enable secure data exchange with the head-end system, and maintain event logging with timestamps. The meters must also be capable of accurately measuring and recording both import and export energy. In addition, they shall meet electrical, mechanical, and environmental endurance requirements to ensure reliable and accurate operation under local site conditions.

SECTION – V: CIVIL & STRUCTURE WORKS

1. Civil Works:

1.1 Design Standard and Code

For material and civil design, The Contractor shall conform to the applicable requirements of the latest revisions of following standards and publications, in principle.

ASTM	American Society for Testing and Materials
ACI	American Concrete Institute
ISO	International Standard Organization
ASCE/SEI - 7	Minimum Design Loads for Buildings and Other Structures
UBC	Uniform Building Code
PBC	Pakistan Building Code
ASTM C33	Standard Specification for Concrete Aggregates
ASTM C39	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C150	Standard Specification for Portland Cement
ASTM C260	Standard Specification for Air Entraining Admixtures for Concrete
ASTM C494	Standard Specification for Chemical Admixtures for Concrete
ASTM C989	Standard Specification for Ground Granulated Blast Furnace Slag for Use in Concrete and Mortars
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
ASTM D1586	Standard Penetration Test
ASTM D2937	Standard Test Method for Density of Soil in Place by the Drive - Cylinder Method

1.2 Design Conditions

The design values to be used in this Project are as follows:

(a) Minimum Seismic Design

Structures and portions thereof shall, as a minimum, be designed and constructed to resist the effects of seismic ground motions per Zone 3 (0.32g) as provided in Pakistan Building Code.

(b) Design Wind Pressure

Wind Pressure $P_w = C \times q$

Where, $q = \frac{1}{2} \times \rho V^2$

$\rho =$ Air density/acc. (0.125 kg sec²/m⁴)

- V= Wind velocity (45 m/sec)
- C = Shape factor
- (For Circular equipment = 0.85)
- (For Angular equipment = 1.2)

1.3 Design Of Foundations

1.3.1 Foundations

All foundations shall be designed with top level 200mm above natural surface level (NSL)/ Finish Floor Level (FFL) unless specified otherwise. Appropriate slope shall be provided at the top of each foundation to prevent accumulation of rainwater.

The loads for design of foundation shall be taken from the foundation reactions calculated in the design of respective solar panels after applying appropriate load factors. The Contractor shall submit design calculations and load analysis for design of footings, retaining/protection walls, building works and other allied works for Employer's Representative or his delegated Assistant's review under Sub-Clause 5.2 of CoC..

The uplift coming at each support member of PV mounting structure shall be solely encountered by the requisite foundation pad weight or as approved by the Employer's Representative or his delegated Assistant. However, on existing CGI sheets The Contractor shall ensure the anchoring arrangement/details for the PV mounted structure and get the approval from the Employer's representative or his delegated Assistant.

All the PV mounting structure should be galvanized with relevant standard as approved by the Employer's representative or his delegated Assistant.

Protective coatings shall also be applied on foundations in contact with the soil and cost of protective coatings shall be deemed included in the price of the respective civil work/foundation.

1.4 Earth Work

1.4.1 Levelling of Site

The Contractor shall level the Site as required and to the extent considered necessary by the Employer's Representative or his delegated Assistant.

1.4.2 Excavation

- Excavation under this section shall consist of the dewatering, removal, hauling, dumping, and satisfactory disposal of all materials from required excavations for levelling the site area and construction of Civil Works. Excavation in rock/gravel strata by means of drilling, blasting, chemicals etc. shall also be done by The Contractor wherever required for which no additional cost will be permissible by The Contractor.
- Any and all excess excavation for the convenience of The Contractor or over-excavation performed by The Contractor for any purpose or reason, except as may be ordered in writing by the Employer's Representative or his delegated Assistant, and whether or not due to the fault of The Contractor, shall be at the expense of The Contractor.

1.4.3 Filling and Back-Filling

- Except as noted otherwise in the Specifications or the drawings, all the materials for filling and back-filling shall comply with the following requirements:

- Material shall not include any harmful materials, such as fertile soil or pieces of wood, slurry, mud, organic and other unsuitable material. The Contractor shall submit test reports of chemical properties (sulphate, chloride, etc.), organic content and pH value for the material which shall subject to approval by the Employer’s Representative or his delegated Assistant.
- Material shall not be of an extreme swelling nature.
- The gradation of the general fill/borrow fill material shall conform to the following limits or as approved by the Employer’s Representative or his delegated Assistant:

Material Size, U.S. Sieve Series	Percent Finer Than, by Weight
No. 10	100
No. 50	70 – 95
No. 100	25 – 75
No. 200	0 – 15

- The compaction shall be made in the field by raming machines or other mechanical means as approved by the Employer’s Representative or his delegated Assistant. The layer of compacted earth filling shall not be more than 15 cm per lift, and it shall be graded as horizontally as possible, and shall be sufficiently compacted to produce not less than 95% of laboratory maximum dry density as determined by ASTM Designation D1557 “Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort”. Field dry density shall be measured according to ASTM D-1556 - Standard Test Method for Density and Unit Weight of Soil in Place by Sand - Cone Method or ASTM D-2937 “Standard Test Method for Density of Soil in Place by the Drive - Cylinder Method” or other methods as approved by the Employer’s Representative or his delegated Assistant.
- Unless otherwise specified the base of all ground floors shall be constructed in accordance with the following specification.
- Sand filling shall be done in layers not more than 4 inch (100mm.) thick and shall be rammed after saturation to such an extent that 100mm (4 inch.) Layer is reduced to about 75mm (3 inch.) after compaction.
- Density achieved should correspond to 95% of the compaction obtained by ASTM 1557 at optimum moisture content.
- The base shall be perfectly level. Sand shall conform in all respects to the specifications for fine aggregate except for its grading, i.e. it shall pass through sieve No.16 and not more than 30% shall pass through sieve No. 100.

1.5 Concrete

1.5.1 Materials

The Contractor shall furnish all materials for use in concrete, including but not limited to cement, sand, coarse aggregate, water, reinforcing bars, admixture (including ground slag) and concrete curing compound. Air-entraining agent and curing compound shall be accepted on manufacturer's certification of compliance with specification requirements. However, the Employer's Representative or his delegated Assistant reserves the right to require submission of and to perform tests on samples of the agent and/or compound prior to shipment and use in the Work at the cost of Contractor.

Cement

Cement shall meet the requirements of ASTM C150 and shall meet the false-set limitations specified therein. The cement shall be free from lumps and damaged cement when used in concrete. Adequate provisions shall be made to prevent absorption of moisture when cement is stored. Cement Type-I shall be used. No extra payment shall be made to The Contractor in case, if sulphate resistant cement is used.

Cement Mill Test Certificates, when requested, shall be provided for each shipment of cement. Under no circumstances shall the source of cement be changed without prior written approval of the Employer's Representative or his delegated Assistant.

Sand and Coarse Aggregate

Sand and coarse aggregate shall be furnished from any approved source. The sand particles shall be clean, hard, dense, durable, uncoated rock fragments that will pass a screen having 6.5mm square openings. The sand shall be well graded from fine to coarse and shall be free from injurious amounts of dirt, organic matter, and other deleterious substances.

The coarse aggregate shall consist of clean, hard, dense, durable, suitable graded, uncoated rock fragments, shall be free from injurious amounts of flakes and elongated pieces, organic matter, or other deleterious substances. The maximum size of crushed coarse aggregate shall be 38mm/19mm or as directed by the Employer's Representative or his delegated Assistant. The grading of these sizes shall conform to ASTM C33. Lean Bed should be prepared underneath for dumping of Coarse Aggregate & Fine Aggregate to avoid mixing of soil and loose particles in the dump at site.

The Contractor shall submit, for testing and approval, representative samples of the sand and coarse aggregate proposed for use in the concrete work. All aggregates shall conform to the requirements of ASTM C33 including Petro-graphic test. During construction The Contractor shall also arrange testing of sand and coarse aggregate if directed by the Employer's Representative or his delegated Assistant to determine compliance with Specifications. The cost of all laboratory testing of these samples shall be borne by The Contractor.

Following tests shall be performed on sand and coarse aggregate to be used in construction:

- Gradation Analysis
- Sodium Sulphate Soundness
- Water Absorption
- Fineness Modulus (for sand)

- Sulphate and Chloride
- Los Angeles Abrasion (for coarse aggregate)
- Alkali-Silica or Potential Reactivity
- Petro-graphic Examination for suitability with OPC and SRC
- Flakiness and Elongation Indices (for coarse aggregates)

Fine Aggregate for Plastering shall conform to the requirements of ASTM C897.

Water

Water used for mixing concrete shall be clean and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances that may be deleterious to concrete or reinforcement and shall meet the requirements shown in Table below. A complete chemical analysis of water shall be submitted prior to the start of construction work and shall be required for each new water source being chosen. The cost of all laboratory tests of the samples shall be borne by The Contractor. No change in water source shall be permitted without prior approval by the Employer’s Representative or his delegated Assistant..

Total Dissolved Solids (TDS)	800 ppm (max)
Magnesium, Chlorides and Sulphates	300 ppm (max)
pH Value	6.5 – 8.0

Reinforcing Bars

Reinforcing bars shall be deformed bars conforming to ASTM Designation A615, Grade 60. Representative steel bar samples shall be collected from the site and tested in the laboratory approved by the Employer’s Representative. The testing shall be witnessed by the Employer’s Representative or his delegated Assistant.. The cost of all laboratory tests and travelling of Employer’s Representative or his delegated Assistant shall be arranged/borne by The Contractor. Negative variation in weight [mass] up to maximum 2.0% of reinforcement bar(s) from the applicable weight [mass] per unit length prescribed in Table 1 of ASTM A615 will be allowed for bar(s) placement. Contractor will have to make adjustments in bar spacing/number of bars to accommodate the excessive negative variation in weight [mass] if greater than 2.0%. Contractor will not be allowed for bar(s) adjustment in case of overweight [excessive mass] of any deformed bar.

Admixtures and Ground Slag

Admixtures to be used in concrete shall be subject to prior approval of the Employer’s Representative or his delegated Assistant, and shall meet the following requirements:

- (i) Chemical Admixtures
 - Air-entraining admixtures shall conform to the requirements of ASTM C260, "Standard Specification for Air-Entraining Admixtures for Concrete.
 - Water reducing or retarding admixtures (normal plasticizers) shall conform to the requirements of ASTM C494, "Standard Specification for Chemical

Admixtures for Concrete”, Type A or D, respectively.

- High range water reducing or retarding admixtures (super plasticizers) shall conform to the requirements of ASTM C494, Type F or G, respectively.
- Only one of the admixture Type A, D, F or G, shall be added at a time.
- Chloride bearing admixtures shall not be permitted.
- Super Plasticizers shall be checked for their compatibility with pozzolanic materials in blended cement concrete.

(ii) Ground Granulated Blast-Furnace Slag

In area where high sulphate and chloride contents are present in soil/water, finely ground granulated blast-furnace slag can be used as cementitious material in concrete by replacing SRC maximum up to 30%. The properties of ground granulated blast-furnace slag should conform to the requirements of ASTM C989.

The cost of all laboratory testing of these samples shall be borne by The Contractor. Contractor will not be paid extra cost for the procurement of ground granulated blast-furnace slag to the construction site.

Air-Entraining Admixture and Cold Weather Concreting

It is mandatory that in all the concrete works air-entraining admixture conforming to ASTM C 260 shall be used. Guide to Cold Weather Concreting (ACI 306R) specifying concrete producers through the selection processes that identify methods for cold weather concreting will have to be opted. The objectives of cold weather concreting practices are to: a) prevent damage to concrete due to freezing at early ages; b) ensure that the concrete develops the recommended strength for safe removal of forms; c) maintain curing conditions that foster normal strength development; d) limit rapid temperature changes; and e) provide protection consistent with intended serviceability of the structure. Concrete placed during cold weather will develop sufficient strength and durability to satisfy intended service requirements when it is properly proportioned, produced, placed, and protected. Contractor will not be paid for the admixtures and precautionary measures to safeguard the concrete (prior, during and after).

1.5.2 Composition

- (a) The Contractor shall determine the proportions of water, sand, coarse aggregate, cement and admixture (if required) needed to provide concrete, meeting the requirements of these Specifications and shall be approved by the Employer’s Representative or his delegated Assistant. Concrete ($210\text{kg}/\text{cm}^2$) which contains 25mm or 19mm maximum size aggregate shall have a cement content of not less than 380 kg per cubic meter. The net water-cement ratio by weight shall not exceed 0.5. Surface water contained in the aggregate shall be included as part of the mixing water in determining the water content. Reinforced concrete design will be checked in accordance with the ACI Code.
- (b) The Contractor will take minimum three test cylinders (152mm x 305mm) from the same batch and the average compressive strength at 28 days shall exceed $210\text{ kg}/\text{cm}^2$ (3000 psi) or $140\text{ kg}/\text{cm}^2$ (2000 psi) and no individual test value should fall more than $35\text{ kg}/\text{cm}^2$ (500 psi) from the minimum specified value.

The compressive strength of the concrete will be determined by the Employer’s Representative or his delegated Assistant. through the medium of test cylinders (152mm

x 305mm) made and tested in accordance with ASTM C39. The Contractor shall furnish all necessary sampling equipment such as slump cones, test cylinders, etc. at the site. This equipment is to be approved by the Employer’s Representative or his delegated Assistant. Or nominated person by Employer’s Representative. The cost of the material lab tests shall be borne by The Contractor.

The use of calcium chloride in concrete will not be permitted.

(c) The slump of concrete shall not exceed 75mm for Conventional Foundations and 150mm for piling.

1.5.3 Batching and Mixing

Unless specifically approved by the Employer’s Representative or his delegated Assistant., all concrete used on the Project shall be machine mixed. Hand mixing shall only be used when authorized by the Employer’s Representative and shall be performed under his directions.

1.5.4 Conveying and Placing of Concrete

Unless otherwise mentioned on the drawings or approved by the Employer’s Representative or his delegated Assistant., all concrete placed will be monolithic.

Forms shall be sufficiently tight to prevent loss of mortar from the concrete and shall be maintained rigidly in position until the concrete has hardened sufficiently to prevent damage by form removal. All surfaces of foundations upon or against which concrete is to be placed shall be free from standing water, mud and debris.

Concrete shall be vibrated (internal vibrators having a minimum frequency of 8,000 vibrations per minute) until it has been consolidated to the maximum practicable density, free from rock pockets of coarse aggregate, closes snugly against all surfaces of forms and embedded materials. Standby vibrators shall be available during concrete placement.

Exposed unformed surfaces of concrete shall be brought to uniform surfaces and worked with suitable tools to a reasonably smooth wood float or steel-trowel finish as directed.

The height of the end of buckets and hoppers shall be at most 1.0m above the level of placement.

1.5.5 Protection and Curing

The Contractor shall protect all concrete against injury until final acceptance.

The concrete, after being placed, shall be cured with water at least for fourteen (14) days or as directed by the Employer’s Representative or his delegated Assistant. Until it gains sufficient strength to a degree that works can be done without impairing it. Immediately after form removal, the surfaces should be kept continuously wet by water.

Bituminous Emulsion Waterproof & Protective Coating will be applied below ± 0.00 level to all structure elements. A minimum of two applications shall be required, and the applications shall be 100 percent effective. Surfaces to be treated shall not be coated with curing compound. No extra payment will be made to The Contractor for treating concrete surfaces with bituminous compound.

1.5.6 Repair of Concrete

Any concrete that is damaged or defective from any cause; that is honey-combed, fractured or otherwise defective, and concrete damaged because of excessive surface depressions or any imperfections and irregularities on concrete surfaces, shall be removed, replaced and corrected to bring the surfaces to the prescribed lines. The removal and replacement of damaged or

defective concrete, and the correction of surface imperfections and irregularities shall be made with concrete dry pack, or mortar (Portland cement-sand mortar), or at the option of The Contractor, with epoxy-bonded concrete, or epoxy-bonded epoxy mortar, where and as applicable for the type of repair involved. All repairs should be completed within 24 hours after removal of forms, and as directed by the Employer’s Representative or his nominated person.

1.6 Steel Structures

This Section comprises the Standards and Specifications pertaining to the fundamental requirements of design, manufacture, testing, inspection, supply and erection of structural steel including galvanized anchor bolts, base plates, stiffeners, rafters, post, purlins etc. for supporting the solar panels.

All drawings and statements shall be in English language and Metric System of measurements shall be used.

Design, manufacturing, testing, inspection, supply, erection, installation, commissioning and guaranteeing of all steel support structures required or specified or implied herein are included in the scope of the Contract. The material and fabrication shall be the best of their respective kinds and to a standard not less than specified herein.

All steel material shall be hot dip galvanized. The Contractor shall ensure proper fitting and alignment of offered structures.

The Contractor shall be responsible for submitting all detail designs and drawings as required or specified herein based on information provided in the Contract Documents and as directed by the Employer’s Representative or his delegated Assistant.

The Contractor shall submit the Finite Element Model (FEM) along with the calculations for each structural component for review and approval from the Employer’s Representative or his delegated Assistant.

The Contractor shall prepare as-built drawings/documentation and submit to the Employer’s Representative or his delegated Assistant.

The minimum thickness of the structural steel element shall not be less than 2.5mm.

1.6.1 Structural Loadings

Loading and design shall be in accordance with the requirements of the latest ASCE Manual and ASCE Standard 10 based on the information hereof.

1.6.2 Wind Loads

Structures shall be designed for (i) wind acting at 90 degrees to the surfaces (ii) wind acting at 135 degrees (45 degrees) to the surfaces. Wind pressure corresponding to 160 km/hr wind velocity acting horizontally in any direction at 25°C everyday temperature shall be used and as per the latest guidelines provided by the ASCE or PBC.

1.6.3 Snow Loads

Structures shall be designed against snow loadings as per ASCE 7-22.

1.6.4 Vertical Loads

Equipment weights and dead loads together with estimated construction/maintenance loads as required.

1.6.5 Loading Due to Thermal Forces

Thermal stresses caused by a temperature variation as indicated in special provisions shall be taken and expansion joints shall be provided at the appropriate locations.

1.6.6 Earthquake Intensity

Horizontal earthquake acceleration of an intensity of minimum 0.32g acting in any direction shall be considered for the design of ground structures acting in any direction irrespective of their height and flexibility. The above value shall be considered as the Peak Ground Acceleration (PGA).

All the joints and base mounted fastening of free-standing electrical equipment such as circuit breakers, dis-connectors/isolators, instrument transformers, line traps, bus bars, surge arresters and post insulators shall be designed to resist the effects of an acceleration intensity minimum 0.32g in any direction.

1.6.7 Slenderness Ratio (L/r)

Determination of L/r ratio and allowable compressive stress shall be followed as:

The maximum L/r ratio of a member shall not exceed to the following limits:

For main compression member	150
For secondary members carrying calculated stresses	200
For redundant members without calculated stresses	250

1.6.8 Materials

All materials shall be of the highest grade free from defects and imperfections of recent manufacture, unused and of the classification and grades designated, conforming to the requirements of the latest revision of the relevant Standards cited herein. All structural steel sections, plates and its connection bolts, nuts, washers shall be hot dip galvanized after fabrication.

1.6.9 Structural Steel

All structural steel shall be supplied in accordance of minimum Grade A50 for Parking Shed and steel structure for roof/ground mounted and roof/ground elevated shall be supplied in accordance with minimum Grade A36.

1.6.10 Bolts and Nuts

All steel structure connection bolts and nuts shall be of steel and shall conform to the requirements of ISO 898-1 (minimum 6.8 property class), ISO 898-2 (minimum 6.8 property class), DIN 7990 and DIN 555. All steel structure connection bolts, nuts, washers shall be of minimum 12 mm size.

All connections shall be bolted type and shall be designed for 100%-member capability. 5% surplus of bolts, nuts, washers and check nuts shall also be supplied. A connecting bolt shall contain one nut, one washer and one check nut.

1.6.11 Steel Fabrication

Holes

All holes shall be clean-cut without torn or ragged edges. All burrs resulting from reaming or drilling shall be removed. All holes shall be cylindrical/elliptical and perpendicular to the member. The diameter of the finished hole shall be 1.5 mm greater than the nominal diameter of the bolt.

Welding

Welding shall be performed in accordance with the latest edition of "Code for Arc and Gas Welding in Building Construction", as formulated by the American Welding Society or equivalent Standard.

A shielded arc-welding process shall be used. All welds shall be made in such a manner that residual shrinkage stresses will be reduced to a minimum.

Galvanizing

All plates, members and shapes shall be hot dipped galvanized in accordance with ASTM Designation A123 or equivalent Standard. All bolts, nuts and washers shall be hot dipped galvanized in accordance with ASTM A153 or equivalent Standard. Re-threading of bolt threads after galvanizing will not be permitted.

All necessary precautions shall be taken in the selection of steel and its fabrication and preparation for galvanizing to prevent embrittlement of any item or parts of item including bolts and nuts.

Material on which galvanizing has been damaged shall be re-dipped. Any member on which the galvanized coating becomes damaged after having been dipped twice shall be rejected.

1.7 Minimum Design Requirements

(a) Roof Elevated, Roof Mounted and Ground Mounted Structures:

- Wind Speed = 100mph or as per latest BCP-21/ASCE7-22
- Wind Pressure = As per BCP-21 or latest ASCE 7-22
- Seismic Zone = As per Latest seismic Map of Pakistan
- Concrete Strength = 21MPa for 28 days cylindrical strength
- Structural Steel Grade = A-36
- Galvanization of Structural Steel = As per ASTM A123 & A153
- Minimum Member thickness for columns = 2.5mm
- Minimum Member thickness for Rafter, Purlin & Bracing = 2.0mm
- Galvanized Steel Base Plate thickness = 6mm Minimum
- Reinforcement Steel Grade = G-60 (413MPa UTS)
- Galvanized Steel Bolt Class = 6.8
- Connection Detail = Proper bolted and Welded connection as per design requirements.
- PV mounting Structure Design = Proper Computer Aided Design (CAD) on Finite Element Based (FEM) Software (i.e ETABS, SAP2000 etc.)
- Grouting = As approved by the Employer's Representative or his delegated Assistant.
- Water Proofing = Chemical water proofing as approved by the Employer's Representative or his delegated Assistant.
- Replacement of GI Sheets = Replacement shall be carried out wherever applicable

- Replacement and Addition of Wooden Planks = Replacement & Addition shall be carried out wherever applicable
- Fixing Arrangements (i.e. U-Clamp & Middle Clamp) detail of PV modules along with jointing/clamps detail of GI sheets with PV module should be provided by The Contractor for safe installation

(b) Parking Shed:

- Wind Speed = 100mph or as per BCP-21/ASCE7-22
- Wind Pressure = As per BCP-21 or ASCE 7-22
- Seismic Zone = As per Latest seismic Map of Pakistan
- Concrete Strength = 21MPa for 28 days cylindrical strength
- Bitumen Coating = All concrete work shall be coated with 2 coats of bitumen compound after stripping of the form work as a curing compound
- Structural Steel Grade = Fy-50
- Galvanization of Structural Steel = As per ASTM A123 & A153
- Minimum Member thickness for columns = 3.0mm
- Minimum Member thickness for Rafter, Purlin, Bracing & Stiffeners = 2.5mm
- Minimum Dia. for Sag Rod = 10mm
- Galvanized Steel Base Plate thickness = 6mm Minimum
- Reinforcement Steel Grade = G-60 (413MPa UTS)
- Steel Bolt Class = 6.8
- Class of Anchor Bolt = 6.8
- Length & Dia. of Anchor Bolt = as per design requirements
- Connection Detail = Proper bolted and Welded connection as per design requirements.
- PV mounting Structure Design = Proper Computer Aided Design (CAD) on Finite Element Based (FEM) Software (i.e. ETABS, SAP2000 etc.
- Grouting = As approved by the Employer's Representative or his delegated Assistant.

Water Proofing = Chemical water proofing as approved by the Employer's Representative or his delegated Assistant.

SECTION – VI: OPERATION AND MAINTENANCE

1. OPERATION & MAINTENANCE (O&M) FOR ROOFTOP SOLAR POWER PLANTS

1.1. Introduction

The Rooftop PV Hybrid Systems are designed for an operation lifetime of at least 25 years. Their optimal performance is sensitive to best-in-class O&M practices, which will ensure the best performance during the 25-years period. The Bidder is required to describe in detail his definite plans how to execute the below described requirements for the defined mandatory O&M period. As part of that, the bidder shall provide an organisational chart and CVs of the key O&M staff as well as the locations where staff and facilities (e.g. spare parts inventory) will be located. Any failure to describe a convincing concept will be leading to a rejection of the bid.

1.2. General Scope of Work

The Contractor shall provide operational guarantee for the PV Hybrid System for the first three (03) years after commissioning. Any repair or replacement of component(s) during this time shall be at the expense of the Contractor. Later repair or replacement shall be at the expense of the Contractor as long as it is caused by component failure during warranty period, workmanship of installation or lacking O&M execution during the Contractor’s O&M phase.

The Contractor will provide the complete O&M service during this duration at its own expense. The Contractor has to warrant the performance of the PV Hybrid System within his area of influence, as well as the Availability and time consumed for detection of malfunctions and its repair. The Contractor shall provide a full-service Operation and Maintenance service in order to maintain a fully functional PV Hybrid System for each building including all equipment, subsystems and structures.

This shall include, but not be limited to, the following items:

- Preventive maintenance according to maintenance programs, such as periodic preventive maintenance of inverters, batteries, and PV modules etc., according to manufacturers’ requirements.
- Scheduled inspection routines: E.g. PV modules to check for discoloration, first signs of delamination, loose wires in the electronics, corrosion of mounting structures, erosion.
- Maintenance of spare parts inventory (prompt replenishment of used spare parts) including continuous reporting of status and consumption.
- Corrective maintenance with guaranteed response and reaction times, including all repair and replacement costs.
- Technical operation of the PV Hybrid System including presence of O&M personnel close to the Project site as required to fulfil all O&M Contract obligations.
- Regular cleaning of the PV Hybrid System site, preventive and corrective maintenance of civil works and cabinets.
- Smooth functioning of data communications over Centralized Monitoring System (CMS).
- Provision of regular service reports about performance, repairs, maintenance, and tests.
- Regular performance of variance analysis of the entire fleet of PV Hybrid Systems.

- Ensuring that any warranties and insurance policies for the PV Hybrid System are assignable / transferrable to Employer in case of change of Contractor.
- Provision of all O&M personnel trained and certified as far as applicable. The staffing concept and selected key employees shall be presented to the Employer for approval.
- Arrangement of service contracts with specialized sub-contractors, permitting the requested response and reaction times and quality of work required to maintain the PV Hybrid System.

1.3. Hiring / Training Period / Initial Inspection

The Contractor’s Personnel must be nominated by the Contractor no later than 8 weeks prior to operations start date of the first PV Hybrid System and contractually hired no later than 4 weeks prior to operations start date of the first PV Hybrid System.

The Contractor’s O&M Personnel shall be certified experts with the PV Hybrid System and its documentation, to enable an efficient operation & maintenance from handover day. The Contractor shall also understand all pending items (e.g. punch-list) and performance deficits (if any) for which the Contractor is responsible for, after operations start date.

The O&M Personnel shall familiarize themselves with the specific PV Hybrid System equipment and maintenance requirements as imposed by the component manufacturers and Employer. In addition, the O&M Contractor shall arrange and provide all training as a prerequisite for the selected staff and provide the respective certificates.

The O&M Contractor shall establish all maintenance routines, inspection checklists, working files, etc. as required.

At this phase, the O&M Contractor must always coordinate with Employer and keep Employer updated regarding progress of preparation, status of construction, pending issues of construction, commissioning and testing.

At the end of the mandatory O&M phase and if the contract is not extended further, the Contractor shall give sufficient and adequate training to the Employer’s staff (or its subcontractor’s staff) that will continue the O&M works.

1.4. Centralized and Remote Monitoring Systems (CMS and RMS)

The Contractor shall provide a CMS and RMS that must be capable of providing a reliable, stable and continuous (24/7) centralized and remote access with the monitoring system of the PV Hybrid System.

Centralized and remote access to all operational data for the PV Hybrid System must guarantee the uninterrupted transfer and acquisition of operational data.

The provided monitoring systems will be subject to review and approval by Employer prior to procurement. It must provide different access levels and access rights.

The communication network between the PV Hybrid System and the monitoring systems will be built with common and standardized components and network cables. The long-term availability of spare parts must be assured. Standardized communication protocols must be used.

The following functionalities are required:

- I. Remote monitoring and management of the whole system by Contractor on a 7-days 12-hour daytime basis, with the capability of web-based information sharing.
- II. Continuous transmission of monitoring data to centralized monitoring server.
- III. Data must be readily available for the fulfilment of all warranties.
- IV. Remote backup of centralized monitoring data.
- V. Frequent string level data collection (30-min sampling interval), analysis, and display of the fundamental parameters of the system and sub-system. Real-time transmission of Alarms.
- VI. Alarms / alerts and timely notification of key performance indicators.
- VII. Monthly, quarterly and annual reporting including opening/closing of service tickets, spare parts used, and any deviations from the guaranteed Performance.
- VIII. Status of overvoltage protection and grounding protection (DC).
- IX. Separate monitoring of inverters, battery charger and batteries (current and voltage).
- X. Provision of on-call service for the Employer for availability outside business hours and during weekends (24/7).
- XI. Any reductions in performance must be logged.
- XII. The data must present the current status of the PV Hybrid System, including the string level monitoring, battery SOC and SOH status, current production, balance of energy flow within system and via its system boundaries, daily, monthly and annual overview, and the current power being exported to the grid (in future).
- XIII. The remote monitoring must also control the operation of the PV Hybrid System. To ensure this, the PV Hybrid System data should be sent to a central server and stored permanently.
- XIV. The remote monitoring must also include the ticketing of faults and resolution measures taken.
- XV. the Contractor shall provide to Employer permanent online read access to the remote monitoring system for parallel monitoring of the PV Hybrid System’s raw data and performance. Additionally, the Contractor shall send the data automatically and regularly (minimum every 30 min) to an ftp server set up through CMS.
- XVI. The data transfer costs (fees for internet connection, etc.) are to be paid by the Contractor.
- XVII. The log data must be provided continuously, completely, and stored in CMS for a minimum period of five (5) years for all measuring channels. The on-site data storage should be provided for one (01) month.

The Bidder should detail the IT system architecture (the physical link, internet, transport, and application layers), hardware and software descriptions of servers, bus drivers, communication cables, and security and information exchange protocols for the data management outlined above. It should also explain the data backup processes to be implemented to ensure timely information for preventive and corrective measures in order to maintain optimal system output.

1.5. Allocation of O&M Personnel

The Contractor will provide all O&M personnel, trained and certified as far as applicable. The staffing concept and selected key employees shall be presented to the Employer for approval.

The Contractor shall arrange service contracts with specialized sub-contractors permitting the requested response times and the required quality of work to maintain the PV Hybrid System.

All operational data shall be logged on-site in parallel to the remote monitoring data storage.

2. SCOPE OF SUPPLY AND SERVICES FOR THE O&M OF ROOFTOP SOLAR POWER PLANTS

2.1. Quarterly Inspections

The Contractor shall perform quarterly inspections of the PV Hybrid System. The inspections must follow the detailed inspection procedure and be documented accordingly. The scope must include the following (as a minimum):

2.2. PV Modules and Supporting Structure

- Visual inspection of all PV modules regarding damage.
- Visual damage inspection of all accessible cable trenches and cable trays.
- Visual inspection and random testing of PV module DC connectors.
- Check for loosening of PV module clips. Clips should be replaced if necessary. (Scope: Min. 10% per inspection including documentation of location; 100% during 3-year PV Hybrid System inspection).
- Testing of sturdiness of mounting foundation / system and random substructure corrosion inspection.

2.3. Inverters

- Functional check of inverter ventilator system and filters (if applicable).
- Test of the internal circuit breakers and power switches, emergency shutoff test.
- Visual inspection of all fuses.
- Inspection of overvoltage protection and upstream fuses regarding external damage.
- Functional check of internal and external overvoltage and under voltage protection through operation of test terminal.
- Functional insulation monitoring check.
- Check of control and auxiliary voltages.
- Check of the safety circuit for the interruption of the AC-grid protection in the case of failure (emergency shutoff, over-/ under voltage, over temperature, etc.).
- Visual inspection of AC and DC clamps for tightness and discolouring, tightening of clamps.
- Inspection of the interior of the inverter regarding dust deposit, dirtiness, humidity, water penetration from outside. The inverter shall be cleaned if necessary.
- Testing of inverter features according to manufacturer’s maintenance schedule.
- Maintenance of inverters according to manufacturer’s instructions.

2.4. Battery Charge Controller

- Inspection of the exterior of the battery charge controller regarding dust deposit, dirtiness, humidity. The battery charge controller shall be cleaned if necessary.
- Testing of battery charge controller features according to manufacturer’s maintenance schedule.
- Maintenance of battery charge controller according to manufacturer’s instructions.
- Batteries / Electricity Storage

- Inspection of the exterior of the batteries regarding dust deposit, dirtiness, humidity. The batteries shall be cleaned if necessary.
- Testing of battery features according to manufacturer’s maintenance schedule, including remaining battery capacity.
- Maintenance of batteries according to manufacturer’s instructions

2.5. Enclosure Cabinet for Inverters and Batteries

- Functional check of enclosure cabinet ventilator system and filters (if applicable).
- Inspection of the interior of the electrical cabinet regarding dust deposit, dirtiness, humidity, water penetration from outside. The cabinet shall be cleaned if necessary.
- Visual damage inspection of all accessible cable trenches and cable trays.

2.6. Security System / Theft Protection

- Random test and retightening of security bolts if necessary, according to manufacturer’s instructions.

2.7. Additional Inspections

- Functionality testing of the remote monitoring system.
- Adequacy of settings for battery charge settings.
- Maintenance of all PV Hybrid System components according to manufacturer’s instructions.
- If applicable: Inspection of all aspects required from the applicable permits (environmental, building, etc.).

The Contractor has to modify the inspections routines as well as the frequency of the special inspection in case of specific the requirements and/or norms will be defined or modified by relevant authorities in Pakistan and/or grid operators.

2.8. Roof Maintenance

Roof maintenance includes all procedures necessary to avoid PV module shading and faults due to problems of the rainwater drainage. Any blockage of roof drains shall be cleared on each site visit.

In case the integrity of the roof is affected due to improper installation of the PV modules and/or the supporting structure, such as leakages through the affected roof, the Contractor shall carry out all the repairs at his own cost.

3. PERFORMANCE OF MAINTENANCE AND REPAIR WORKS

The results of the inspection and maintenance works, as well as the deactivations, must be documented in a report (blank maintenance report example shall be delivered by the Contractor as part of the O&M Works).

For the performance of the contractual services, the Contractor will be obliged to observe and respect the component manufacturer’s maintenance and operation specifications and regulations (especially for the PV modules, inverters and batteries), in particular during the warranty period.

For the performance of the contractual services, the Contractor will be obliged to observe and respect local laws, regulations and international PV standards.

Throughout the duration of the Contract, the Contractor will be held responsible for public safety at the PV Hybrid System.

4. PERFORMANCE GUARANTEES

Every fault message must be registered and stored by the on-site, centralized and remote monitoring software. According to the fault message, the Contractor will issue a fault diagnosis within a response time of 24 hours (24/7) and, as far as possible, immediately restart the operation of the affected part of the PV Hybrid System.

- All fault messages and results relevant for the operation of the PV Hybrid System are to be documented in the ticketing system. Any fault messages resulting in fault calls must be documented in the corresponding monthly reports, indicating start and end of fault, reason and/or any repair work performed, as well as the respective components of the PV Hybrid System fault management / warranty defects
- Fault management procedures must include necessary communication of faults, coordination of on-site appointments with service staff or service partners, as well as the corresponding and general operational structure.
- Fault management procedures must include the preparation, handling and support in events covered by insurance, and the enforcement of claims for compensation to third parties, including the component manufacturers.
- The Contractor is obliged to identify potential warranty defects and support Employer in obtaining rectification from the respective manufacturer. The Contractor shall be responsible for coordinating through Employer all claims related to warranty defects and their rectification during the respective product warranty period.
- Operational defects that are not considered as warranty defects must be rectified as soon as possible by the Contractor within its scope of work.
- All defects are to be documented within the same day of detection, and a summary provided to Employer on a monthly basis in the corresponding monthly report. All fault and defect rectification must be included in the monthly reports, with reference to the initial alarm/notification of occurrence.
- All incurred repair times outside of the fault rectification time identified above will be considered as unavailability of the affected PV Hybrid System component.
- All replacements and repairs are to be covered by Contractor’s annual remuneration under the Contract within the initial O&M Period of three (03) years.

4.1. Liquidated Damages for Failure to Comply with Performance Guarantees

- The scope of service shall include any working times for all fault calls including travel times and any travel costs.
- If faults cannot be identified completely from the fault message or the restart of operation is not possible, additional service staff or service partner shall take action with standard tools and spare parts. The following fault rectification times shall apply, which will start (i) as soon as the fault message is received by the monitoring system, or (ii) as soon as the fault has been detected onsite, or (iii) as soon as the fault is detected during regular on-site controls.

Fault Rectification Time		
	Fault / Error / Defect	Rectification time
Priority 1	- Failure of complete communication with RMS - Failure of battery backup system - Failure of at least 50% of connected PV strings or inverter	2 Calendar days
Priority 2	- Failure of single PV modules or single PV module string	4 Calendar days

The fault call is to include on-site fault diagnosis, as well as an immediate fault correction, if possible. The fault must be corrected within the fault rectification time and, failing that, an in-depth diagnosis of the fault must be performed indicating further measures.

In-case the fault is not rectified within the fault rectification time as defined above, then the Contractor shall pay to the Employer Liquidated Damages (LDs) as stated in Volume-I.

Fault calls can be performed without prior consent of Employer.

4.2. Approval of Extensive Repairs

Extensive repairs requiring an amendment of the PV Hybrid System or an exchange of original equipment for different types (i.e. the installation of non-original components), must be approved by Employer. All non-original components (e.g. a specific inverter or battery type) must be procured from the original component manufacturer (e. g. the inverter manufacturer needs to remain the same, but the inverter or battery type can be modified).

4.3. Repair Works Documentation

All major repair works (defined as all repair works which require spare parts not fully provided by the spare parts inventory) and insurance compensations must be documented in the corresponding monthly reports.

4.4. Inspection of Repair Works

The Employer reserves the right to inspect the repair works within three months (90 days) of receiving the repair works documentation. Employer reserves the right to consult an independent expert in the event that any doubt arises as to the Contractor’s performance.

4.5. Spare Parts Inventory and Maintenance Tools

The Contractor will provide a spare parts inventory by the start of O&M Period at the latest. The spare parts inventory will be placed in Employer’s designated premises. e.g. in a specific container with safety locks and connected to a security surveillance system.

The Contractor shall operate and maintain the spare parts inventory during the term of the O&M Period. The Contractor will be responsible for the immediate replenishment of the spare parts. The Contractor is responsible to cover all cost for the replenishment of the spare parts inventory within its annual remuneration under the Agreement.

The status and consumption of the spare parts inventory must be included in the corresponding monthly reports.

The Contractor must provide the necessary set of maintenance tools to perform the services.

5. SCOPE OF SUPPLY FOR SECURITY SERVICES

The Contractor will not be responsible for Security Services of the PV Hybrid System. The Client will be responsible for the security of each PV Hybrid System against any theft and vandalism.

5.1. Reporting of all O&M Activities

Monthly and annual reports based on the data of the remote monitoring are to be prepared by O&M Contractor and provided to Employer within 4 four weeks after the end of the corresponding reporting period. The reports must include the reporting any deviations from the expected performance of the PV Hybrid System.

Any fault messages resulting in fault calls must be documented in the corresponding monthly reports indicating start and end of fault, reason and/or any performed repair works, as well as the respective components of the PV Hybrid System.

The status and consumption of the spare parts inventory must be included in the corresponding monthly reports.

The results of inspection performed maintenance works, as well as deactivations must be documented in a report.

The specific reporting format of each report type will be subject to review and approval by Employer and its OE prior to the execution of the O&M Contract.

6. MISCELLANEOUS

6.1. Change of Inspection and Maintenance Work Procedures

The Contractor shall perform the work in accordance with all applicable laws. In case of conflict between the specified requirements and the applicable law, the Contractor shall propose a solution to adapt the works accordingly and resolve the matter in a mutual sense for Employer’s approval.

6.2. Person in Control of PV Hybrid Systems

The Contractor must propose at least one main responsible and suitable person in charge of the PV Hybrid Systems for buildings for each district, the “O&M Manager”. These persons must fulfil all local requirements, permits and standards, must have sufficient experience and be approved by Employer and be available for communication with Employer (mobile phone) during the above-defined O&M times. Any replacement or substitute of these persons will be subject to approval by Employer.

6.3. Handover of Documentation after end of O&M Contract

Within one month after the end of the O&M Contract, the Contractor must hand over the complete electronic, printed and written documentation for the O&M of the PV Hybrid Systems. This includes the complete documentation which was previously handed over to the Contractor by

Employer or its service provider. This also includes the complete raw data of the PV Hybrid System monitoring acquired through the remote monitoring system.

6.4. Codes, Standards, Regulations, Permit, etc.

State of the art O&M is required. The fulfilment of all relevant IEC and Pakistani norms, standards and regulations is the full responsibility of the Contractor.

The O&M Works for the PV Hybrid Systems must fulfil all applicable international and regional norms, standards, and grid connection requirements.

The Contractor must comply with all applicable permits and the conditions imposed on the PV Hybrid System by all authorities.

The Contractor must fulfil all applicable health and safety standards required by the relevant Pakistani authorities during the entire Operation and Maintenance phase

7. Rooftop Plant BESS O&M

7.1. System Operation and User Interface

Roof top Solar BESS systems shall feature user-friendly mobile applications and cloud-enabled monitoring. The system automatically manages charging from PV arrays and provides backup power during grid outages.

Systems generate user-friendly notifications through mobile applications:

- State of Charge notifications: As per Employer’s Requirements
- State of Health status: Continuous
- Load Disconnection Notifications

7.2. Maintenance and Safety

Biweekly visual inspection of system indicators, quarterly cleaning of ventilation areas, and annual professional maintenance ensure safe operation. The system's IP65 enclosure protection and low noise operation (≤ 65 dB(A)) enable indoor installation.

Annual inspection by certified technicians includes BMS diagnostics, electrical connection testing, and performance verification. The system's integrated safety features minimize maintenance requirements while ensuring long-term reliability.

7.3. Warranty and Support

All Roof top Solar BESS systems include 10-year product warranty with performance guarantee of $\geq 70\%$ initial capacity after 10 years or 6000 cycles @ 80% DoD. Monitoring enables proactive support and rapid issue resolution within 48-hour response time guarantee.

ANNEXURE I – DRAWINGS

Preambles to Annexure 1

The drawings included in this Part are provided for reference and general guidance only. For specific PV modules and inverters, complete set of Employer’s requirements has set forth under section I (Scope of Work) , Section II (General Project Requirements), Section III (DC Systems), Section IV (AC Systems), and Section V (Civil & Structure Works) shall prevail, which shall be subject to Employer’s approval prior to procurement and delivery at site.

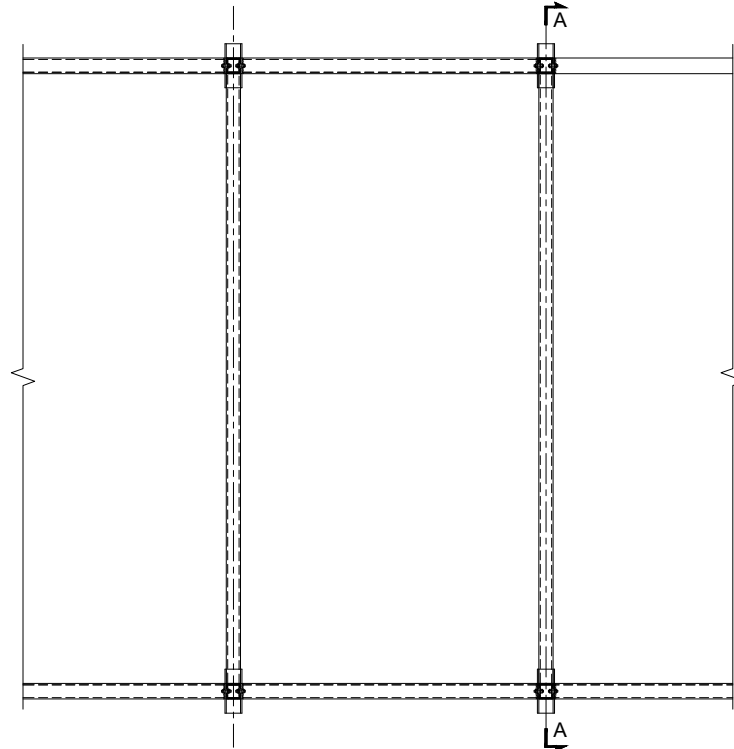
These drawings shall not be considered as Issued for Construction (IFC) documents. In accordance with Sub-Clause 5.2 [Contractor’s Documents] of the Conditions of Contract, the Contractor shall be solely responsible for preparing, submitting, and obtaining approval of its own detailed design and construction drawings. The Contractor shall ensure that its design complies fully with the Employer’s Requirements, applicable standards, and good industry practice.

Any discrepancies, omissions, or variations in the reference drawings shall not relieve the Contractor of its obligations to complete the Works in full compliance with the Contract.

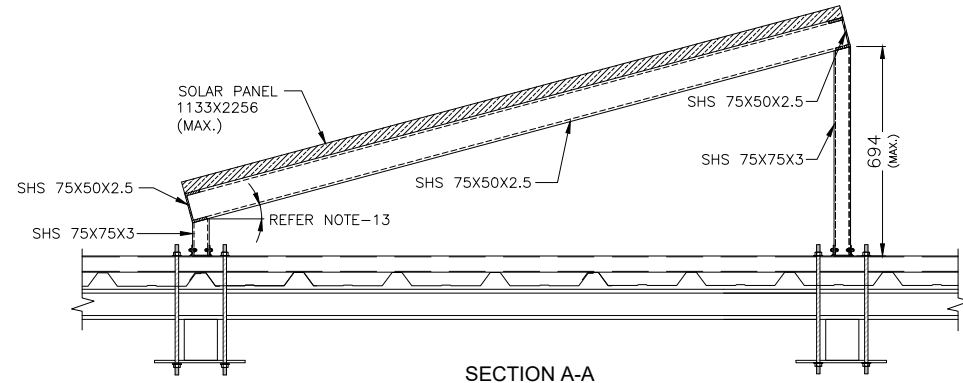
The list of drawings is also attached herewith attached

Sr. No.	Drawing No.	Drawing Title
1	4894/TD/STR/01	CGI Structure
2	4894/TD/STR/03/01	Typical Solar Panel Framing for Ground Elevated Structure
3	4894/TD/STR/03/02	Typical Solar Panel Framing for Ground Elevated Structure
4	4894/TD/STR/03/03	Typical Solar Panel Framing for Ground Elevated Structure
5	4894/TD/STR/04/01	Typical Solar Panel Framing for Ground Mounted Structure
6	4894/TD/STR/04/02	Typical Solar Panel Framing for Ground Mounted Structure
7	4894/TD/STR/02/01	Typical Solar Panel Framing for Parking Shed
8	4894/TD/STR/02/02	Typical Solar Panel Framing for Parking Shed
9	4894/TD/STR/02/03	Typical Solar Panel Framing for Parking Shed
10	4894/TD/STR/02/04	Typical Solar Panel Framing for Parking Shed
11	4894/TD/STR/05/01	Typical Solar Panel Framing for R.C.C Roof Mounted Structure
12	MV / LV – 21	1-10 KW Single Line Diagram
13	MV / LV – 22	10-20 KW Single Line Diagram
14	MV / LV – 23	20-30 KW Single Line Diagram

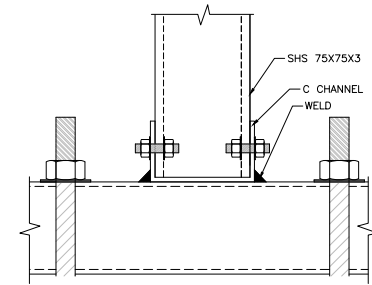
Sr. No.	Drawing No.	Drawing Title
15	MV / LV – 24	30-50 KW Single Line Diagram
16	MV / LV – 25	50-70 KW Single Line Diagram
17	MV / LV – 26	70-100 KW Single Line Diagram
18	MV / LV – 27	100-125 KW Single Line Diagram
19	MV / LV – 28	125-150 KW Single Line Diagram
20	MV / LV – 29	150-200 KW Single Line Diagram
21	MV / LV – 30	200-250 KW Single Line Diagram
22	MV / LV – 31	300 KW Single Line Diagram
23	MV / LV – 32	350 KW Single Line Diagram
24	MV / LV – 33	400 KW Single Line Diagram
25	MV / LV – 34	500 KW Single Line Diagram
26	MV / LV – 35	700 KW Single Line Diagram
27	MV / LV – 36	Earthing Details
28	MV / LV – 37	Lightning Arrestor



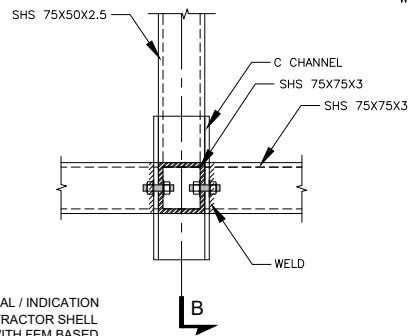
TYPICAL STRUCTURAL FRAMING AND SHEETING PLAN



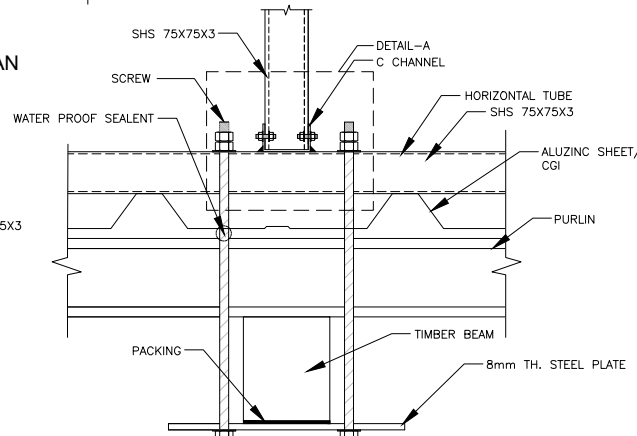
SECTION A-A



DETAIL-A



FIXING DETAIL



SECTION B-B

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL STEEL GRADE SHALL HAVE MINIMUM YIELD STRENGTH OF 250 Mpa.
4. ALL WELD SHALL BE OF E70XX ELECTRODE.
5. ALL STEEL STRUCTURE AND ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED (MIN 85 MICRON).
6. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE 304) AND ANTI-THEFT.
7. IT IS ASSUMED THAT THE EXISTING STRUCTURE IS ADEQUATE TO BEAR THE LOADINGS FROM STRUCTURAL FRAMING OF SOLAR PANEL.
8. TWO DRAINAGE CLIPS SHALL BE PROVIDED FOR EACH MODULE IN THE LAST/LOWEST ROW OF THE MODULES IN A SHED.
9. ALL BEAM TO BEAM & BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING AT LEAST 4MM THICKNESS.
10. AN APPROVED WATER PROOF SEALANT SHOULD BE PROVIDED AT EACH PUNCHING POINT IN ORDER TO AVOID WATER LEAKAGE.
11. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
12. CONTRACTOR TO ENSURE THAT THE EXISTING DRAINAGE CHARACTERISTICS OF THE ROOF TOP ARE NOT COMPROMISED.
13. FOR ANGLE REFER TO SIMULATION DRAWINGS/REPORT.

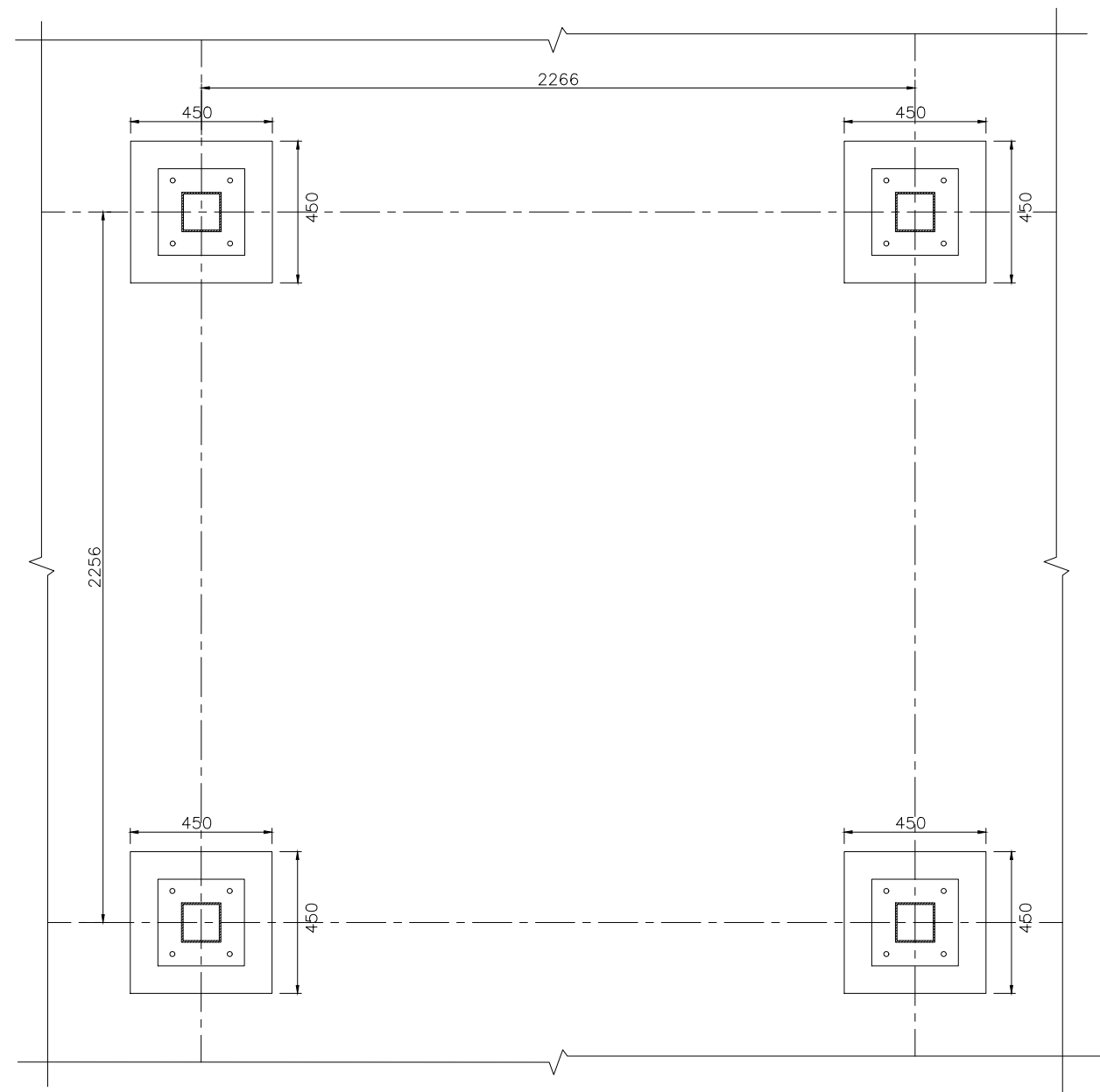
NOTE:

THESE ARE MINIMUM REQUIRED CONCEPTUAL / INDICATION DRAWINGS ONLY HOWEVER, THE EPC CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS ALONG WITH FEM BASED MODEL FOR APPROVAL PURPOSES.

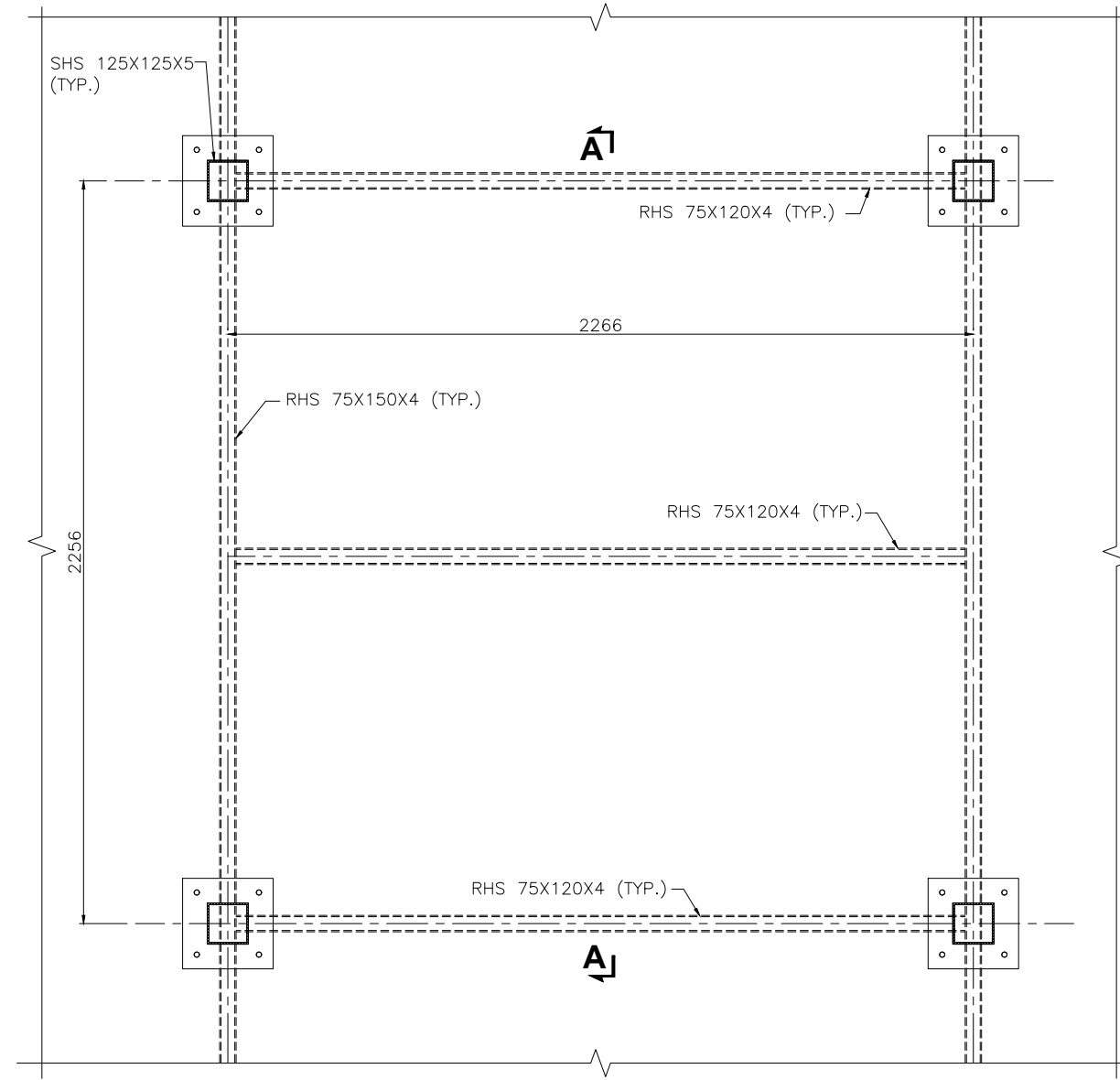
CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE- NESPAK HOUSE, I.C. BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT	04			DRAWN	M.A	PROJECT	CGI STRUCTURE DATE MAR. 2025 DRAWING No. 4894/TD/STR/01	SCALE
	WATER & POWER GILGAT BALTISTAN	03			SUBMITTED		100 WM DISTRIBUTED SOLAR PV PLANTS AT VARIOUS SITES IN GILGAT BALTISTAN		NTS
		02			RECOMMENDED				REV.
		01			CHD./VER.				↕
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			

NOTES:
1. REFER NOTE ON SHEET G02.




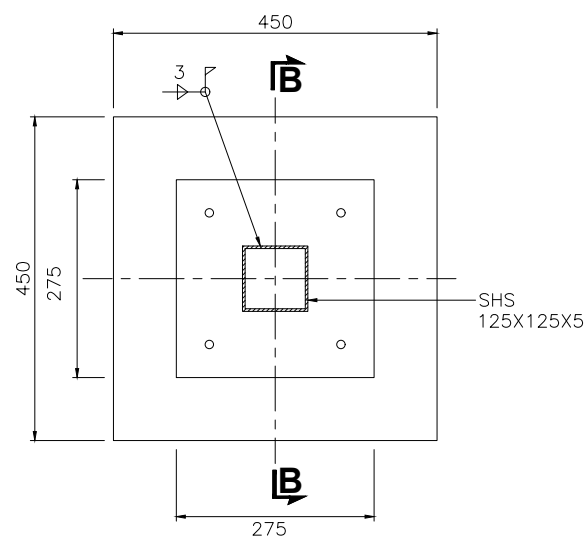
FOUNDATION LAYOUT PLAN



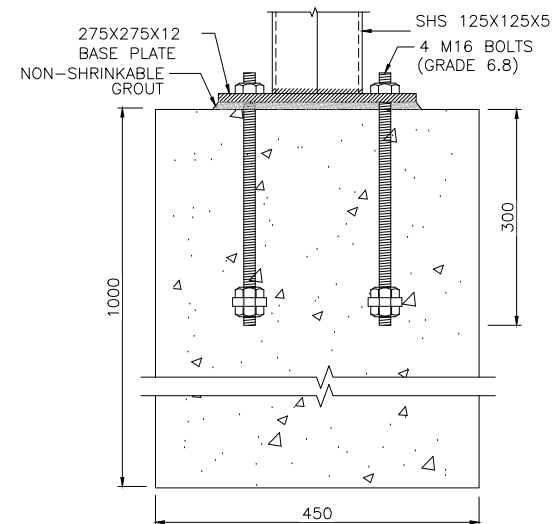
TYPICAL STRUCTURAL FRAMING PLAN

NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT	04			DRAWN	S.A	PROJECT	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
	WATER AND POWER GILGAT BALTISTAN	03			SUBMITTED		100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	DATE	DRAWING No.	NTS
		02			RECOMMENDED			MAR-2025	4894/TD/STR/03/01	REV.
		01			CHD./VER.				0	
	REV. DATE DESCRIPTION APPROVED APPROVED									



CONCRETE BLOCK DETAIL



SECTION B-B


GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
11. WELDED ELECTRODES SHALL BE 70XX.
12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.5 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN $1.5T/\text{FT}^2$.
17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
21. THE STRENGTH OF P.C.C IS 14MPa , AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa .
22. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
23. REFER TO SIMULATION REPORT FOR ANGLE.

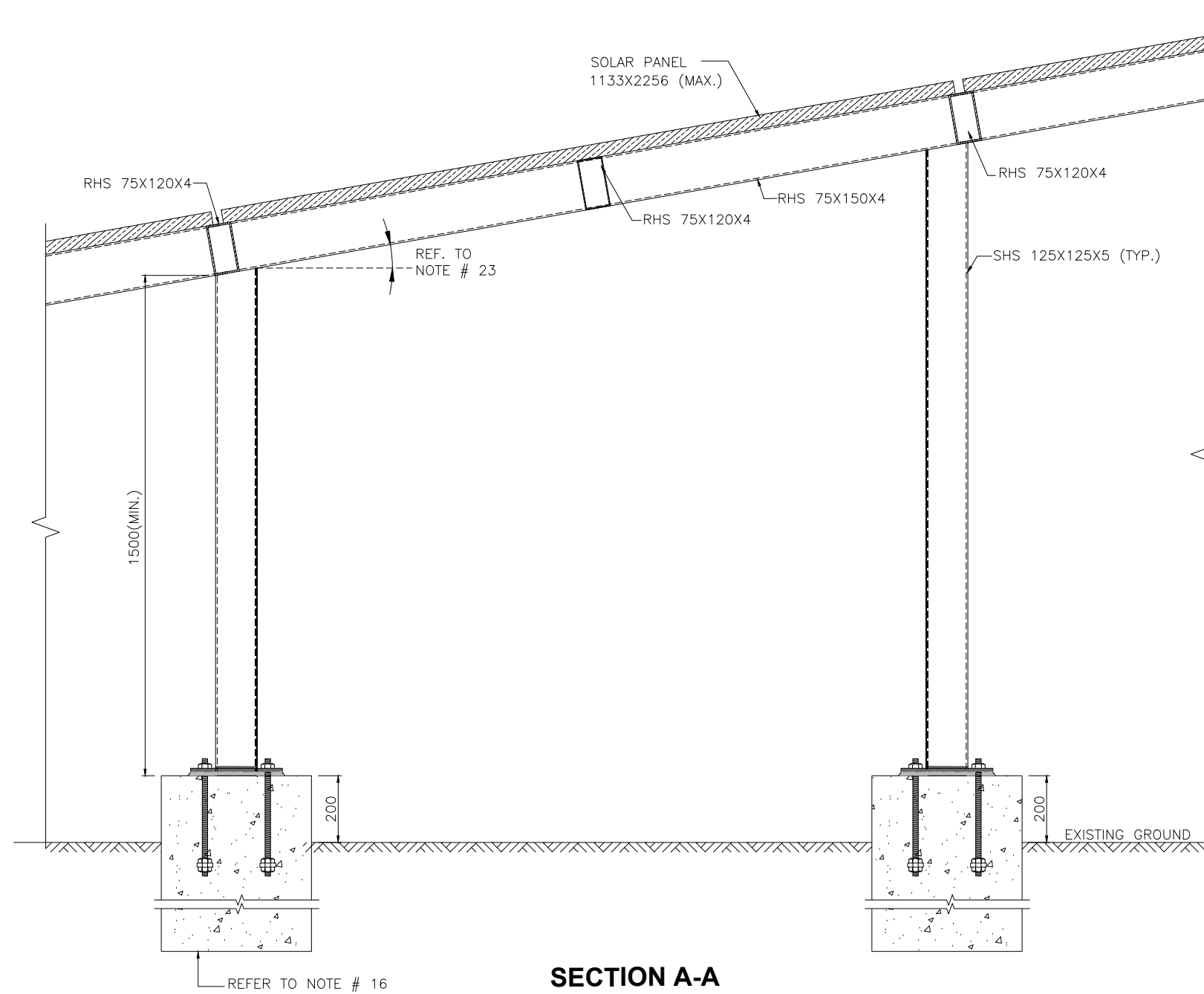
NOTES:

THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE		SCALE
		03			SUBMITTED					NTS
		02			RECOMMENDED					
		01			CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.
								MAR-2025	4894/TD/STR/03/02	0

NOTES:
1. REFER NOTE ON SHEET G02.



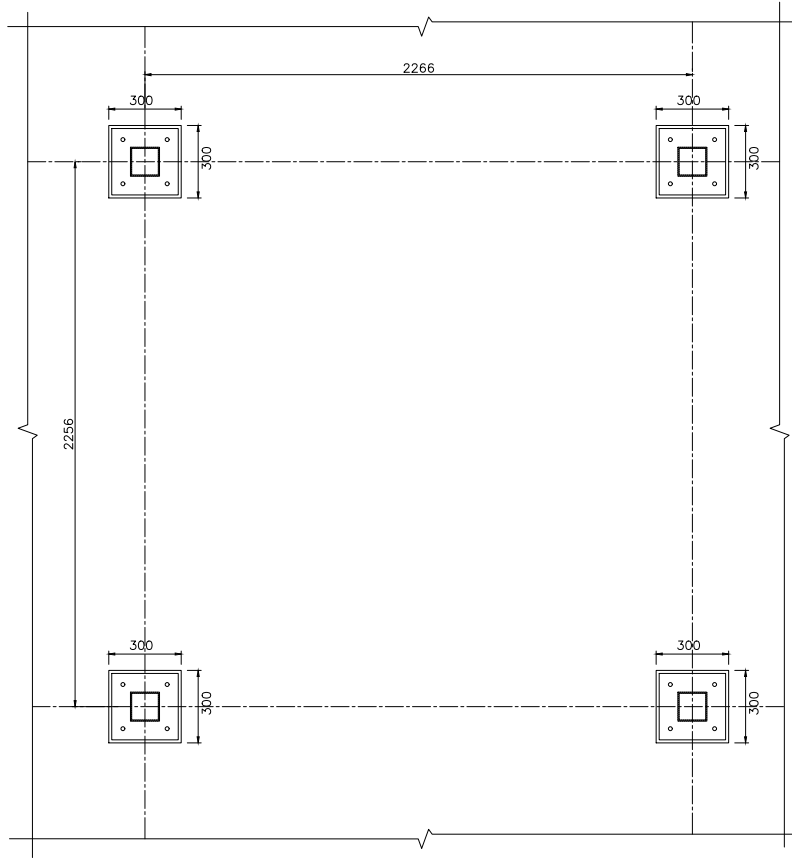
SECTION A-A

NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

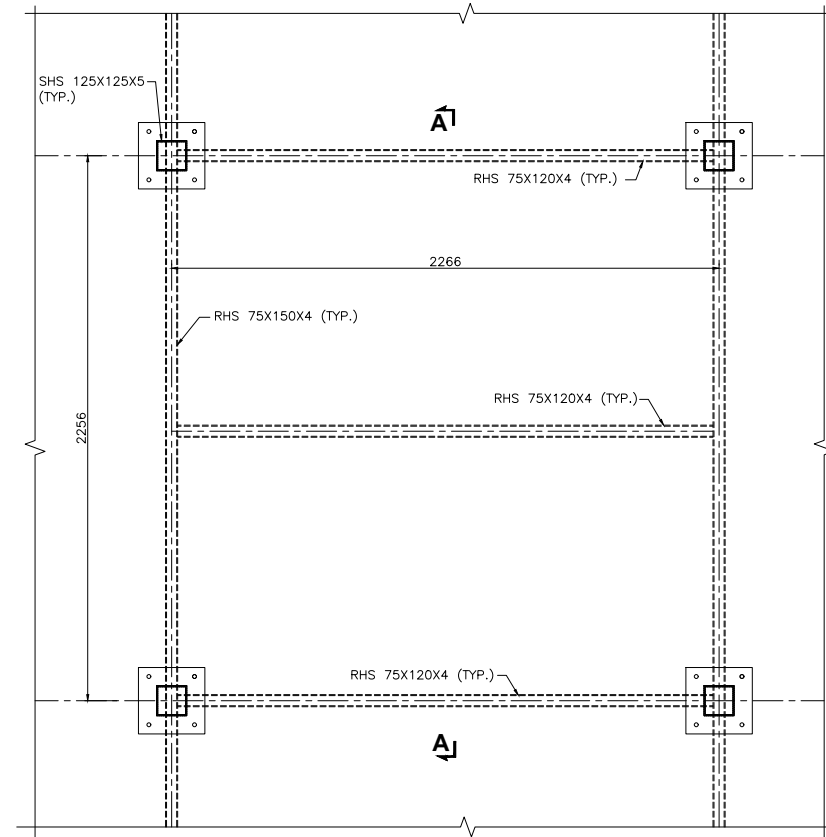
CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	<p>CLIENT</p> <p>WATER AND POWER GILGAT BALTISTAN</p>	04			DRAWN	S.A	<p>PROJECT</p> <p>100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN</p>	<p>TYPICAL SOLAR PANEL FRAMING FOR GROUND ELEVATED STRUCTURE</p>		SCALE
		03			SUBMITTED			NTS		
		02			RECOMMENDED					
		01			CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED	DATE	DRAWING No.	REV.	
							MAR-2025	4894/TD/STR/03/03	0	

NOTES:
1. REFER NOTE ON SHEET G02.




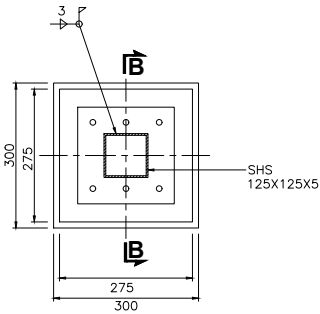
FOUNDATION LAYOUT PLAN



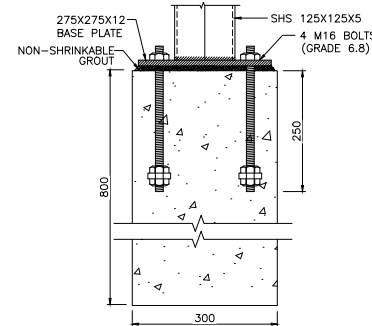
TYPICAL STRUCTURAL FRAMING PLAN

NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

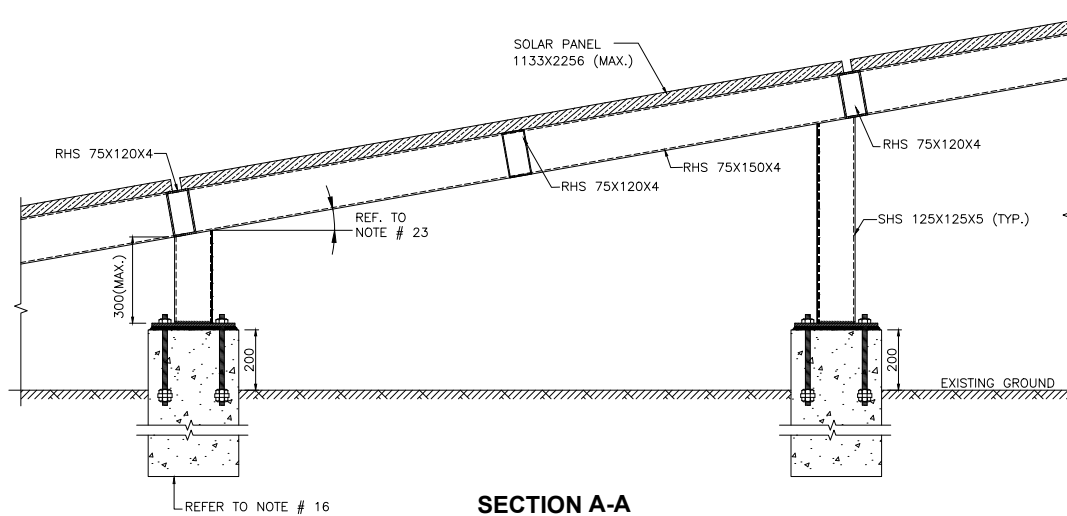
 NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04				DRAWN S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	TYPICAL SOLAR PANEL FRAMING FOR GROUND MOUNTED STRUCTURE		SCALE
		03				SUBMITTED		NTS		
		02				RECOMMENDED				
		01				CHD./VER.				
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.	
							MAR-2025	4894/TD/STR/04/01		



CONCRETE BLOCK DETAIL



SECTION B-B



SECTION A-A

- GENERAL NOTES:
1. ALL DIMENSIONS ARE IN MM.
 2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
 3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
 4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
 5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
 6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250\text{MPa}$.
 7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
 8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
 9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
 10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
 11. WELDED ELECTRODES SHALL BE 70XX.
 12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
 13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
 14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
 15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.5 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
 16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN 1.5T/FT².
 17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
 18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
 19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
 20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
 21. THE STRENGTH OF P.C.C IS 14MPa, AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF 21MPa.
 22. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
 23. REFER TO SIMULATION REPORT FOR ANGLE.

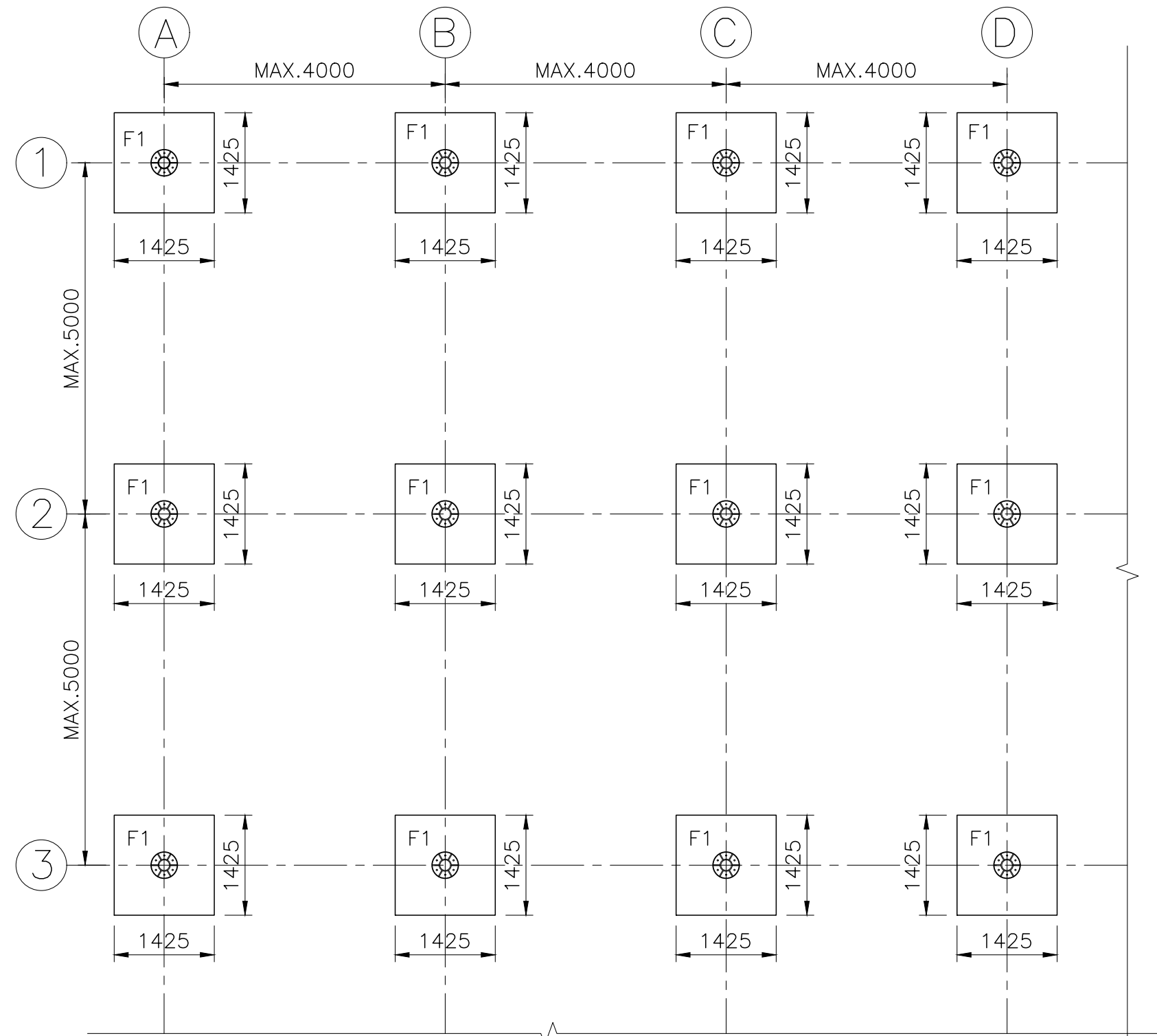
NOTES:

THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.</p> <p>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	<p>CLIENT</p> <p>WATER AND POWER GILGAT BALTISTAN</p>	04			DRAWN	S.A	<p>PROJECT</p> <p>100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN</p>	<p>TYPICAL SOLAR PANEL FRAMING FOR GROUND MOUNTED STRUCTURE</p>		SCALE
		03			SUBMITTED			NTS		
		02			RECOMMENDED					
		01			CHD./VER.		DATE	DRAWING No.	REV.	
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED		MAR-2025	4894/TD/STR/04/02	

NOTES:
1. REFER NOTE ON SHEET G03.



FOUNDATION LAYOUT PLAN

NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

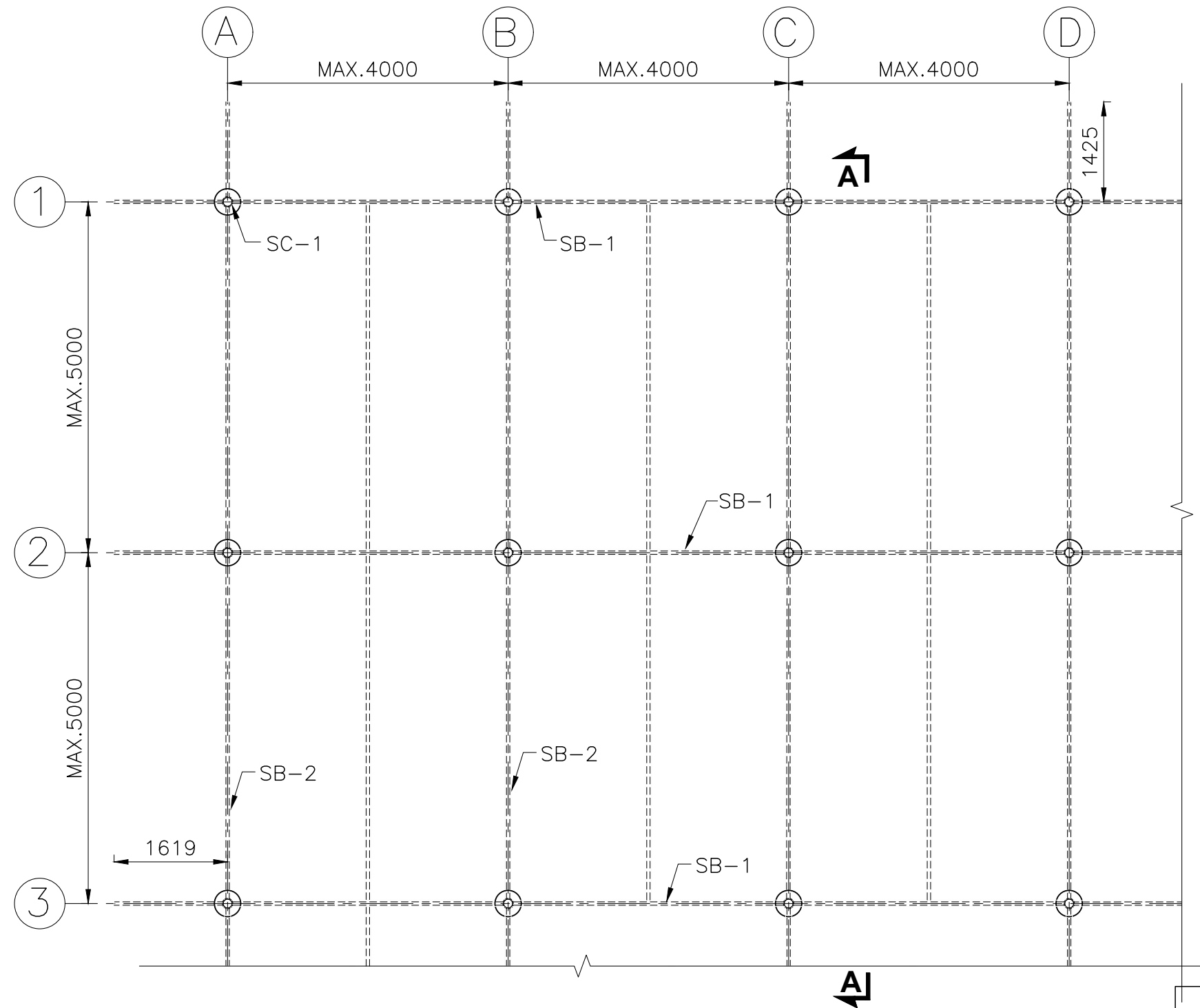
CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. <small>HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</small>	CLIENT	WATER AND POWER GILGAT BALTISTAN	04		DRAWN	S.A	PROJECT	SCALE
				03		SUBMITTED		NTS
				02		RECOMMENDED		
				01		CHD./VER.		
				REV.	DATE	DESCRIPTION	APPROVED	APPROVED
							DATE	DRAWING No.
							MAR-2025	4894/TD/STR/02/01
								0

100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN

SOLAR PANEL FRAMING FOR PARKING SHED

NOTES:
1. REFER NOTE ON SHEET G03.



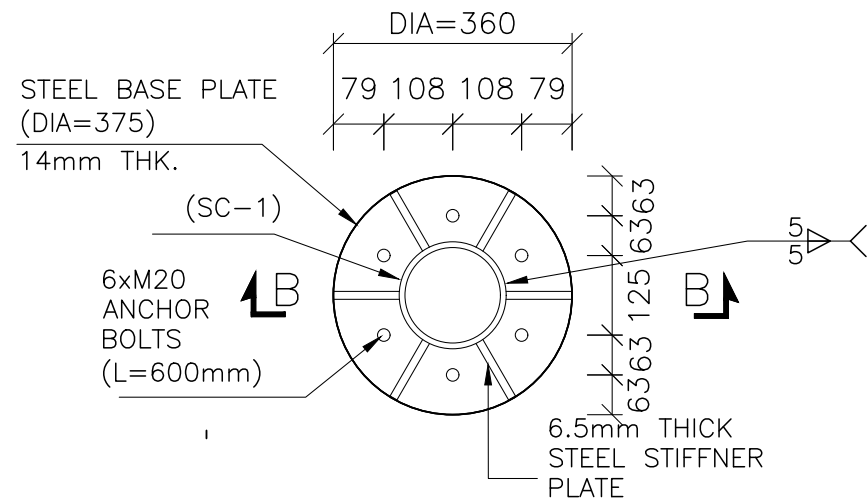
FRAMING LAYOUT PLAN

MEMBERS	SIZE/DESIGNATION
SC-1	I-SECTION OF 150X75X6mm
SB-1	I-SECTION OF 150X75X6mm
SB-2	C-CHANNEL OF 125X75X3mm

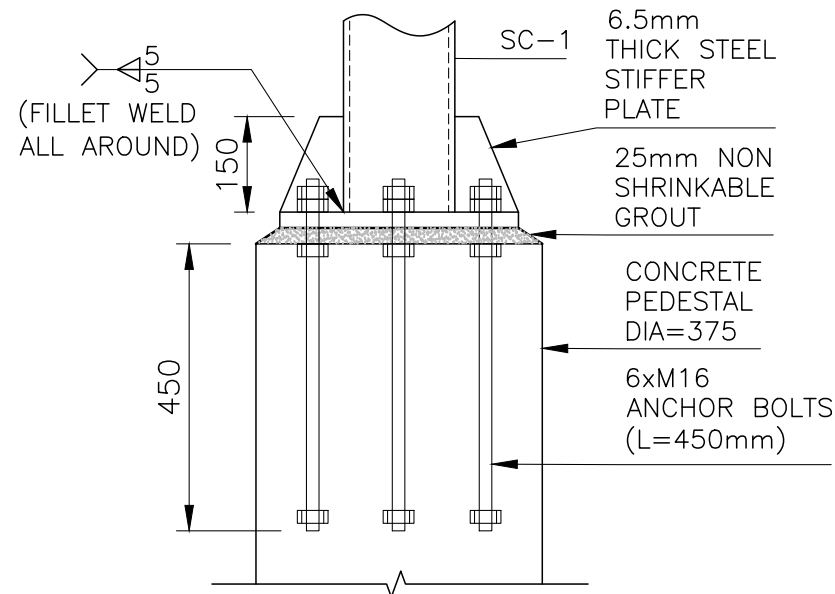
NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

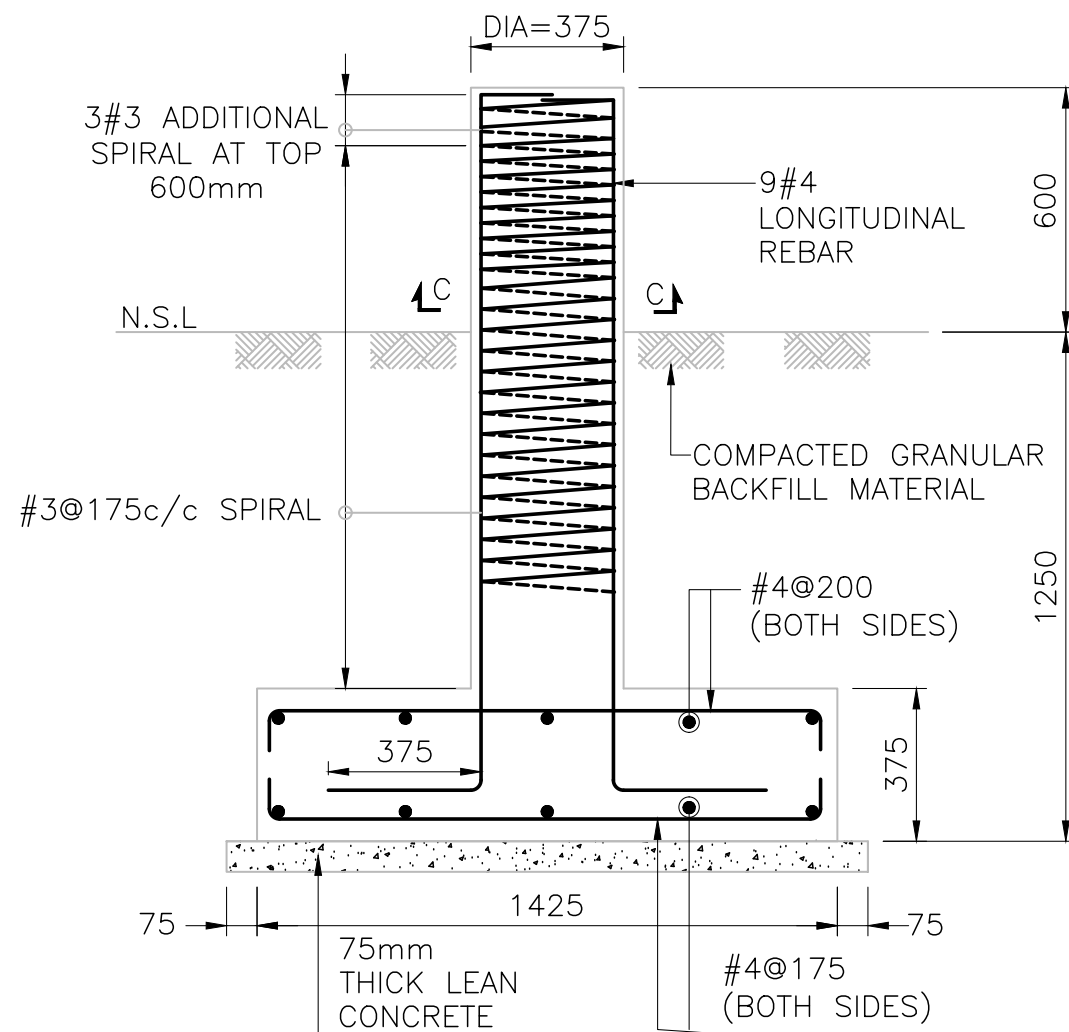
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED		SCALE
		03			SUBMITTED					NTS
		02			RECOMMENDED			DATE	DRAWING No.	REV.
		01			CHD./VER.			MAR-2025	4894/TD/STR/02/02	0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



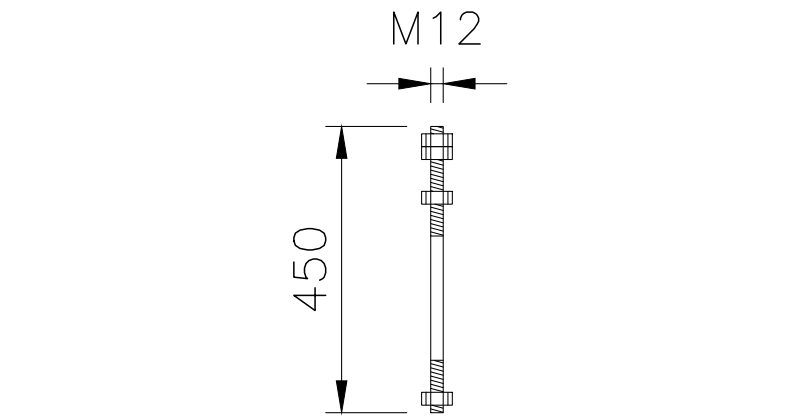
TYPICAL BASE PLATE DETAIL



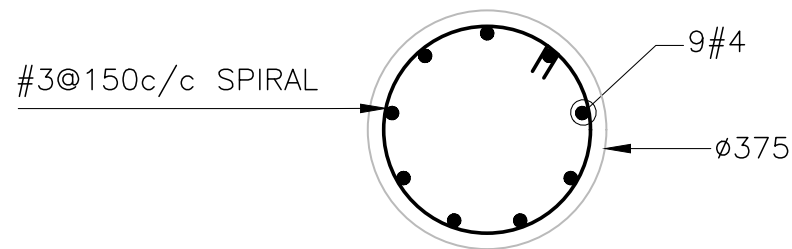
SECTION B-B



TYPICAL FOUNDATION REBAR DETAIL (F1)



TYPICAL BOLT DETAIL



SECTION C-C

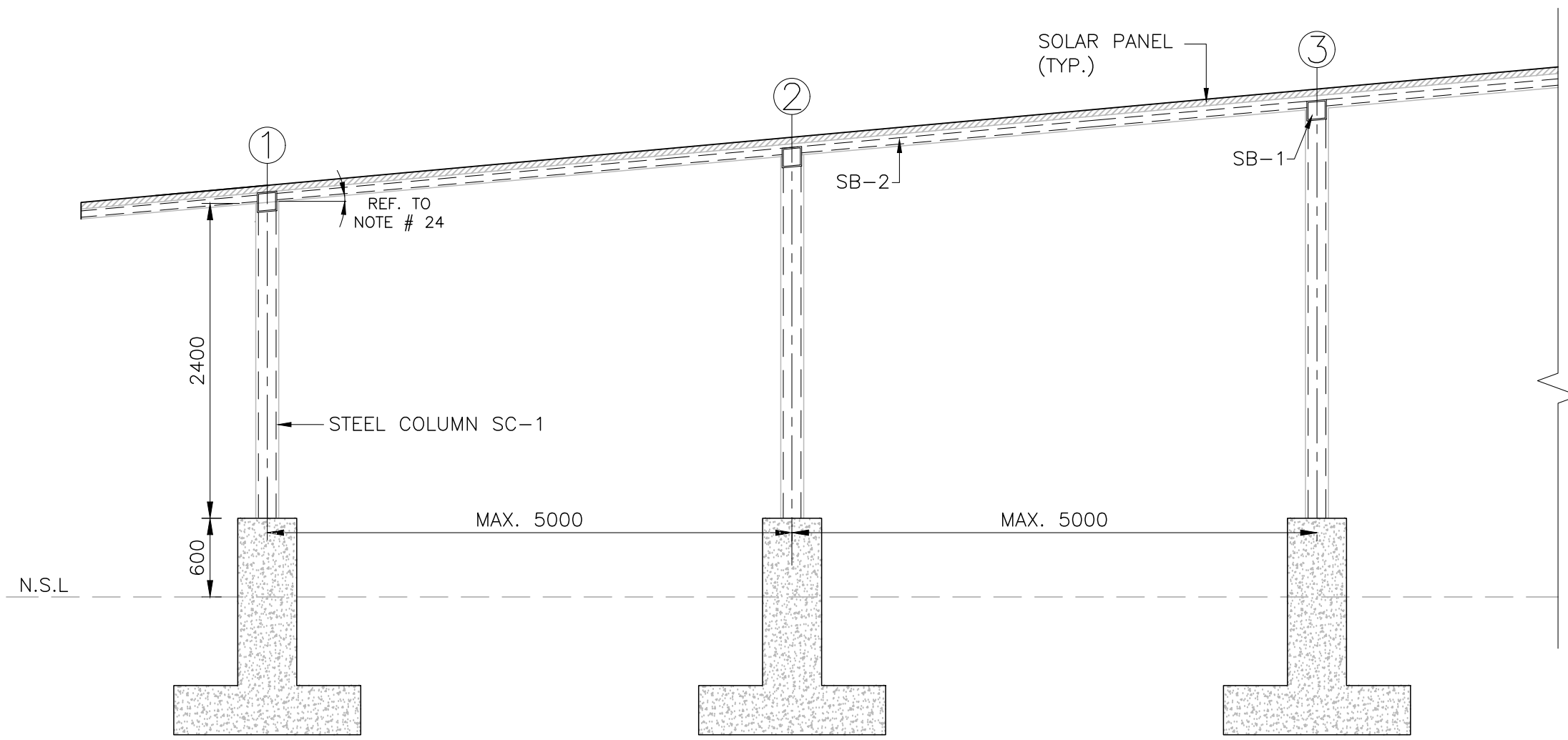
GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
4. ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING ATLEAST 4MM THICKNESS.
5. NON-SHRINKAGE GROUT OF ATLEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
6. ALL STEEL MEMBERS STRENGTH SHALL BE MINIMUM $F_y = 250MPa$.
7. ALL STEEL MEMBERS ARE HAVING WELDED CONNECTIONS.
8. MINIMUM WELD THICKNESS SHALL BE 4mm UNLESS NOTED OTHERWISE.
9. TYPE OF CEMENT SHALL BE DECIDED AS PER SOIL CHEMICAL ANALYSIS.
10. ALL THE STEEL MEMBERS, BOLTS (ANTI-THEFT) AND PLATES SHALL BE HOT DIPPED GALVANIZED (100 MICRON MINIMUM).
11. WELDED ELECTRODES SHALL BE 70XX.
12. ALL THE ANCHOR BOLTS SHALL BE OF A325 (105KSI TENSILE) OR EQUIVALENT (NON-METALLIC).
13. ALL THE MATERIAL SHALL BE TESTED AS PER AISC GUIDELINES.
14. CONTRACTOR SHOULD SUBMIT THE SHOP DRAWING BEFORE EXECUTION.
15. FOUNDATION IS DESIGNED BY ASSUMING ALLOWABLE BEARING CAPACITY OF 1.0 TSF. CONTRACTOR TO VERIFY PRIOR TO EXECUTION.
16. ENGINEERING BACKFILL MATERIAL SHALL BE USED BELOW THE FOUNDATION IF THE BEARING CAPACITY FOR THE NATURAL STRATA IS LESSER THAN $1.5T/FT^2$.
17. MINIMUM OF 95% MODIFIED AASHTO DENSITY SHALL BE ACHIEVED FOR EACH LAYER OF COMPACTION.
18. WELDING/BOLTING FOR ALL THE CONNECTION SHALL BE CONDUCTED AS PER ENGINEER APPROVED.
19. ANCHOR BOLT SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
20. INSTALLATION SHOULD NOT BE DONE BEFORE BACKFILLING.
21. THE STRENGTH OF P.C.C IS $14MPa$, AND R.C.C SHOULD HAVE 28 DAYS CONCRETE CYLINDER STRENGTH OF $21MPa$.
22. THE CABLE TRAY WILL BE ATTACH WITH THE STRUCTURE IF REQUIRED.
23. BEFORE COMMENCEMENT OF THE CONSTRUCTION WORK COMPLETE SITE CLEARANCE SHALL BE PERFORMED BY CONTRACTOR.
24. REFER TO SIMULATION REPORT/DRAWING FOR ANGLE.

NOTES:
THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT WATER AND POWER GILGAT BALTISTAN	04				DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED	SCALE	
		03				SUBMITTED				NTS	
		02				RECOMMENDED					
		01				CHD./VER.					
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			DATE	DRAWING No.	REV.
									MAR-2025	4894/TD/STR/02/03	0



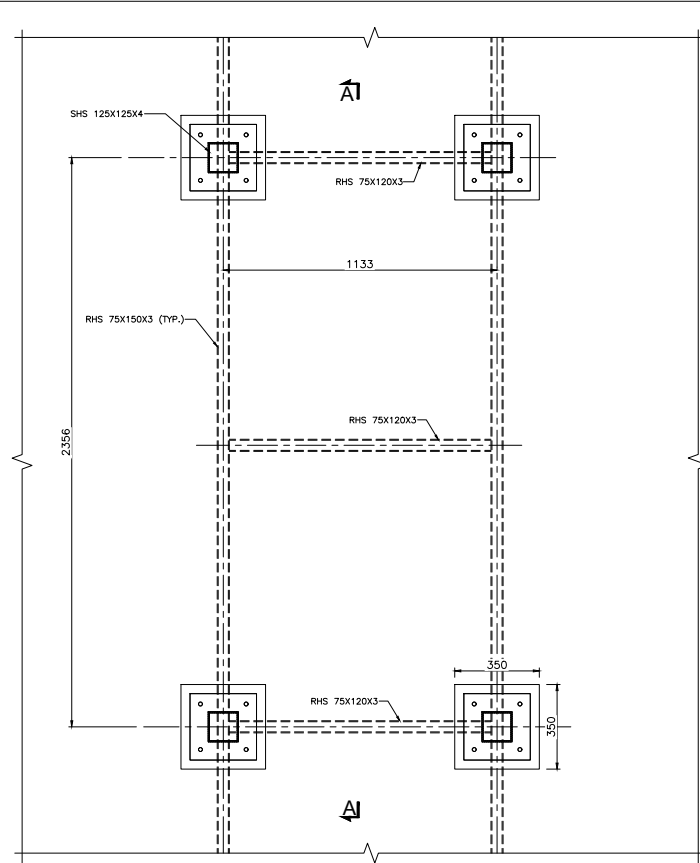
SECTION A-A

MEMBERS	SIZE/DESIGNATION
SC-1	I-SECTION OF 150X75X6mm
SB-1	I-SECTION OF 150X75X6mm
SB-2	C-CHANNEL OF 125X75X3mm

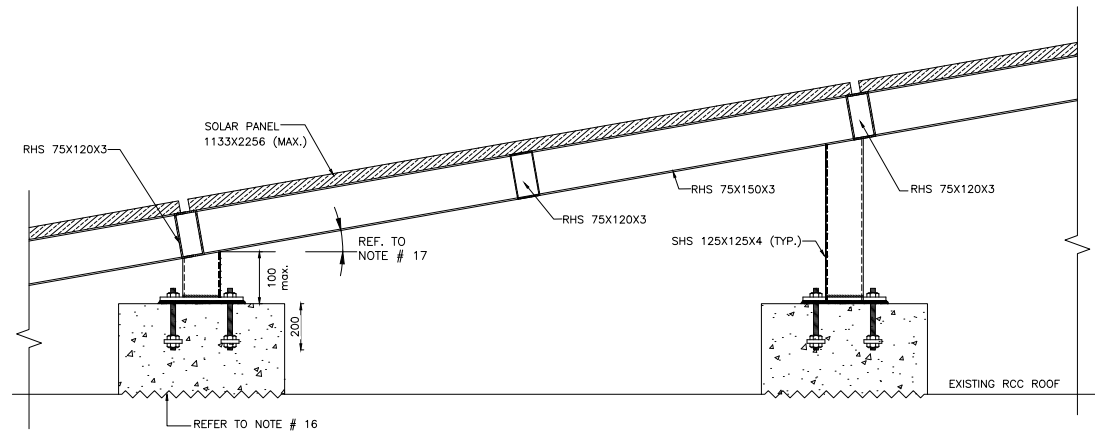
NOTES:
 THESE ARE MINIMUM REQUIRED CONCEPTUAL/INDICATIVE DRAWINGS ONLY HOWEVER THE EPC CONTRACTOR SHOULD SUBMIT THE DETAIL DRAWINGS ALONG WITH FEM BASED ANALYSIS MODEL FOR APPROVAL PURPOSES.

CONCEPTUAL DESIGN

<p>NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.</p>	CLIENT WATER AND POWER GILGAT BALTISTAN	04			DRAWN	S.A	PROJECT 100MW DISTRIBUTED SOLAR PV PLANTS AT VARIES SITES IN GILGAT BALTISTAN	SOLAR PANEL FRAMING FOR PARKING SHED		SCALE
		03			SUBMITTED				DATE	DRAWING No.
		02			RECOMMENDED			MAR-2025	4894/TD/STR/02/04	REV.
		01			CHD./VER.					0
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED				



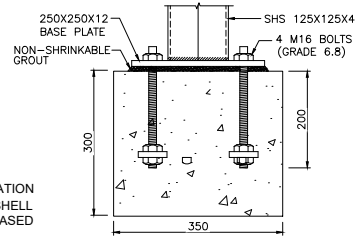
TYPICAL STRUCTURAL FRAMING PLAN



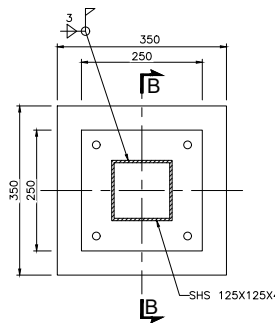
SECTION A-A

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETER.
2. ALL CONNECTIONS TO BE DESIGNED AND DETAILED BY CONTRACTOR.
3. ALL STEEL GRADE SHALL HAVE MINIMUM YIELD STRENGTH OF 250 Mpa.
4. ALL WELD SHALL BE OF E70XX ELECTRODE.
5. ALL STEEL STRUCTURE AND ANCHOR BOLTS SHALL BE HOT DIP GALVANIZED (MIN 85 MICRON).
6. ALL NUT BOLTS SHALL BE OF STAINLESS STEEL MATERIAL (NON-METALLIC, GRADE A325 ANTI-THEFT).
7. IT IS ASSUMED THAT THE EXISTING ELEVATED SURFACE OF ROOF IS ADEQUATE TO BEAR THE LOADINGS FROM STRUCTURAL FRAMING OF SOLAR PANEL.
8. MINIMUM CLEARANCE OF PV MODULE SHALL BE 6 FEET ABOVE THE ROOF LEVEL.
9. TWO DRAINAGE CLIPS SHALL BE PROVIDED FOR EACH MODULE IN THE LAST/LOWEST ROW OF THE MODULES IN A SHED.
10. ALL BEAM TO BEAM & BEAM TO COLUMN CONNECTION ARE FULLY WELDED CONNECTION WHICH IS HAVING AT LEAST 4MM THICKNESS.
11. NON-SHRINKAGE GROUT OF AT LEAST 25MM THICKNESS SHALL BE PROVIDED UNDER ALL BASE PLATES.
12. ANCHOR BOLT (GRADE A490) SHOULD PROJECT A MINIMUM OF 3 THREADS ABOVE THE FULLY ENGAGED NUT(S).
14. CONTRACTOR TO ENSURE THAT THE EXISTING DRAINAGE CHARACTERISTICS OF THE ROOF TOP ARE NOT COMPROMISED.
15. A PROTECTION MAT OF APPROVED TYPE SHALL BE PROVIDED BETWEEN ROOF TOP LAYER AND MOUNTING STRUCTURE/CONCRETE BLOCKS.
16. EXISTING SURFACE TO BE ROUGHENED & APPLY EPOXY CHEMICAL PRIOR TO CASTING OF NEW CONCRETE.
17. REFER TO SIMULATION REPORT FOR ANGLE .
18. COMMENCEMENT OF WORK SHOULD BE CARRIED OUT AFTER CLEARING OF SITE AND APPROVAL FROM CONSULTANT .



SECTION B-B



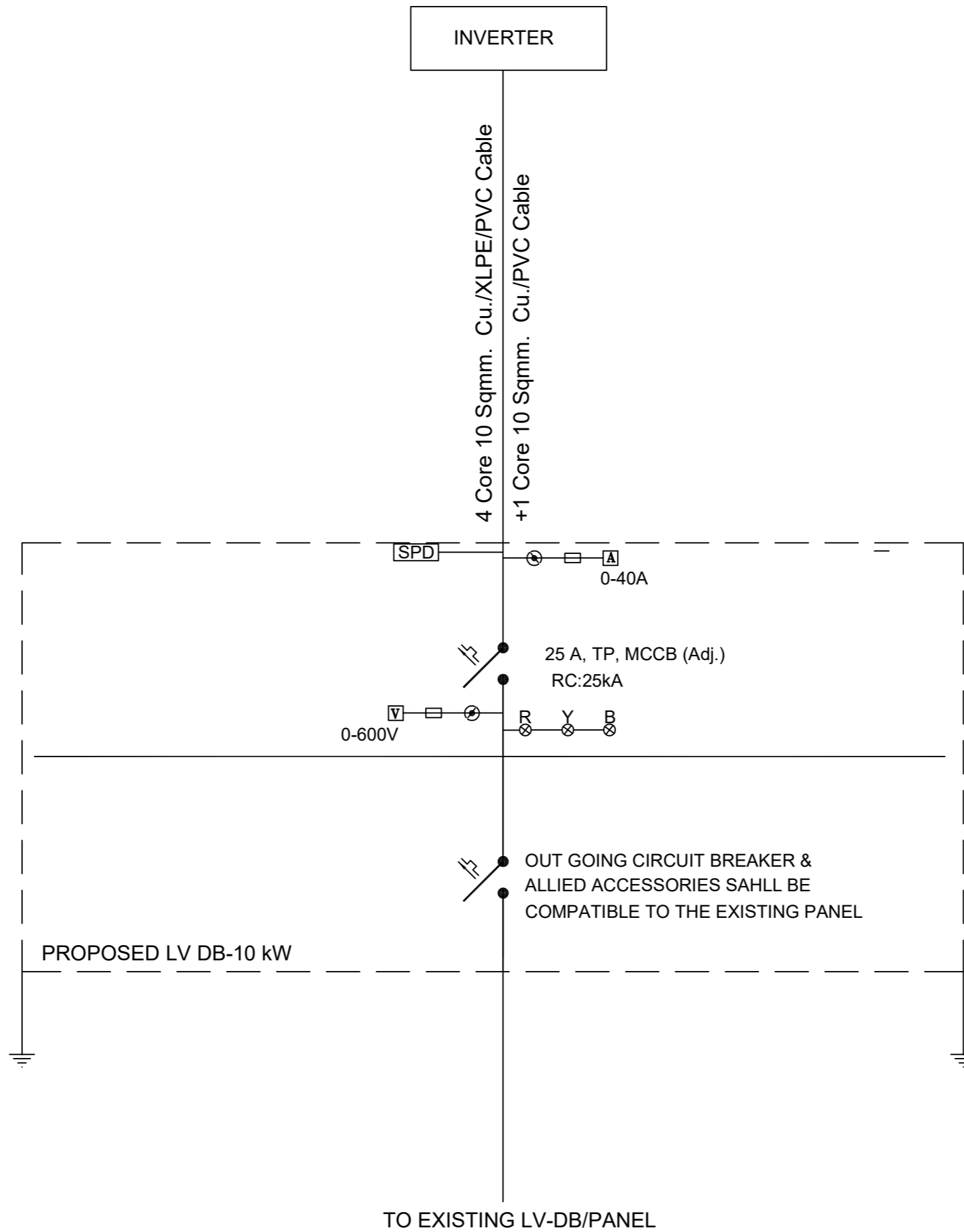
CONCRETE BLOCK DETAIL

NOTE:

THESE ARE MINIMUM REQUIRED CONCEPTUAL / INDICATION DRAWINGS ONLY HOWEVER, THE EPC CONTRACTOR SHALL SUBMIT THE DETAILED DRAWINGS ALONG WITH FEM BASED MODEL FOR APPROVAL PURPOSES.

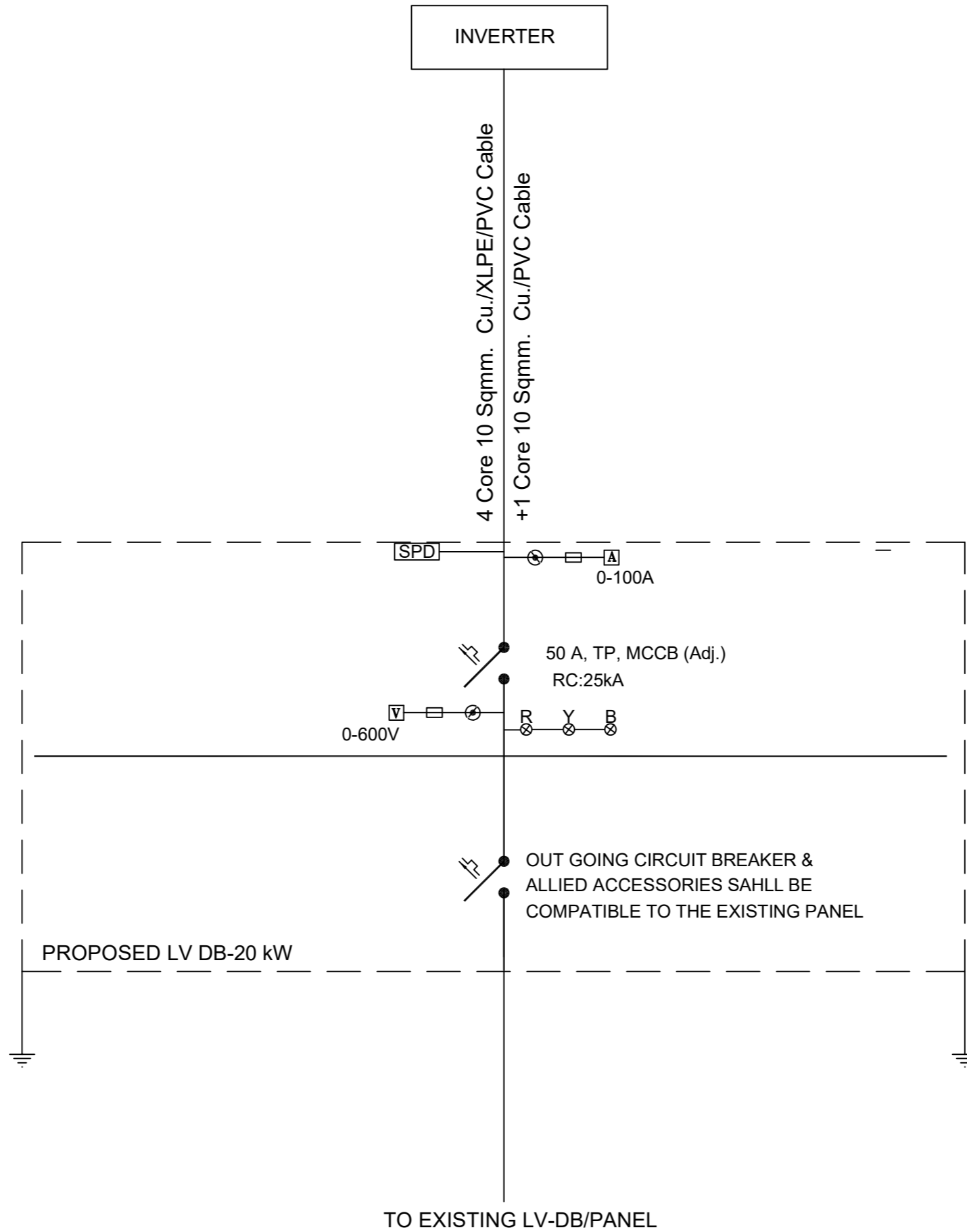
CONCEPTUAL DESIGN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE- NESPAK HOUSE, I.C. BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	CLIENT	04			DRAWN	M.A.	PROJECT	TYPICAL SOLAR PANEL FRAMING FOR R.C.C ROOF MOUNTED STRUCTURE	SCALE
	WATER & POWER GILGAT BALTISTAN	03			SUBMITTED		100 WM DISTRIBUTED SOLAR PV PLANTS AT VARIOUS SITES IN GILGAT BALTISTAN		NTS
		02			RECOMMENDED			DATE	REV.
		01			CHD./VER.			MAR- 2025	4894/TD/STR/05/01
		REV.	DATE	DESCRIPTION	APPROVED	APPROVED			



NOTE:
THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

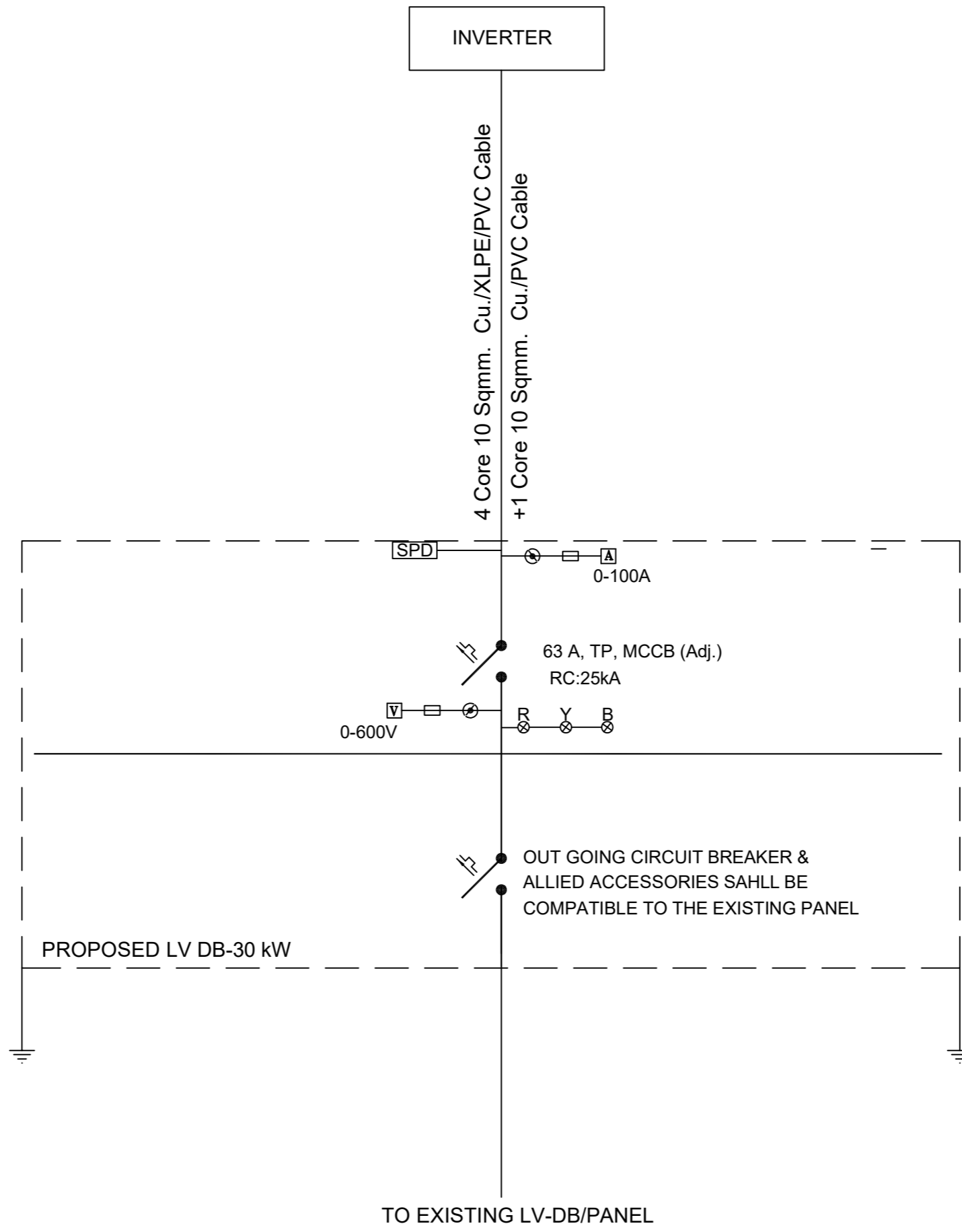
CONSULTANT NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04			DRAWN	SH	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(1-10 KW) SINGLE LINE DIAGRAM		SCALE
	03			SUBMITTED					
	02			RECOMMENDED					
	01			CHD./VER.					
REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.	
						AUG, 2025	MV/LV-21	0	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

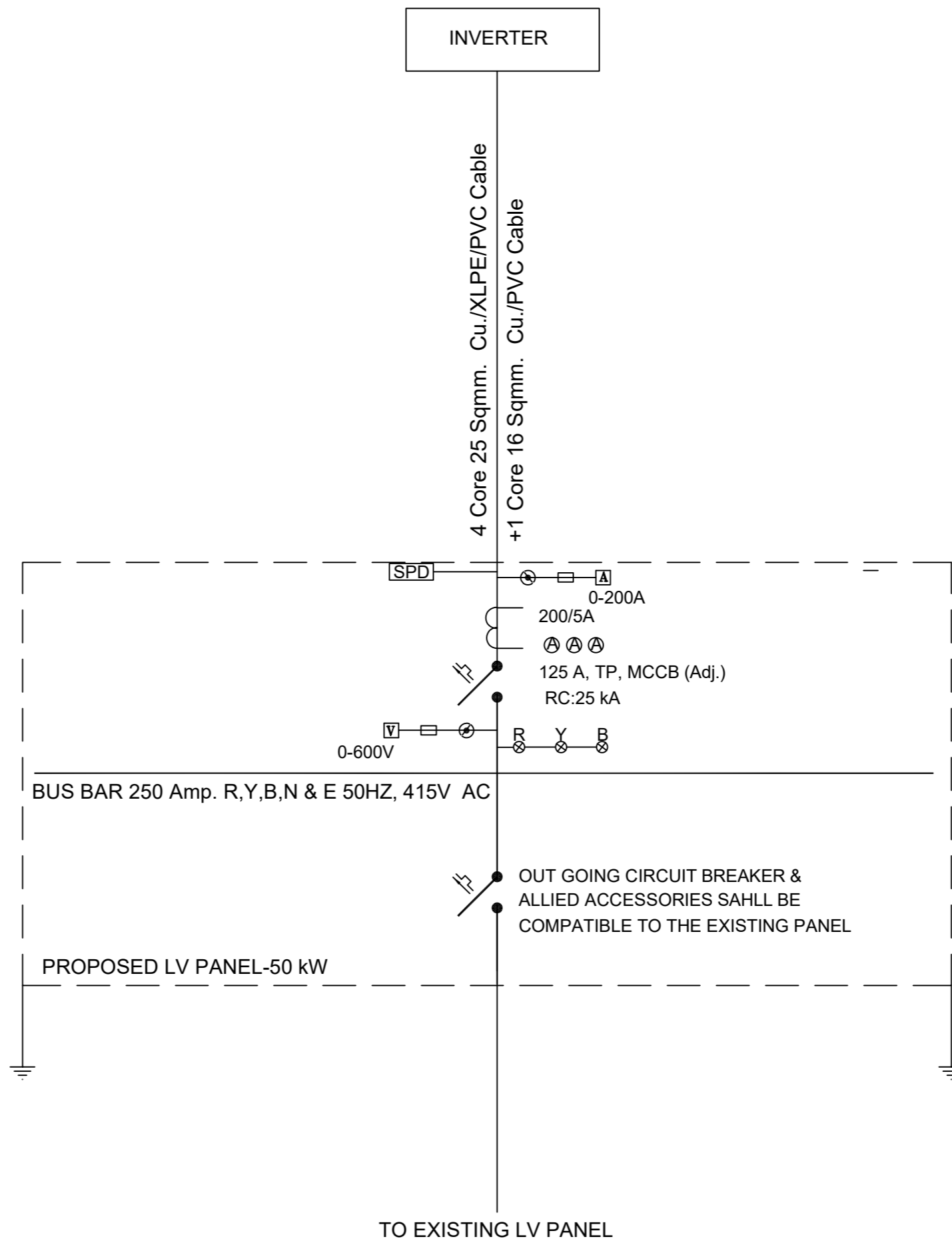
04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

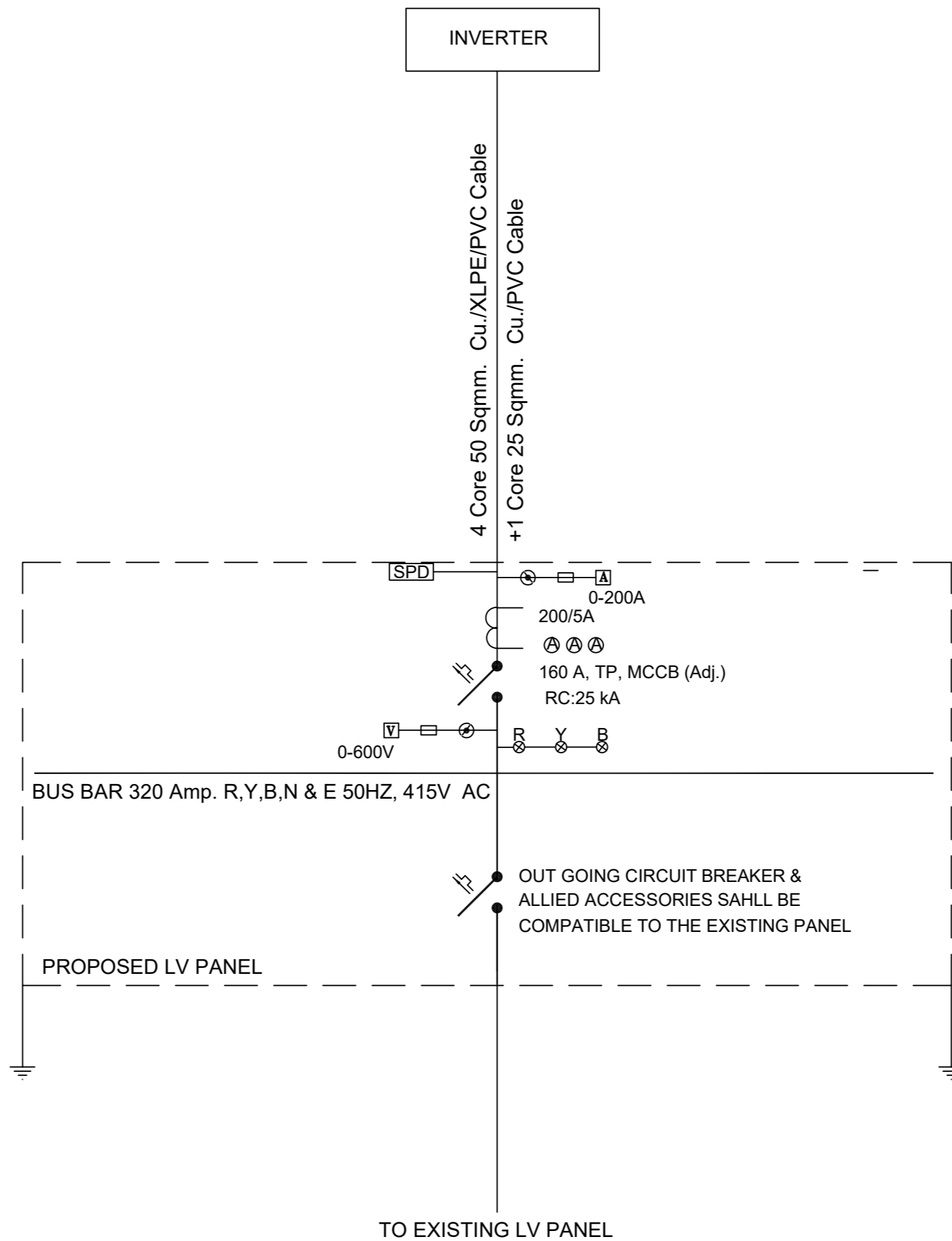
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04			DRAWN	S.H	PROJECT 100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	(20-30 KW) SINGLE LINE DIAGRAM		SCALE	
	03			SUBMITTED						NTS
	02			RECOMMENDED						
	01			CHD./VER.						
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED		DATE	DRAWING No.	REV.	
							AUG, 2025	MV/LV-23	0	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

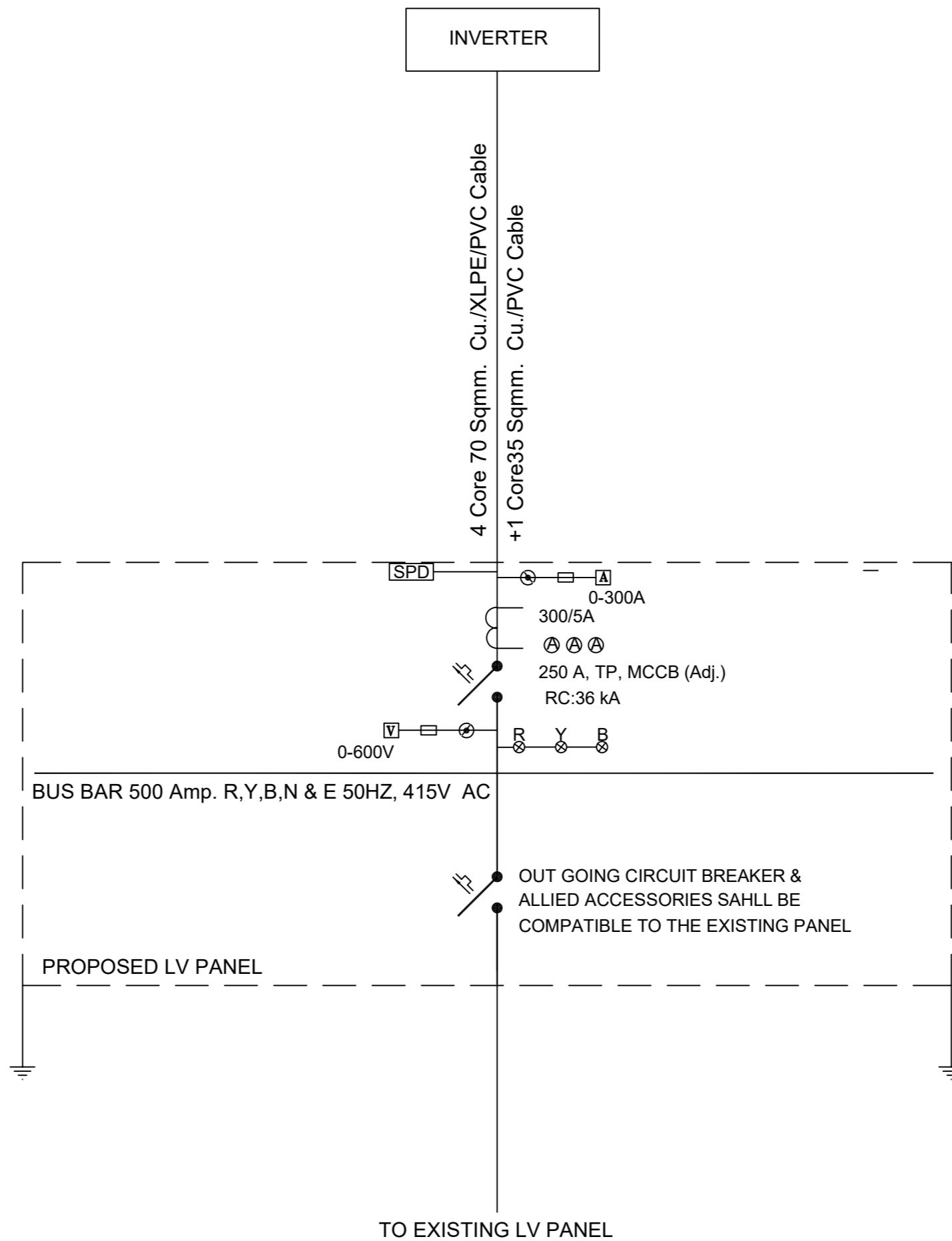
04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

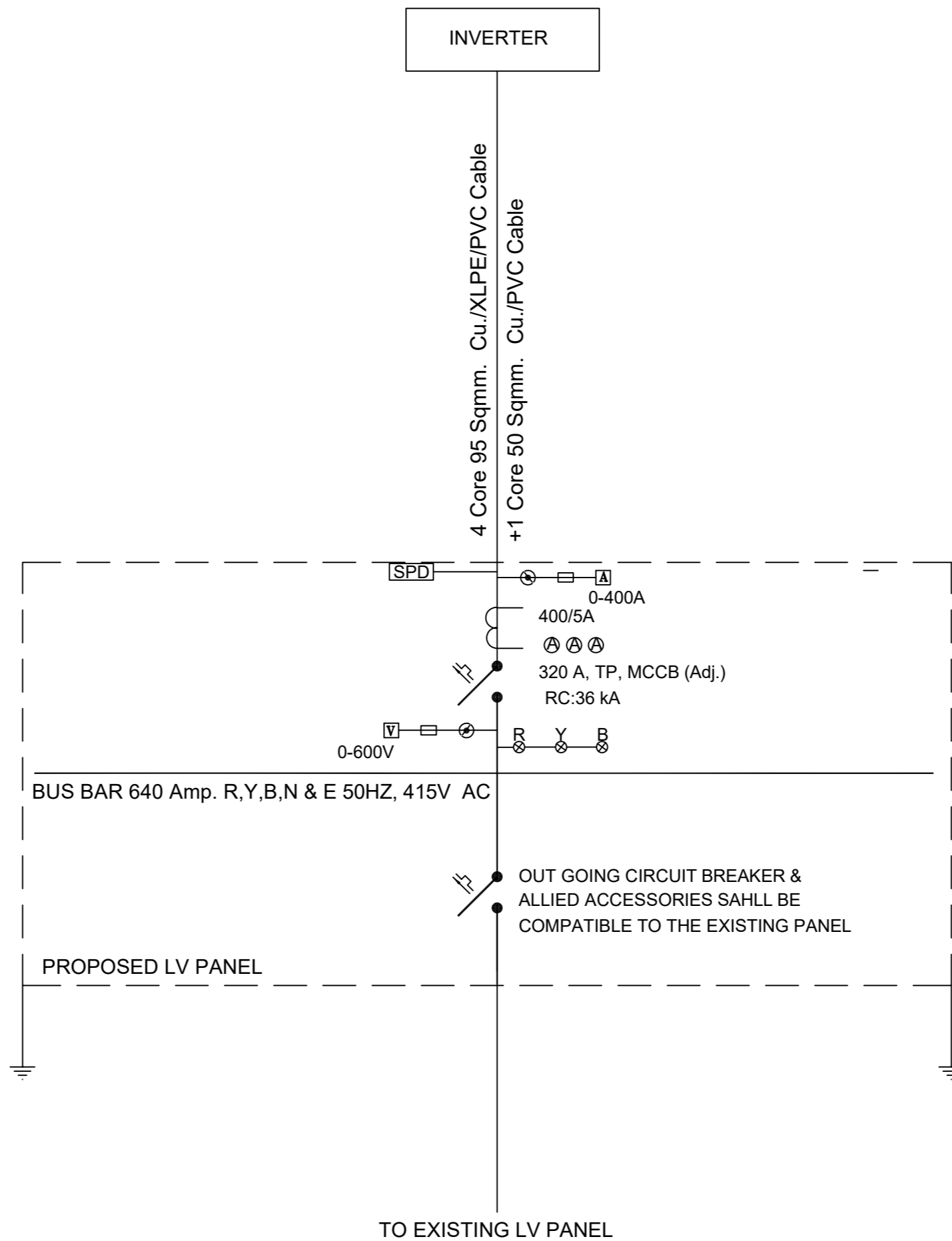
04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



NOTE:

THE RATINGS/SIZES OF THE ELECTRICAL EQUIPMENT (LV/MV CABLES, LV/MV PANELS, TRANSFORMER, EARTHING ETC.) AS MENTIONED IN SLD ARE BASED ON THE INVERTER/SOLAR PV SIZES/RATINGS. HOWEVER, IF THE CONTRACTOR CHANGES THE RATING OF THE INVERTER, THEN THE SIZE/RATING OF THE REFERRED ELECTRICAL EQUIPMENT MAY BE MODIFIED AND CONTRACTOR SHALL SUBMIT THE CALCULATIONS FOR THE EQUIPMENT SIZES (WITH RESPECT TO LOAD, TEMPERATURE, ALTITUDE ETC.) PROPOSED BY HIM ACCORDINGLY.

04				DRAWN	S.H
03				SUBMITTED	
02				RECOMMENDED	
01				CHD./VER.	
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	



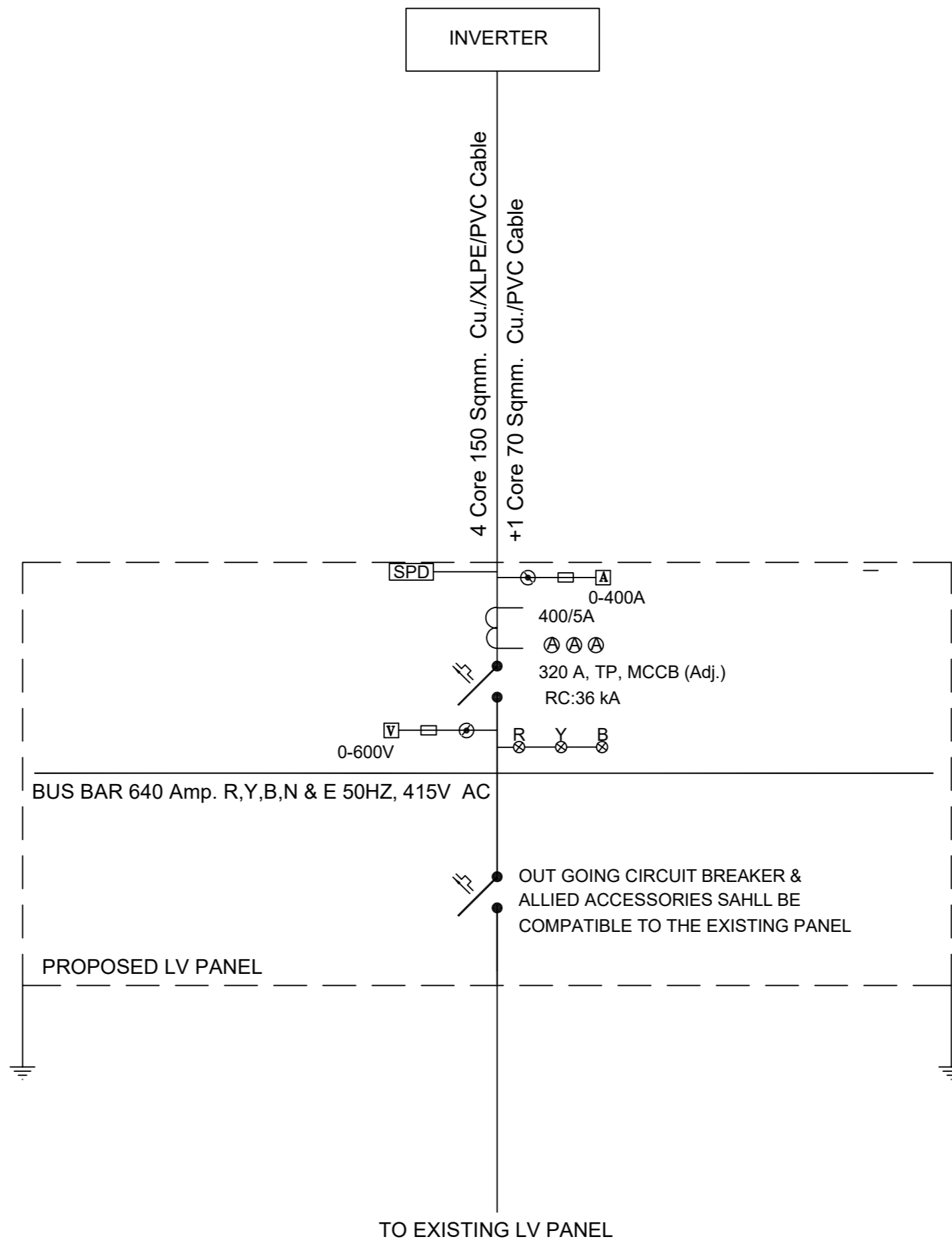
NOTE:
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04					
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REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

	DRAWN	S.H	PROJECT
	SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
	RECOMMENDED		
	CHD./VER.		
	APPROVED	APPROVED	

(100-125 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-27	REV.

(100-125 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-27	REV.



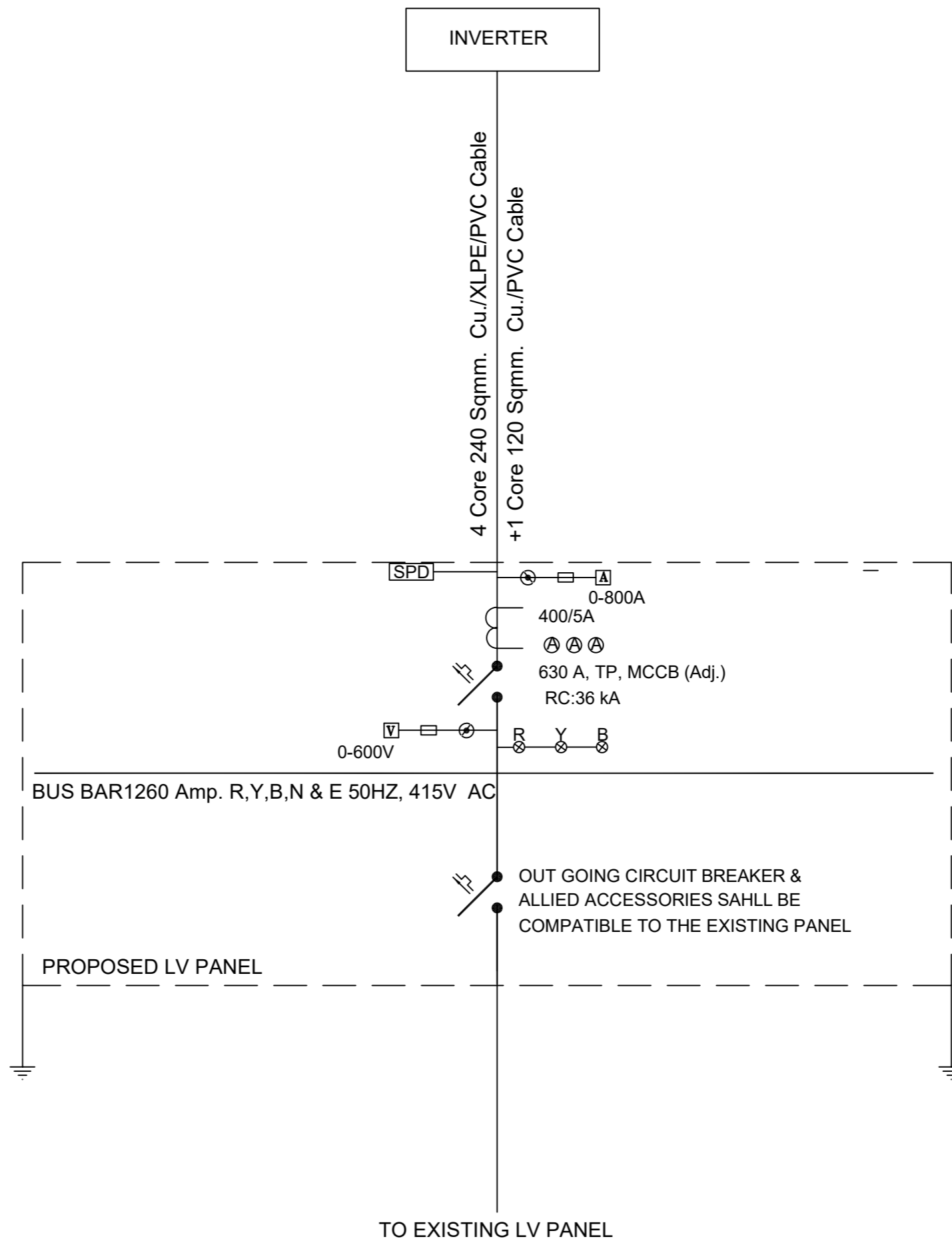
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REV.	DATE	DESCRIPTION	APPROVED

	DRAWN	S.H	PROJECT
	SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
	RECOMMENDED		
	CHD./VER.		
	APPROVED	APPROVED	

(125-150 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG. 2025	MV/LV-28	REV.

(125-150 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG. 2025	MV/LV-28	REV.



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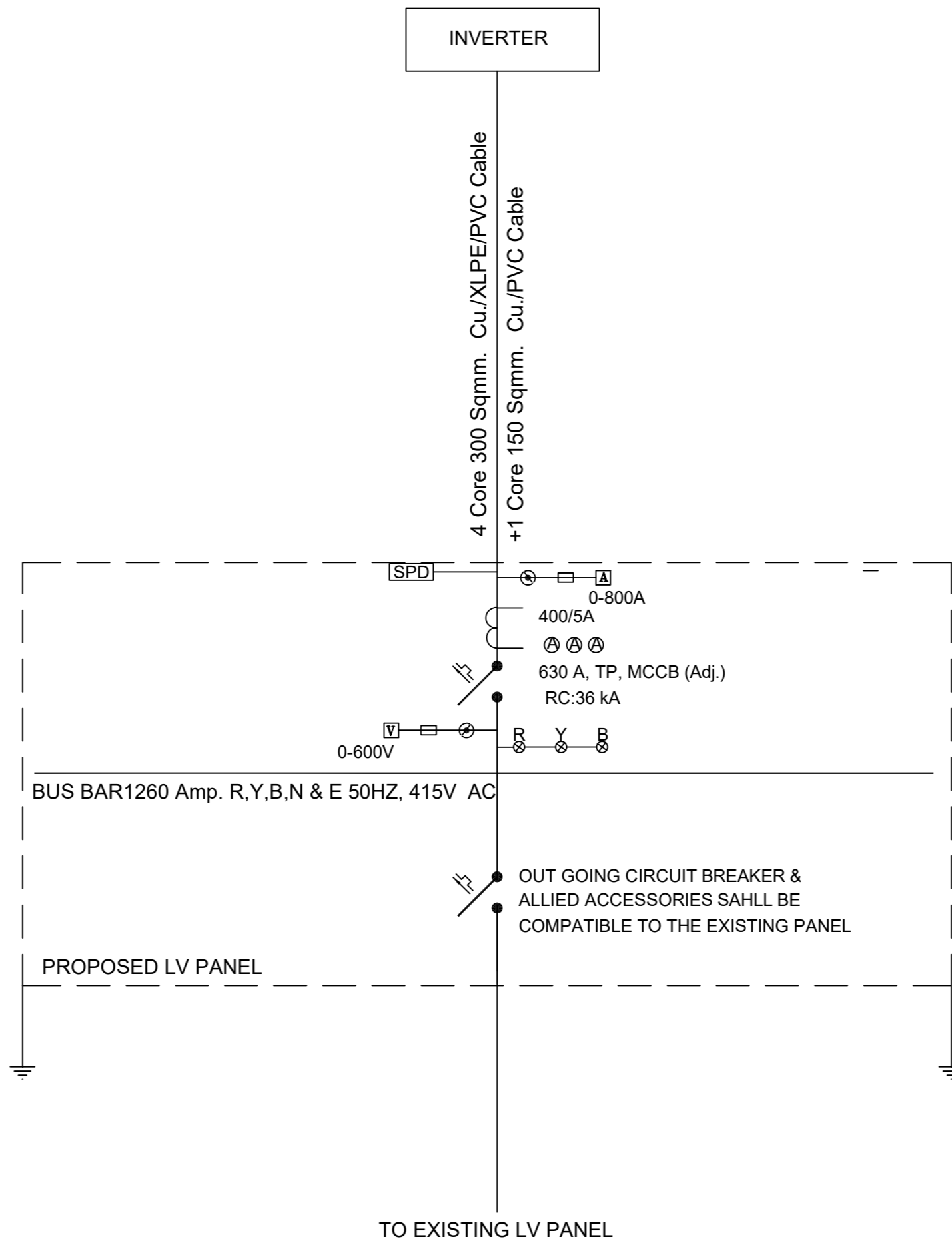
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REV.	DATE	DESCRIPTION	APPROVED

	DRAWN	S.H
	SUBMITTED	
	RECOMMENDED	
	CHD./VER.	
	APPROVED	

PROJECT
**100 MW PROJECT OF SOLARIZATION IN
 GILGIT BALTISTAAN**

**(150-200 KW)
 SINGLE LINE DIAGRAM**
 DATE: AUG 2025
 DRAWING No. **MV/LV-29**

SCALE
 NTS
 REV.



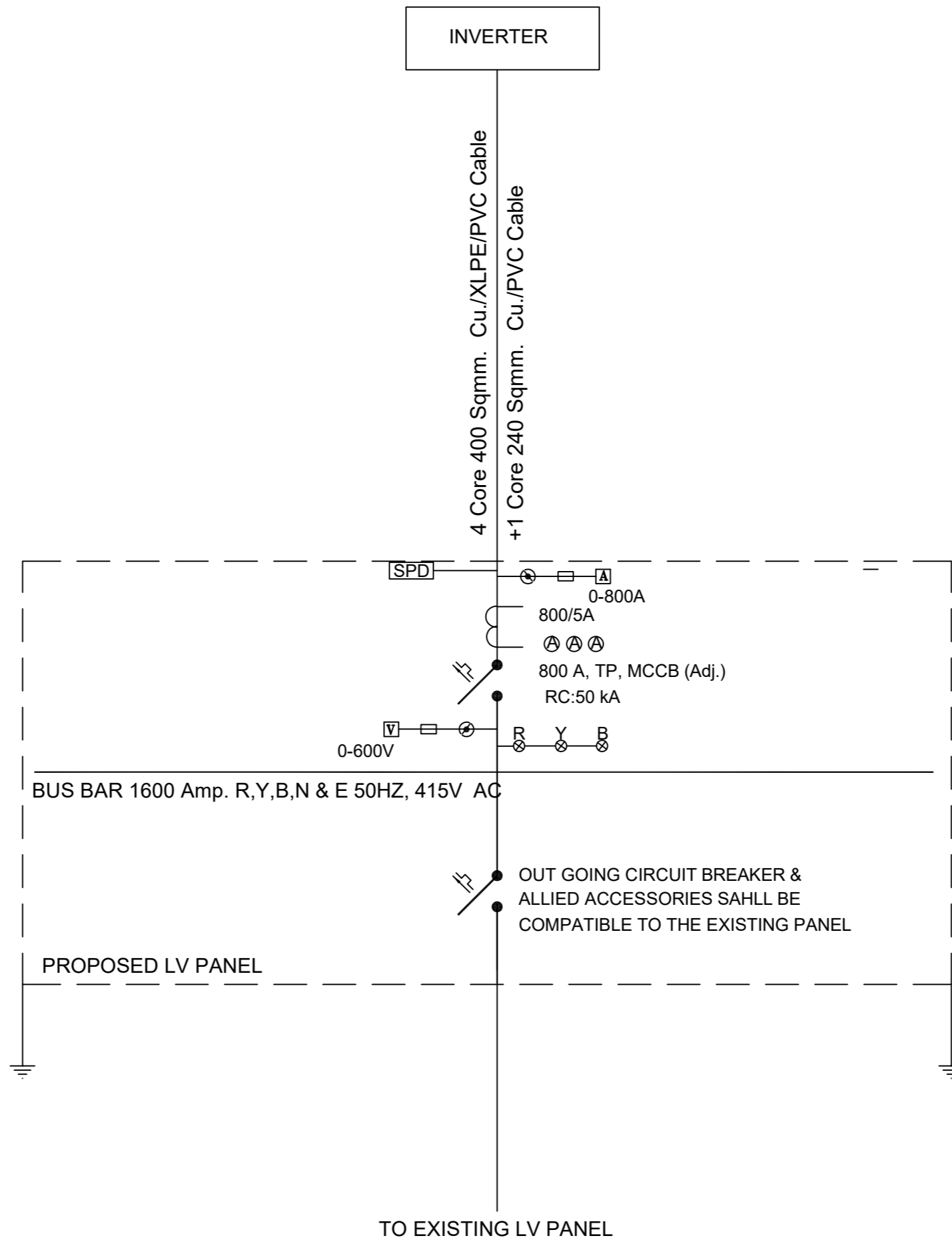
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03					
02					
01					
REV.	DATE	DESCRIPTION	APPROVED	APPROVED	

	DRAWN	S.H	PROJECT
	SUBMITTED		100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN
	RECOMMENDED		
	CHD./VER.		
	APPROVED	APPROVED	

(200-250 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-30	REV.

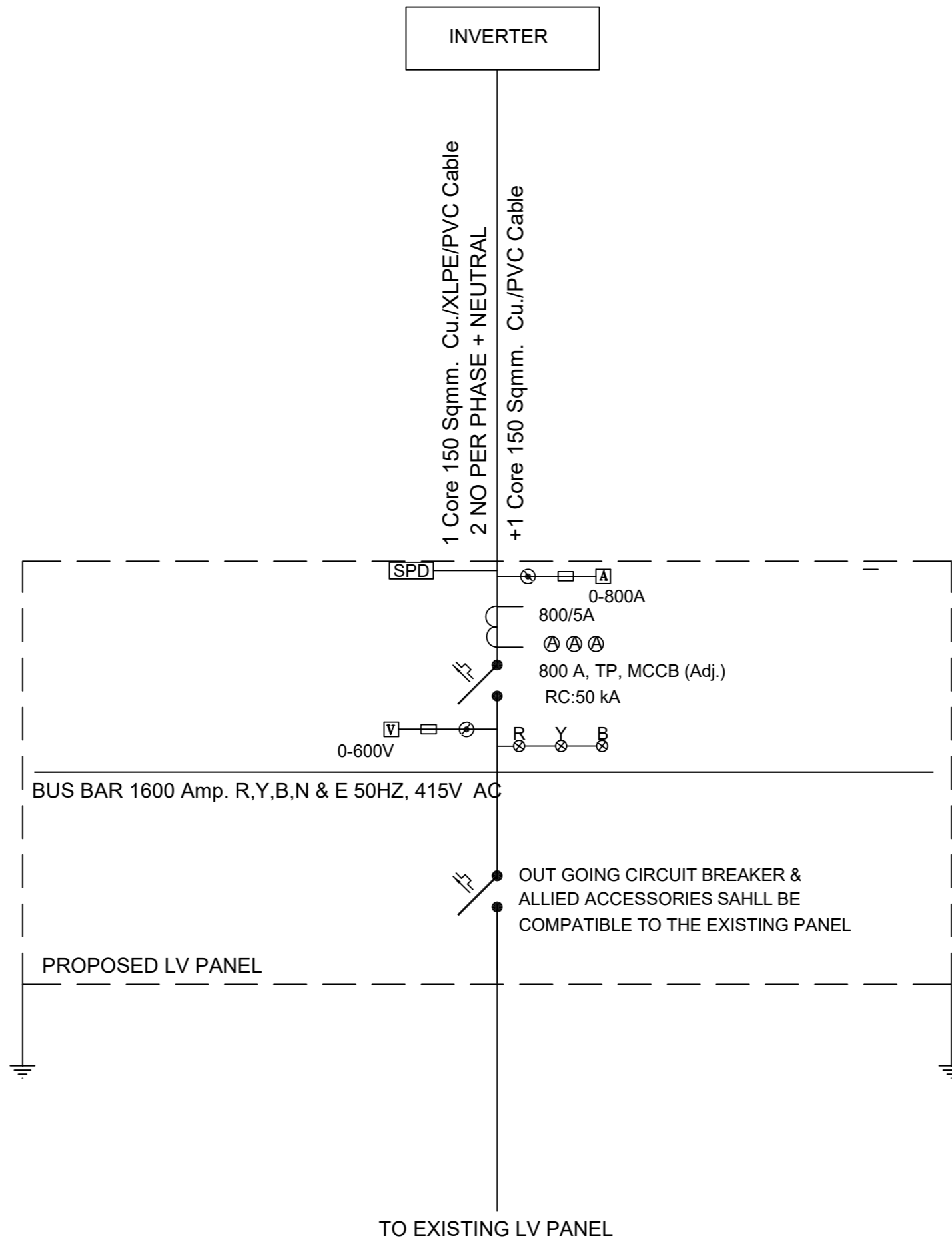
(200-250 KW) SINGLE LINE DIAGRAM		SCALE
DATE	DRAWING No.	NTS
AUG 2025	MV/LV-30	REV.



NOTE:
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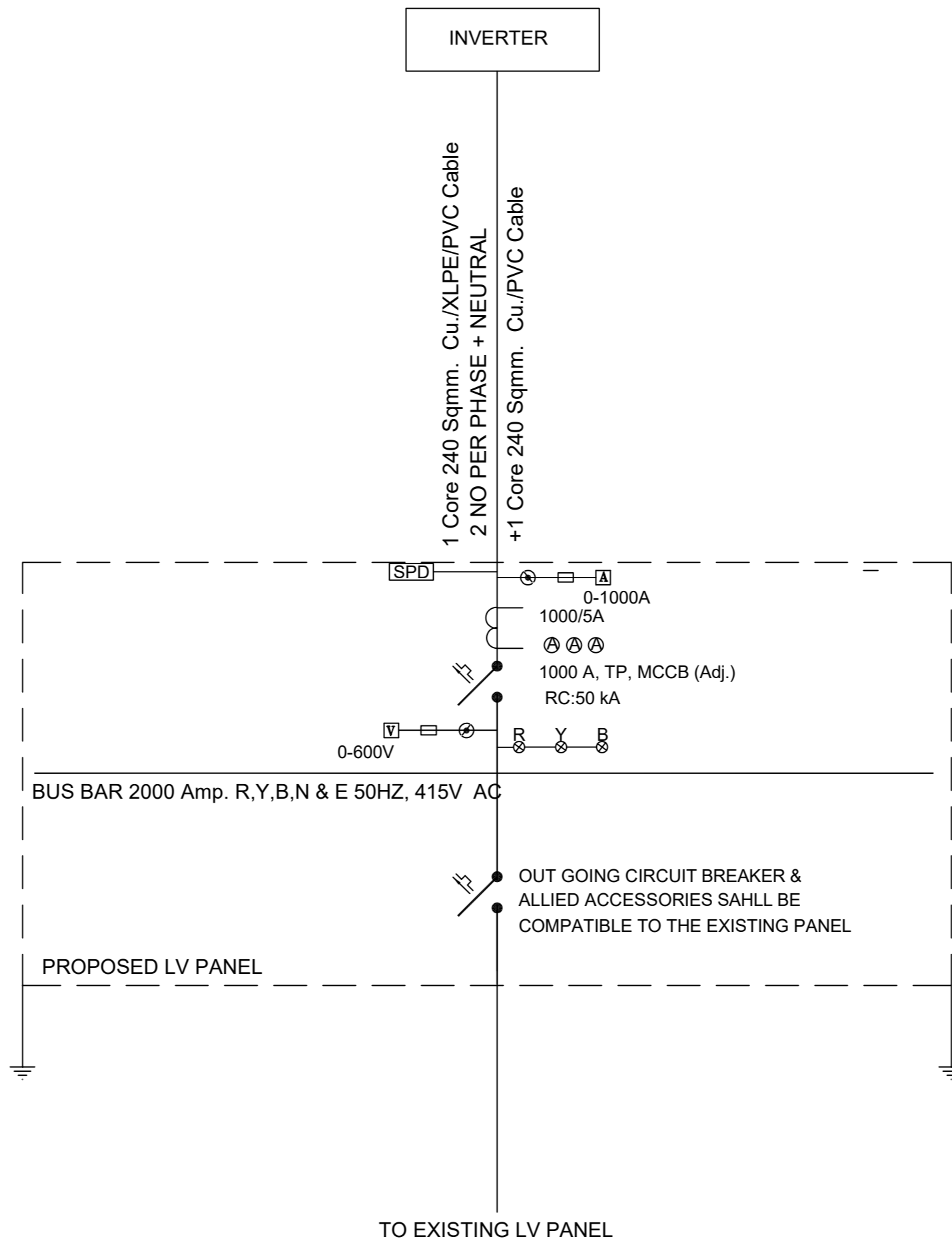
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REV.	DATE	DESCRIPTION	APPROVED

DRAWN	S.H
SUBMITTED	
RECOMMENDED	
CHD./VER.	
APPROVED	



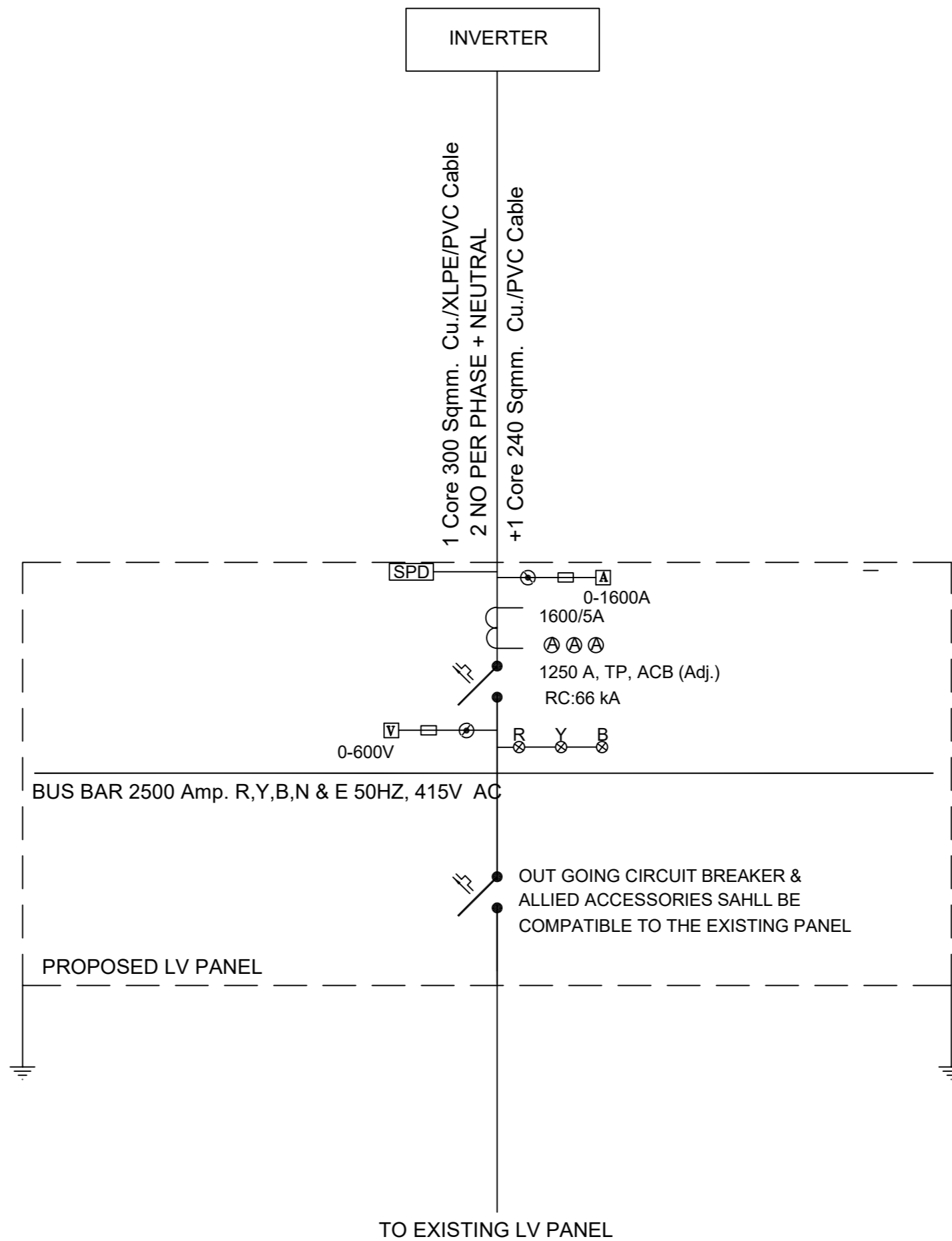
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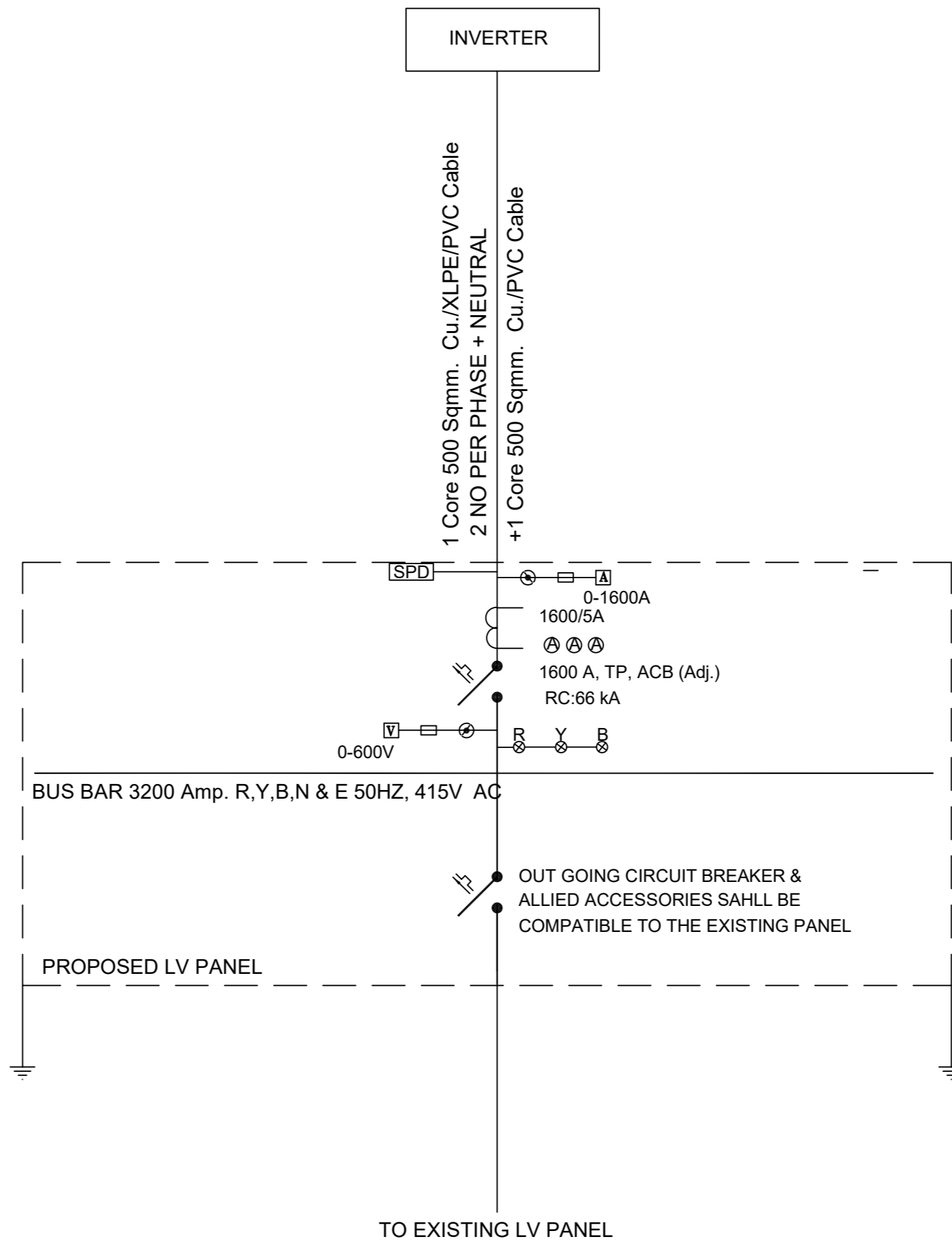
04					DRAWN	S.H
03					SUBMITTED	
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REV.	DATE	DESCRIPTION	APPROVED	APPROVED		



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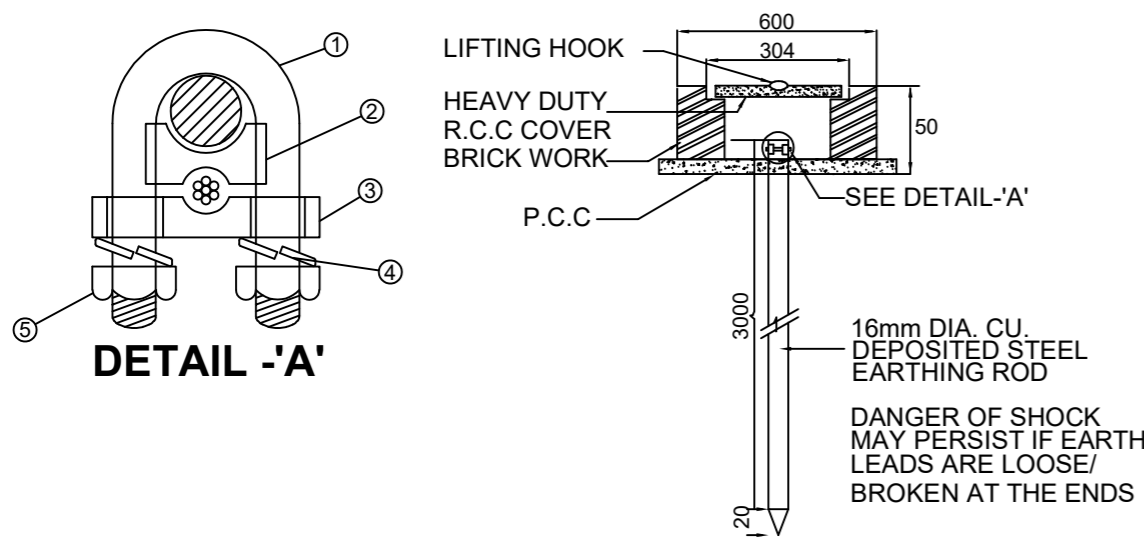
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03				SUBMITTED	
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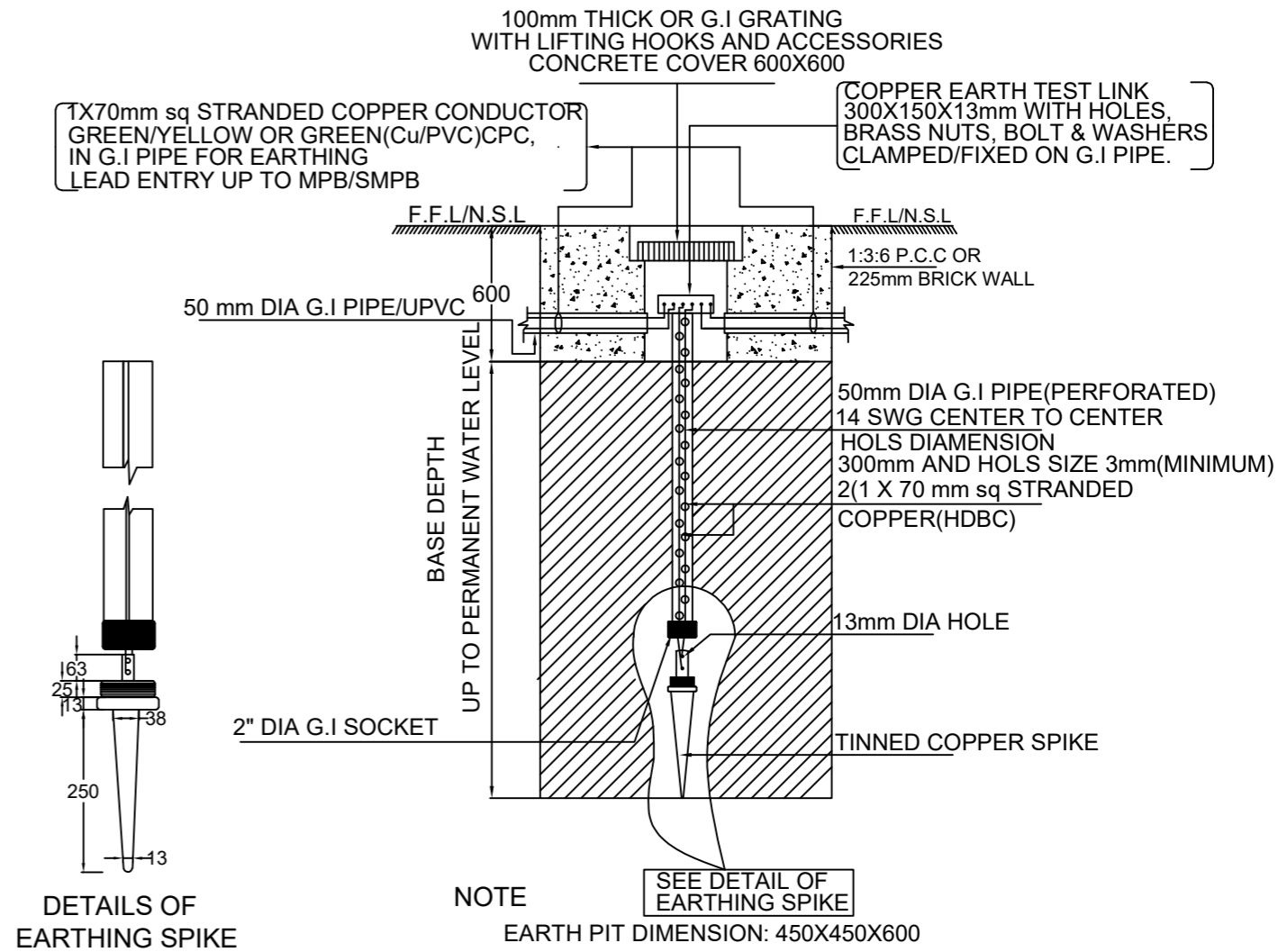
04				DRAWN	S.H
03				SUBMITTED	
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ROD TYPE EARTHING DETAIL



ITEM NO.	ITEM NAME	MATERIAL
1	U-BOLT	MILD STEEL
2	SPACER	CAST IRON
3	BASE	MILD STEEL
4	SPRING WASHER	CARBON STEEL
5	NUT	MILD STEEL

BORE TYPE EARTHING DETAIL



NOTE
EARTH PIT DIMENSION: 450X450X600

NOTES

1. THIS DRAWING IS FOR INDICATIVE DESIGN MODEL AND SHOULD BE READ IN CONJUNCTION WITH SPECIFICATIONS AND ITEMS OF BILL OF QUANTITIES.
2. EARTH BORE SHALL BE MADE AT 2000MM (2M) AWAY FROM FOUNDATION/STRUCTURE.
3. DISTANCE BETWEEN TWO EARTH BORES SHALL NOT BE LESS THAN 3000MM (3M)
4. CONNECTION SHALL BE BOLTED WITH THIMBLES, BRASS NUTS, BOLTS/WASHER ETC.
5. CONTRACTOR SHALL MEASURE EARTHING RESISTANCE IN THE PRESENCE OF SITE ENGINEER, FOR FINAL ACCEPTANCE.
6. THE VALUE OF EARTH RESISTANCE SHALL BE INCORPORATED IN FINAL AS-BUILT DRAWINGS.

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. HEAD OFFICE:- NESPAK HOUSE, I-C, BLOCK-N, MODEL TOWN EXTENSION, LAHORE, PAKISTAN.	04				DRAWN	S.H	PROJECT	(EARTHING DETAILS FOR PANELS)	SCALE	
	03				SUBMITTED				100 MW PROJECT OF SOLARIZATION IN GILGIT BALTISTAAN	NTS
	02				RECOMMENDED					
	01				CHD./VER.					
	REV.	DATE	DESCRIPTION	APPROVED	APPROVED					DATE
							AUG. 2025	MV/LV-36	0	