For Website only

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED
(Corporate Identity Number (CIN): L40169GU2000S016488)
Regd. Office: Vidyut Bhawan, Jyoti Nagar, Jaipur-302 005.
Office of the Superintending Engineer(T&C)
Jaipur city, Heerapura-302021.
Telephone: 0141-2250440 ; Fax: 0141-2250433.
Email: sc.t&c.galavy@rvpn.co.in Website: www.energy.rajasthan.gov.in

NOTICE INVITING BID

Sealed Bids are invited from experienced firms / contractors for following works as detailed below:-

<table>
<thead>
<tr>
<th>S. No</th>
<th>Specification/BN No</th>
<th>Description of Item</th>
<th>Cost of bid specification (in Rs.)</th>
<th>Estimated cost (in Rs.)</th>
<th>Amount of Bid Security (in Rs.)</th>
<th>Start Date &amp; time of Sale of bid specification</th>
<th>End Date &amp; time of sale of bid specification &amp; submission of bid</th>
<th>Date &amp; time of opening of bid</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>BM/22/000001/2017-18</td>
<td>Construction of 06 Nos. New 33 KV Bays at 132 KV GIS, Jawahar Nagar, Jaipur.</td>
<td>1000+18% GST</td>
<td>4.20 Lac</td>
<td>8.400/-</td>
<td>25.01.18 (11.00 AM) &amp; To 08/02/2018 (2.00 PM)</td>
<td>08.02.18 (2.00 PM) &amp; 08.02.2018 (5.00 PM)</td>
<td>09.02.18 (11.00 AM)</td>
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Detailed Bid document specification can be obtained from office of the SEIT&C, Jaipur City, RVPN, Heerapura, Jaipur 302021 by remitting the cost of specification (Non-refundable) as specified above or can be downloaded from http://epgp.std.rajasthan.gov.in & http://energy.rajasthan.gov.in websites but before submitting the bid, the bidder shall deposit cost of specification with the bid document as mentioned in the specifications.

The bidder's are requested to submit their bids prior to last date & time of submission to avoid non submission of their bids up to the prescribed date due to avoid any other reasons at last moment.

The Cost of Bid document/specification (Non refundable) as above shall be deposited by Cash/demand, payable in favour of the Accounts Officer (T&C), RVPN Ltd., Jaipur City, Heerapura, Jaipur.

Further extension of dates/amendments, if any, will be uploaded on above referred website only.

(A.K. Jhilian)
SUPERINTENDING ENGINEER (T&C) JAIPUR CITY
RVPN, HEERAPURA JAIPUR
BID SPECIFICATION NO. RVPN/SE/T&C/JC/BN-2210001724/2017-18

Sealed Bid are hereby invited for Construction of 6 Nos. New 33 KV Bays at 132 kV GSS, Jawahar Nagar, Jaipur.

GENERAL DETAIL OF WORKS:

<table>
<thead>
<tr>
<th>A</th>
<th>BID No.</th>
<th>Work Description</th>
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<th>C</th>
<th>Cost of Bid Specification</th>
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<tr>
<td></td>
<td>Rs. 1000.00+18% GST (Goods &amp; Service Tax)</td>
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<th>D</th>
<th>Bid Security</th>
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<td>Amount of Bid Security: Rs 8,400/- (Eight Thousand Four Hundred only) by Cash/ Demand Draft (DD)/ Banker’s Cheque in favour of Account Officer (T&amp;C-Jaipur City) or in the form of Bank Guarantee in favour of Superintending Engineer (T&amp;C-Jaipur City).</td>
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<th>E</th>
<th>Estimated Cost</th>
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<td>Rs.4.20 Lac (Approx.)</td>
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<th>F</th>
<th>Validity</th>
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<td>120 days after the date of Bid Opening</td>
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<th>Bidding procedure</th>
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<td>Single Part bidding</td>
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IMPORTANT DATES:

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<th>Events</th>
<th>Date &amp; Time</th>
<th>Location</th>
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<td>(i)</td>
<td>Date of sale of Bid specification.</td>
<td>25/01/2018 (11.00AM) To 08/02/2018 (2.00PM)</td>
<td>Office of the SE (T&amp;C JPR City), Heerapura, Jaipur-302021</td>
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<tr>
<td>(ii)</td>
<td>Date &amp; Time of pre-Bid meeting along with Pre-Bid Queries.</td>
<td>30/01/2018 (11.00AM)</td>
<td>Conference Room, Office of the SE (T&amp;C JPR City), Heerapura, Jaipur-302021 ; Email: <a href="mailto:se.tnc.jprcity@rvpn.co.in">se.tnc.jprcity@rvpn.co.in</a></td>
</tr>
<tr>
<td>(iii)</td>
<td>Start date &amp; time of</td>
<td>05/02/2018 (11.00AM)</td>
<td>Office of the SE</td>
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NOTE:

1. The bidders are requested to submit their bids prior to last date of submission to avoid Non-submission of their bids up to prescribed date.

2. Furnishing of Bid Security /Exemption certificate as per clause No.1.04 of Section-I of this specification is essential otherwise the bid will not be opened. The bid security is 2% of the estimated value of bid.

   In lieu of bid security, Departments’ of the Rajasthan State Government and Undertakings, Corporations, Autonomous bodies, Registered Societies, Cooperative Societies which are owned or controlled or managed by the Rajasthan State Government and Government Undertakings of the Central Government may furnish bid securing declaration in the prescribed format at Appendix-II of specification. Every bidder, if not exempted, participating in the procurement process shall be required to furnish the bid security as specified in the notice inviting bids.

3. (i) The bidder will have to deposit prescribed cost of Bid specification by Cash/DD/Banker’s cheque payable in favour of Accounts Officer (T&C Jaipur City), RVPN Ltd., Jaipur up to stipulated date & time in the office of the A.O. (T&C Jaipur City), Heerapura, Jaipur-21 and obtain a receipt thereof.

   (ii) The bidder will have to deposit prescribed Bid Security by Cash/DD/Banker’s Cheque payable in favour of Accounts Officer (T&C Jaipur City), RVPN Ltd., Jaipur payable at Jaipur up to stipulated date & time in the office of the A.O. (T&C Jaipur City), Heerapura, Jaipur-21 and obtain a receipt/ acknowledgement thereof and they must enclosed the receipt/ acknowledgement along with their bid.

4. Bid security is to be furnished also by the Vendors registered with the NIGAM.

5. The Central and State Govt. undertaking/ Corporations and companies are exempted from furnishing of bid security. However, they have to upload copy of certificate/documentary evidence in support of their being Govt. undertaking, with their bid.

6. Technical and Commercial deviations, if any, shall only be mentioned in 'Schedule-IV Section V 'Departure from the Specification' attached with this specification. Mentioning of such deviations elsewhere in the offer will not be considered as deviation. The printed terms and conditions of firms, if any, attached with the Bid will not be considered. RVPN shall have right to accept or reject these deviations.

7. Offers of bids without Schedules and without relevant documents with respect to qualifying requirements shall not be considered.
8. Any cutting/over writing in the figures of Bid documents should also be clarified/indicated in words duly signed.

9. The bidders are required to furnish the clarification/confirmation/documents sought subsequent to opening of bid within specified time failing which, the case shall be finalized/decided on the basis of available information. The responsibility of being ignored on account of delay in furnishing of desired information/documents shall be of the bidder.

10. The Bid documents/Specification can be downloaded from the website http://sppp.rajasthan.gov.in & www.energy.rajasthan.gov.in or can be obtained from office of the SE (T&C) Jaipur city), RVPN, Heerapura, Jaipur **remitting the cost of bid specification/documents as mentioned above.** The bidders are requested to submit their bids up to stipulated date and time as mentioned above.

11. This specification includes Section-I, Section-II, Section-III, Section-IV (Schedules) and Appendix

Bid documents issued to M/s........................................................... ................................................

......................................against Bid Cost (Rs. 1000+18%GST/-) deposited vide A-9 receipt

No......................... Dated......................

Superintending Engineer (T&C) Jaipur City
RVPN, Jaipur.
BID SPECIFICATIONS FOR AWARD OF CONTRACTS FOR
(1) CONSTRUCTION OF 6 NOS. NEW 33KV BAYS AT 132 KV
GSS, JAWAHAR NAGAR AGAINST BN-2210001724 /2017-18
UNDER S.E. (T&C-CITY), RVPN, HEERAPURA, JAIPUR.

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<td>SCHEDULES, ANNEXURES &amp; APPENDIX</td>
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SECTION - I
INSTRUCTIONS TO BIDDERS

1.00 SCOPE:

The bids are invited for award of Labour Contract basis for execution of following types of works:

Construction of 6 Nos. New 33 KV Bays at 132 kV GSS, Jawahar Nagar, Jaipur.

Unless specifically mentioned otherwise;

i) All the material / equipment, including nuts & bolts, etc. required for the work shall be supplied by RVPN.

ii) All T&P shall be arranged by the Contractor.

iii) All consumables & other material shall be arranged by the Contractor as mentioned in these specifications.

1.01 INTRODUCTION:

The bidder, in his own interest, is requested to read very carefully these instructions and the terms and conditions as incorporated in Sections – I, II, III, IV before filling the bid form. If he has any doubt as to the meaning of this specification or any portion thereof, he shall, before submitting the bid, refer the same to this office in writing at least SEVEN days before the specified date of opening of the bid so that such doubts may be clarified. Submission of the bid shall be deemed to be the conclusive proof of the fact that the bidder has acquainted himself and is in agreement with all the instructions, terms and conditions governing the specification, unless otherwise specifically indicated / commented by him in his bid.

1.02 FILLING OF BIDS:

a) The bids shall be submitted in sealed envelope and all blanks in the bid and the schedule to the specification shall be duly filled in. The completed forms and schedule(s) shall be considered as part of the contract documents in the case of successful bidder(s).

b) No alteration should be made to the form of the bid specification and schedules. The bidder must comply entirely with specification. Alternative proposals, if any, shall be clearly stated in the covering letter and shall accompany each copy of the bid.

c) The bid and all accompanying documents shall be in Hindi / English Language and shall be signed by a responsible and authorized person. The name, designation and authority of the signatory shall be stated in the bid.

d) Bid should be filled in only with ink or typed. No bid filled in by pencil or otherwise shall be considered.

e) All additions, alterations, and over writings in the bid must be clearly initialed by the Signatory to the bid.

f) The bidder shall quote the rate in the enclosed schedule-I of section-IV. The same offer will be applicable as per rates in Schedule-II of Section-IV for items not mentioned in Schedule-I.
and required to be carried out for completion of work. The rates / prices shall be entered in words as well as in figures. These must not contain any additions, alterations, over writings, cuttings or corrections and any other marking which leave any room for doubt.

g) The NIGAM will not be responsible to accept any cost involved in the preparation or submission of bids.

h) Bids and accompanying documents / correspondence shall be addressed to Superintending Engineer (T&C-Jaipur City), RVPN, Jaipur at the address given above.

i) The bidder should sign the bid form at each page at the end.

j) Telegraphic quotation or quotations sent by fax or email will not be considered.

1.03 QUALIFYING REQUIREMENT: To participate in the bidding process following shall be minimum qualification requirement for the prospective bidder.

1. (i) The Bidder should have executed construction of bay works of 33 KV, 132KV or higher voltage level at RVPN GSS for at least 80% of estimated cost of the proposed work / project for which he intends to participate, during last five years, prior to date of Bid opening.

(ii) The Bidder shall furnish documentary evidence to this effect in the form of a certificate Issued by user(s)/ Purchaser(s)/ Chartered Accountant containing the details of execution of with their voltage class. The attested copy of certificate must be submitted along with bid.

Besides above, only such contractors should apply, who are already registered with provident fund Commissioner.

2 Replacement with ESI Department.

3 The bidder must have A/B Class Electrical Contractor’s License issued by The Sr. Electrical Inspector, GoR, Jaipur. The copy of certificate/license in this respect should be attested by Notary Public and signed by the bidder or by authorized representative of the firm

Or

The Bidder must be an E-1 Class registered Contractor in RVPN on or before 31-05-2016

5 The bidder should have GST (Goods & Service Tax) Registration Number as per provision.

1.04 BID SECURITY:

(a) The bidder shall have to furnish prescribed Bid Security as specified in the bid notice either in cash or by DD/Banker’s cheque payable in the name of Accounts Officer (T&C-Jaipur-City) RVPN, Jaipur payable at Jaipur.

(b) Any bid not accompanied by a copy of receipt / acknowledgement for cost of Bid Specification and bid security / Exemption Certificate shall be rejected and the bid will not be opened.

(c) The bid security of unsuccessful bidders shall be refunded soon after final acceptance of successful bid and signing of contract agreement and submitting performance security either in form of bank guarantee (B.G.) or crossed Bank Draft or by furnishing an undertaking for deduction of performance security from his each running and final bill @ 10% of the amount of the bill by successful bidder(s). In case of the successful bidder, the amount of bid security may be adjusted in arriving at the amount of the Performance Security, or refunded if the successful bidder furnishes the full amount of performance security.

(d) Request for adjustments/ proposal for acceptance of bid security, if any, already lying with the NIGAM in connection with some other bids/orders shall not be entertained.

(e) No interest shall be payable on such deposits.
(f) The purchaser reserves the right to forfeit bid security or part thereof in circumstance, which according to him indicate that the bidder is not earnest in accepting/ executing any order placed under the specification.

(g) Bid security is to be furnished also by the Vendors registered with the NIGAM.

1.05 DOCUMENTS TO BE ENCLOSED WITH THE BID:

The bid shall be accompanied with the following schedules, documents and the fact of their having been enclosed shall be indicated on the top of envelope cover of the bid. The bid not accompanied by any or all of the following schedules / documents or accompanied by incomplete schedules is liable for rejection.

i) Certificate of Registration with provident fund Commissioner.
ii) Certificate of Registration with ESI department.
iii) ‘A/B’ Class’ Electrical Contractor License issued by the Sr. Electrical Inspector, Govt. of Rajasthan or copy of E-1 class registration in RVPN.
iv) PAN Card.
v) Certificate of GST (Goods & Service Tax) Registration Number as per provision.
vi) Certificate of experience / execution of line works as per Clause No. 1.03.
vii) The attested copy of all above certificates / documents in this respect must be Submitted in a separate envelope marked as “Qualifying Requirements”.

1.06 RECEIPT AND OPENING OF BIDS:

a) The bid offer shall be furnished in the following manner:

(i) One medium size Envelope-I containing proof of deposit of Bid Cost & Bid Security (EMD) as per Clause 1.04 (a). This envelope shall be superscripted “Proof of deposit of Bid Cost and Bid Security against BN – ………………………to be opened on ………….

(ii) One medium sized Envelope-II containing proof as per Clause 1.03 of meeting the qualifying requirements. This envelope shall be superscripted “Valid Competency Certificate against BN -………. to be opened on …………”

(iii) Another medium sized Envelope-III containing the “Price Bid” and any other information required to be enclosed with the bid as per Clause 1.05 above. This envelope shall be superscripted “Price Bid against BN ………….to be opened on………………”

(iv) All three envelopes shall be placed in a big size envelope superscripted “Bid Offer against RVPN/SE/ T&C/JPR-CITY/BN……. to be opened on …………”

(v) All above envelopes shall also be duly sealed individually.

b) Sealed covers in which the bids are enclosed shall be delivered in this office not later than 3.00 P.M. (unless otherwise specified) on the specified date. Bids shall not be accepted after the above hour and date fixed for receipt of bids.

c) The bids will be opened as per schedule in the office of SE (T&C-CITY), RVPN, Jaipur. First of all Envelope-I will be opened at 4.00 P.M. on the specified date, in the presence of bidders or their authorized representative who choose to be present. If the bid security is not found in order, envelope-II & III will not be opened.

d) The Envelope-II superscripted “Qualifying Requirements” will be opened after opening of Envelope-I.

e) After examination of Bid Security & QR, Envelope-III containing “Price Bid” of qualified bidders only will be opened on same day.

f) If the date fixed for opening of the bids is declared public holiday, the bids shall be received and opened on the next date on which office reopens after such holiday(s).
1.07 VALIDITY OF OFFERS: Bid offer shall be valid for a minimum period of 120 days after the date of opening of Bid. Bids mentioning a shorter validity period than specified are likely to be rejected / ignored.

1.08 SIGNATURE OF BIDDER:
The bid must contain the name, designation and place of business of the person or persons making the bid and must be signed and sealed by the bidder or the authorized signatory with his usual signatures.

1.09 TYPES OF WORK:
Construction of 6 Nos. New 33 KV Bays at 132 kV Jawahar Nagar, Jaipur.

(A) The works/activities which may be required to be got done under this specification for the work of Erection of Sub Station are as given below but the number of activities / item & quantity of work may vary according to requirement of the project:

a) Laying of earth mesh.
b) Laying of Earth risers
c) Placing/ Driving of earth electrodes.
d) Except where specifically mentioned otherwise, the scope of work of Contractor for the items at (a), (b) and (c) above includes consumable items such as welding electrodes, bitumen compound, bitumen impregnated tape, red oxide paint, green paint and bentonite slurry.
e) Erection of Sub-Station Steel Structures.
f) Stringing of Bus bar of ACSR conductor.
g) Stringing of Earth wire.
h) Jumpering.

The scope of work of Contractor for the items at (e), (f) and (g) above includes consumable items such as binding wire etc.
i) Erection of EHV transformer (tank already placed on foundation with wheels).
j) Erection of circuit breaker.
k) Erection of Station Transformer.
m) Erection of Lightening Arrestor.
n) Erection of Isolator & Earthing Switches.
o) Erection of Wave Trap.
p) Erection of capacitor bank with series reactor and residual voltage transformer/ Neutral current transformer.
q) Erection of Post insulator.
r) Erections of control relay panel / L.T Panel / D.C. Board / RTCC Panel / PLCC Panels etc.
s) Erection of marshalling kiosk / line matching unit / Line matching and distribution unit.
t) Erection of Battery Charger.
u) Erection of Battery Sets.
v) Laying of control & Power cables & wiring, etc.
The scope of work includes cable tags/marking strips, G.I. wire, cable glands, thimbles/lugs, ferrules, PVC perforated straps, sand and bricks.

w) Painting of structures and equipments:
   i) Painting of unpainted steel structures.
   ii) Painting of old painted steel structures.
   iii) Painting of transformers and equipments.
The scope of work of Contractor includes supply of material/items such as soda/Caustic solution, Paints, wire brush, Paint Brush, emery paper, cloth & solvent as required for cleaning and painting.

(B) The works/activities which may be required to be got done under this Labour Contract basis for the work of Erection of 220KV/132KV/33KV/11KV Bays are as given below:

   a) Laying of earth mesh.
   b) Laying of Earth risers.
   a) Placing/ driving of earth electrodes.
   Except where specifically mentioned otherwise, the scope of work of Contractor for the items at (a), (b) and (c) above includes consumable items such as welding electrodes, bitumen compound, bitumen impregnated tape, red oxide paint, green paint and bentonite slurry.

   b) Erection of Sub Station Steel Structures.
   c) Stringing of Bus bar of ACSR conductor.
   d) Stringing of Earth wire.
   e) Jumpering.
   The scope of work of Contractor for the items at (e), (f) and (g) above includes consumable items such as binding wire.

   f) Erection of EHV transformer (tank already placed on foundation with wheels).
   g) Erection of circuit breaker
   h) Erection of Station Transformer.
   j) Erection of Lightening Arrestor.
   k) Erection of Isolator & Earthing Switches.
   l) Erection of Wave Trap.
   m) Erection of capacitor bank with series reactor and residual voltage transformer/Neutral current transformer.
   n) Erection of Post insulator.
   o) Erection of control relay panel / RTCC Panel / PLCC Panels etc.
   p) Erection of marshalling kiosk / line matching unit / Line matching and distribution unit.
   q) Laying of control & Power cables & wiring etc.
   The scope of work includes cable tags/marking strips, G.I. wire, cable glands, thimbles/lugs, ferrules, PVC perforated straps, sand and bricks.

   r) Painting of structures and equipments:
      i) Painting of unpainted steel structures.
      ii) Painting of old painted steel structures.
      iii) Painting of transformers and equipments.
The scope of work of Contractor includes the supply of material/items such as soda/Caustic solution, Paints, wire brush, Paint Brush, emery paper, cloth & solvent as required for cleaning and painting.

G) The NIGAM shall also reserve the right to split the quantities and to entrust the order for the erection work to one or more Contractors when placing work order. The bidder shall also agree to accept such part works at the rates/prices mentioned in the quoted by him & and accepted by the NIGAM.

1.10 PRICES:
A) GENERAL:
a) The bidders are advised to quote firm prices. No variation in the quoted prices will be allowed. The bidder quoting ‘VARIABLE’ prices shall be ignored. 
b) The bidder shall quote the prices inclusive of all taxes and levies except Goods & Service Tax (GST) which may be payable as per applicable provisions.
c) The price shall remain valid till completion of the work as per work order awarded against this specification.
d) Any bid containing prices not quoted in the manner prescribed under the above sub clauses is liable to be ignored.
e) No representation for enhancement of rates once accepted will be considered.

B) SUB STATION ERECTION WORKS:
a) The bidder is hereby informed that the scope of work shall include the following specific provisions. The bidder shall consider these when quoting his rates.

i). In case of works of earthing as at (a),(b) and (c) of clauses 1.09(A) and 1.09(B), the scope of work of Contractor shall include consumables items such as welding electrodes, bitumen compound, bitumen impregnated tape, red oxide paint, green paint, and bentonite slurry except where specifically mentioned otherwise.

ii) In case of works as at (e), (f) and (g) of clauses 1.09(A) and 1.09(B), the scope of work of Contractor shall include consumables items such as binding wire.

iii) In case of works as at (v) of clause 1.09(A) and (s) of clause 1.09(B), the scope of work of Contractor shall include cable tags/marking strips, G.I. wire, cable glands, thimbles/lugs , ferrules, PVC perforated straps, sand and bricks.

iv) In case of works as at (w) of clause 1.09(A) and (t) of clause 1.09(B), the scope of work of Contractor shall include material/items such as soda/caustic solution, paints, wire brush, paint brush, emery paper, cloth and solvent as required for cleaning and painting.

a) The material required for the work shall be provided by RVPN and shall be issued from the RVPN store located within the Sub Station.
b) The prices quoted should be inclusive of cost of transportation of material from Sub Station site stores to the location in switchyard.
c) The crane required for any activity during erection shall be arranged by the Contractor at his own cost. The prices quoted shall also include charges for crane.
d) The bidders must quote their fixed prices indicating the percentage variation on the rates as a whole given in Schedule –I (which are based on RVPN BSR applicable from 1-1-2017). The percentage variation above or below quoted by the bidder shall also be applicable for the different types of works which are given in Schedule – II.
j) The prices quoted should be inclusive of cost of Insurance Charges.

1.11 TAXES / DUTIES / LEVIES:

6 | P a g e
a) **INCOME TAX:**
Deduction at source on account of Income tax shall be made as per applicable laws.

b) **GST (Goods and Service Tax):**
Bidder must quote their prices inclusive of all taxes and levies except Goods & Service Tax (GST) which is to be mentioned separately in the same schedule in the Section-IV Schedule-I available in specification. The bidder shall give GST (Goods and Service Tax) registration number. Any statutory variations in taxes will be to the service provider's account. The liability of GST (Goods and Service Tax) shall be applicable as per provisions.

The contractor shall have to give an undertaking with each bill that due taxes shall be deposited by them regularly.

The contractor will submit the documentary proof of deposition of applicable Taxes as per GOVT. provision and also give an undertaking that if the applicable taxes deposited is refunded on any ground by Tax Department the same shall be deposited in RVPNPL.

1.12 **COMPLETION TIME:**
The work shall be completed within the period indicated in the work order as well as Schedule of completion attached with bid specifications **Schedule-III of Section-V.**

1.13 **AMENDMENT IN SPECIFICATIONS:**
The purchaser may revise or amend the specification and timings prior to the date notified for opening of the bids. Such revision or amendment, if any, will be communicated to all the bidders as amendment or addenda to this invitation of the bid.

1.14 **GENERAL:**

a) Purchase of a copy of this specification by the bidder is essential (except in limited bid enquiry) for the consideration of his bid. Only one bid will be accepted against each copy of the specification purchased. This specification is not transferable. The cost of bid form once sold will not be refunded under any circumstances.

b) The Contractor shall treat the details of the specification and other bid documents as private and confidential and they shall not be reproduced without the written authorization of the NIGAM.

c) The NIGAM does not bind itself to accept the lowest or any bid or any part of the bid and shall not assign any reason(s) for the rejection of any bid or a part thereof.

d) The fact of submission of bid to the NIGAM shall be deemed to constitute an agreement between the bidder and the NIGAM whereby such bid shall remain open for acceptance by the NIGAM and the bidder shall not have option to withdraw his offer, impair or derogate the same.

e) After award of the work order the Contractor shall have to execute the contract documents / agreement for the proper fulfillment of the contract. He will execute this agreement on Rajasthan State stamp paper of appropriate value at his own cost.

1.15 Any action on the part of the bidder to revise the rates / price in his own interest after the opening of the bid shall result in rejection of the bid and also debar him from participation
in bids of the T & C wing for at least one year in addition to the forfeiture of Bid Security. In case of Enlisted Contractors in the T&C wing, his name shall be struck off from the list of Enlisted Contractors and his security deposit for enlistment shall be forfeited as per provisions of the RVPN Rules for Enlistment of Contractor for E&M Works, 2007.

1.16 TRANSPARENCY IN PUBLIC PROCUREMENT:

The Government of Rajasthan has enacted the Rajasthan Transparency in Public Procurement Act, 2012 and Rajasthan Transparency in Public Procurement Rules, 2013 w.e.f 26.01.2013. This procurement process is abided by the processes and procedures of the aforesaid Act & Rule. In case the any clause (s), term (s) & condition (s) in this bidder document differ in its interpretation and context from it the later (i.e. GOR Act and Rule as mentioned above) shall prevail.
SECTION – II

GENERAL CONDITIONS OF CONTRACT.

Notwithstanding anything contained to the contrary in the specification or Bid or any subsequent exchange of correspondences, these General Conditions of Contract shall prevail and shall be binding on the Contractor and any change or variation expressed or impressed howsoever made shall be inoperative, unless expressly sanctioned by the NIGAM. The Contractor shall be deemed to have fully informed himself and to have specific knowledge of the provisions of the General Conditions of Contract mentioned hereunder.

1.0 DEFINITION OF TERMS:

In constructing these general conditions and the annexed specification, the following words shall have the meaning herein assigned to them unless there is anything in the subject or context inconsistent with such construction.

a) ‘Act’ shall mean The Electricity Act 2003 (Act 36 of 2003) for the time being in force and shall include any statutory amendments, modification or enactment thereof.

b) ‘Appendix’ shall mean the appendices appended with the Bid documents.

c) ‘Approved Bank’ shall mean State Bank of Bikaner and Jaipur or any other nationalized or scheduled bank approved by the RBI.

d) ‘BOD’ shall mean Board of Directors of RVPN appointed by the State Government.

e) ‘BSR / Basic Schedule of Rates’ shall mean the standard rates as approved by the RVPN for the execution of different items of work which shall be used as the basis for the purpose of estimation of the cost of works.

f) ‘CMD’ shall mean the Chairman & Managing Director, Rajasthan Rajya Vidyut Prasarani RVPN Ltd., Jaipur.

g) ‘Codes’ shall mean and include the Indian Standard Codes of Practice or any other directives / guidelines applicable to the execution of the work including those issued by Statutory Bodies.

h) ‘Contract’ shall mean the contract established between the RVPN and the Contractor and includes the Invitation to Bid, Instructions to Bidders, General Conditions of Contract, Specification, form of Bid, Bid form including schedule of prices, Schedules, Drawings, covering letters, letter of intent and its acknowledgement, formal work order, Power of Attorney, earnest money receipt, security deposit, special instructions, addenda to the contract, contract agreement & other related documents, etc. issued with the Bid specifications / work order.

i) ‘Contract price’ shall mean the sum named in or calculated on the basis of the rates and quantities of work shown in the Schedules plus all applicable taxes, duties, charges, etc. in accordance with the provisions of and annexed with the Bid / contract / work order or any amendment(s) thereto.

j) ‘Contractor’ shall mean the Bidder whose Bid has been accepted by the NIGAM / competent work order approving / sanctioning authority and shall include the Bidder, successors and assignees approved by the NIGAM / work order placing authority.

k) ‘DOP’ shall mean Delegation of Powers to the Officers of the RVPN.

l) ‘Earnest Money / Earnest Money Deposit’ shall mean an amount specified in the Notice Inviting Bid in Cash / Demand Draft / Banker’s Cheque in favour of the owner indicating the Bidder’s commitment to accept / execute any order placed under the Bid specifications.

m) ‘Engineer’ shall mean the Chief Engineer, Addl. Chief Engineer, Dy. Chief Engineer or Superintending Engineer of the RVPN or any other Engineer or Officer for the time being or from time to time duly authorized and appointed by the RVPN or by any competent Authority to act as
authorized Engineer or Inspector for the purpose of the contract.

n) ‘Engineer – In – Charge’ shall mean and include the Assistant Engineer, or any other Engineer or Officer appointed and authorized by the RVPN or by any competent authority for performing the duties of Engineer – In – Charge at the work site for carrying out the inspection, supervision, testing and measurement of the work and also the material / stores / equipments / T&P, etc. included in the contract, and also includes any other agency authorized for the purpose. The Engineer – In – charge shall also be responsible for the issue of material and for the overall material accounting of the work.

o) ‘Final Account Bill’ shall mean the bill for the last payment on a running account to be made to a Contractor on completion or determination of his contract in full settlement of the account subject to deductions as per contract.


q) ‘Head of Department / (HOD)’ shall mean the Authority declared to be such for the purpose of exercise of Administrative & Financial Powers as per orders of the RVPN.

r) ‘Letter of Intent (LOI) / Letter of Acceptance (LOA)’ shall mean the RVPN’s letter conveying its acceptance of the Bid subject to such reservations / conditions as may be stated therein. This acceptance letter precedes the detailed Work order containing the detailed terms and conditions of the technical and financial parameters.

s) ‘Month’ shall mean calendar month.

t) ‘MM Wing’ shall mean Material Management Wing of the RVPN entrusted with the work of purchasing of centrally purchased items and any other work assigned to it.

u) ‘Order Placing Authority’ shall mean the officer competent to place work orders after sanction of the competent authority / committee.

v) ‘Owner’ shall mean the Rajasthan Rajya Vidyut Prasaran Nigam Ltd. represented by Chairman & Managing Director and shall include legal representative, successors and assignees.

w) ‘Performance Security Deposit’ shall mean an amount equal to 5% of the Contract value which shall be deducted and retained by the owner for the prescribed period against the performance of the work done. This shall be deducted from the running / final bills of the Contractor at the rate of 5% of the value of the work done in such bills.

x) ‘Place of Delivery / Store’ shall mean the place of delivery / store of RVPN specified in the contract, or as advised / intimated from time to time during the execution of the contract, at which the RVPN shall deliver / issue the material to the Contractor, and where the Contractor shall be required to deposit the balance material after the work is completed.

y) ‘Plant / equipment / material / stores / works’ shall mean and include the plant and material and any other equipment which are necessary for the execution of the contract and to be provided by the RVPN / Contractor as per provisions of the contract and work / works to be done by the Contractor under the contract.

z) ‘Rate Contract’ shall mean the rate contract approved and concluded by the competent authority of the RVPN.

aa) ‘Rules’ shall mean and include the Indian Electricity Rules, 1956, Factory Act and Regulations made there under, Labour Rules, etc. or such modifications thereof as applicable in the State of Rajasthan during the period of execution of the contract under the State authorities such as Electrical Inspector, Chief Inspector of Factories & Boilers, Labour Commissioner, etc.

ab) ‘Running Account Bill’ shall mean a bill for the payment to be made to the Contractor on a running account when payment for work is made to him at specified intervals, subject to deductions as per contract and final settlement of the account on completion or determination of his contract.

ac) ‘RVPN’ shall mean Rajasthan Rajya Vidyut Prasaran RVPN Ltd. constituted under the Company Act., 1956 and shall include its successors and assignees.

ad) ‘Sanctioning Authority’ shall mean the RVPN and / or such Authority / Committee to whom powers to sanction / approve work contracts / orders have been delegated by the RVPN.

ae) ‘Schedule’ shall mean the schedules as enclosed with the Bid documents.
af) ‘Site’ shall mean the place or places named in the contract or as advised / intimated from time to time during the execution of the contract and shall include, where applicable, the lands and buildings upon or in or across which the works are to be executed.

ag) ‘Specifications / Technical Specifications’ shall mean the specifications and specific conditions enclosed with the Bid documents and the schedule(s) annexed thereto (if any), and also any other specifications mentioned in the contract or otherwise incorporated from time to time.

ah) ‘Standards’ shall mean and include the Indian Standard Specifications or any other standards prescribed by the RVPN as are applicable to the work under the contract.

ai) ‘Successful Bidder’ shall mean the Bidder whose Bid has been accepted.

aj) ‘T & P’ shall mean any tools and plants which are necessary for the execution of the contract and to be provided / arranged by the Contractor, or by RVPN if specified in the contract, for carrying out the works under the contract.

ak) ‘Bid’ shall mean a written or formal offer to execute a work for an agreed price.

al) ‘Bidder’ shall mean and include one or more persons or any firm or any company or Body incorporate who has submitted the Bid in response to the “Invitation to Bid”.

am) ‘Biding / Bid Issuing Officer’ shall mean the Engineer / Officer from whose office the Notice Inviting Bids has been issued and who shall be processing the case and placing the work order.

an) ‘WTDs’ shall mean Whole Time Directors of RVPN appointed by the State Government.

ao) ‘Week’ shall mean a period of 7 (seven) days.

ap) ‘Works’ shall mean and include the works to be done by the Contractor under the contract.

aq) ‘Work Order / Detailed Work Order / Formal Work Order’ shall mean the Owner’s letter containing the terms and conditions of the technical and financial parameters and other particulars as per the provisions of the Specifications and the General Conditions of Contract. This shall be in continuation to the letter of intent / letter of award, if issued.

ar) ‘Work – In – Charge’ shall mean the next higher Engineer(s) / Officer(s) above the Engineer(s) – In - Charge nominated / authorized by the competent authority of the RVPN for carrying out inspection of the works and the material / Stores / equipments / T&P, etc. included in the scope of the contract, and also includes any other agency authorized for the purpose.

Terms and expressions not defined herein shall have the same meaning as assigned to them in the Indian Sale of Goods Act (No. III of 1930), failing that, in the Indian Contract Act (Act IX of 1872), and failing that, in the General Clause Act, 1897.

Words importing the singular only shall also include the plural and vice versa where the context requires.

2.0 CONTRACT AGREEMENT:
The Contractor and NIGAM shall, as soon as possible after placing of work order or unless otherwise agreed upon, enter into an agreement for the proper fulfillment of the contract. The expenses of completing and stamping the agreement shall be paid by the Contractor and the NIGAM shall be furnished free of charge with an executed stamped agreement after the work order has been placed by the NIGAM. All orders / instructions to the Contractor shall, except as herein otherwise provided, be given by the Engineer on behalf of the NIGAM.

3.0 SUBLETING AND ASSIGNMENT:
The Contractor shall not sublet, transfer or assign any obligation, duty or responsibility under the contract, or any part thereof, interest therein or benefit or advantage whatsoever.

4.0 TAXES, LEVIES & DUTIES:
a) In accordance with the scope of works, this is a labour contract of erection work from the “FREE ISSUE” of material; hence no sales tax will be leviable. However, tax on such labour contracts, if levied, shall be to the Contractor's account.
b) **GST (Goods & Service Tax):**

The GST (Goods & Service Tax) is applicable on the services provided in respect of erection, commissioning, installation, and testing part. The GST will be deducted/Payable as per the applicable laws. The bidder shall quote the prices exclusive of applicable GST. Any statutory variation in GST will be to the Contractor's account. Deduction at source on account of GST on reverse charge basis shall be made as per applicable law.

c) **Income Tax:**

Deduction at source on account of Income tax shall be made as per applicable laws.

d) Any new statutory taxes / duties / levies imposed after opening of the Bid and during the validity of the Bid shall be borne by contractor.

### 5.0 ERECTION INSURANCE:

**A) SUB STATION ERECTION WORKS:**

The Contractor at his own cost, after award of the contract, shall take suitable storage cum erection insurance policy for the material to be issued by the Nigam for execution of work awarded to the contractor. The estimated cost as per Store Issue Rate of the material shall be intimated by the officer-in-charge who will supervise the work/project as nominated by the order placing authority.

The Contractor shall also ensure the following:

a) The insurance premium should be paid in one installment. A copy of the receipt of payment of insurance premium shall be submitted to the order placing authority, the Work–In–Charge and the concerning Accounts Officer by the Contractor.

b) Deductible franchise should be minimum as per insurance rules. In case of any loss to the extent of deductible franchise, the same shall be borne by the Contractor.

c) The Stubs /anchor bolts/parts of the structures required for grouting will be issued at one time for carrying out grouting work without insisting for erection insurance. However, insurance shall have to be arranged by the Contractor prior to issue of structures / remaining part of the structures and other material to him and shall remain valid up to 30 days from the date of handing over of the work to the Work-In-Charge.

d) Further material shall be issued to the Contractor only after furnishing of valid insurance policy and Indemnity Bond to the Work–In–Charge. The insurance policy shall be accepted by the order placing authority whereas Indemnity Bond shall be accepted by the Work–In–Charge.

e) A policy indicating discount on account of “EXCESS” will not be accepted.

f) Insurance policy shall be drawn in favour of the work / project indicating the full name of the Sub Station /work.

g) Insurance policy shall be taken from any office of nationalized insurance companies or an insurance company approved by the order placing authority situated at the headquarters of the order placing authority or at the District headquarters. However, for the Contractors whose office is situated outside Rajasthan, the insurance policy may be taken at the place where such office is situated.

h) Insurance policy shall be in combined name of Superintending Engineer (T&C-Jaipur City), RVPN, Jaipur and Contractor.

i) Computerized and stamped insurance policy shall be furnished by the Contractor to the order placing authority for its acceptance.

j) A copy of the computerized and stamped insurance policy shall also be furnished by the Contractor to the Engineer–In–Charge who shall, on receipt of intimation of its acceptance issued by the order placing authority, authorise issue of the material to the Contractor.

k) If the work is not completed within the scheduled completion time, the extension of insurance policy shall be arranged by the Contractor. A part of the premium paid to the Insurance Company...
for this extension, corresponding to the delay on the part of RVPN, shall be reimbursed to the Contractor on finalization of time extension case. However, the part of the premium corresponding to the delay on the part of the Contractor shall be borne by the Contractor.
l) Any deviation to this clause will not be acceptable. It shall be in the interest of the Contractor to take insurance policy for a longer period.

6.0 COMPLETION TIME:
a) The completion time shall be governed by the provisions of the work order.
b) The NIGAM reserves the right to defer the completion period as indicated in the work order. The period during which the works have been so deferred shall not be reckoned as delay in completion in terms of clause no. 7.0 on “Delay in Completion”.

7.0 DELAYS IN COMPLETION:
A) SUB STATION ERECTION WORKS:
a) The time for and the date of completion specified in the work order shall be deemed to be the essence of the contract and the work shall have to be completed not later than the period specified therein. The time allowed for carrying out the work, as mutually agreed upon, shall be strictly observed by the Contractor and shall be reckoned from the 15th day after the written order to commence the work is given to the Contractor. The time allowed may be considered as the time given in the work order plus the time extended for justified reasons by the competent authority.
b) If the Contractor fails to complete the work or any part thereof within the specified completion period, the NIGAM shall be entitled at its option:
i) To recover from the Contractor at 0.5% (half percent) of the cost of the unexecuted work per week or part thereof for the remaining period of unjustified delay subject to a maximum of 10% (ten percent) of the cost of the unexecuted work.
ii) To cancel the contract and, if so desired, to get completed the erection works through other agencies at the risk & cost of the defaulter contractor.
iii) Besides the above, appropriate action may be taken by the Engineer –In – Charge/competent authority to debar the Enlisted/Registered Contractors from taking part in future Bids for a specified period or blacklist him or take action against him under or as per the provisions of the RVPN Rules for Enlistment of Contractors for E&M Works, 2007 / Vendor Registration Scheme/Provisions of Purchase Manual.
iv) All sums payable by the Contractor by way of compensation under any of these or other conditions shall be considered as reasonable compensation to be applied to the use of RVPN without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

c) ADVANCE TIME EXTENSION IN COMPLETION PERIOD:
(i) In case, completion of the work is not possible within the specified completion period, the contractor shall apply before expiry of completion period for time extension in completion period in advance for which the Engineer In-charge will review the situation, record the reasons of delay activity wise either on part of Nigam or the contractor as the case may be and initiate a case for grant of further extension in completion period (original or revised) without waiting for completion of the work, indicating expected revised target date of completion. Such case for time extension will be processed by the Engineer In-charge and submitted to XEN (T&C) before expiry of the stipulated completion period. The XEN (T&C) will examine the matter and submit his comments for obtaining time extension or cancellation of contract on the basis of facts/recorded reasons.

ii) The Accounts officer (T&C) will ensure that, final bill is entertained only after grant of suitable time extension in completion period is received from the competent authority.

8.0 TERMS OF PAYMENT:
a) The payment of the running bills up to the work order value will be released without limiting to the individual item quantities.
b) Deductions in respect of deficiencies, etc. will be made by the Assistant Engineer–In–Charge while passing/verifying the bills and shall be simultaneously conveyed to the Contractor.
c) The following time schedule is specified within which verification / countersignature of all bills shall be done.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Activity</th>
<th>Time schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Verification by AEN–In–Charge &amp; submission to XEN</td>
<td>3 days, 7 days</td>
</tr>
<tr>
<td>2.</td>
<td>Countersignature by XEN &amp; forwarding to Accounts Officer</td>
<td>3 days, 7 days</td>
</tr>
</tbody>
</table>

d) Payment for the erection work will be made to the Contractor on submission of bills in accordance with the procedure as detailed below:

a) 90% (Ninety percent) payment of the total value of the works will be made against running account bills to be submitted to the Assistant Engineer–In–Charge of the work. The running account bills may be submitted weekly by the Contractor.
b) Balance 10% payment, which shall be deducted and kept as performance security deposit, will be made 12 months after the work is completed and accepted by the Assistant Engineer–In–Charge. The payment will be made only after a material account statement of items received and used and returned to stores is settled. Any discrepancy in the quantity will have to be made good by the Contractor or deduction of its cost at double the issue rate applicable at the time of issue of material will be made while settling the balance payment. In case of theft of material, recovery shall be made at single issue rate provided FIR has been lodged timely by the Contractor and a copy of the same is submitted to the Work–In–Charge.

9.0 MODE OF PAYMENT:

A) GENERAL:

(a) The Running Account and Final bills in accordance with above clause (s) shall be furnished along with following information:
    (i) Item wise work done during the billing period.
    (ii) Cumulative work done item wise.
    (iii) Accounts for material, bolts, nuts, accessories, etc. consumed and balance stock.
    (iv) Consumption account of RVPN supplied material, wastage and balance stock.
(b) The payment shall be made after receipt of the bill with complete documents by the concerning Accounts Officer and subject to completion of all contractual formalities as per requirement of the work order. The time for making payment shall be as per prevailing payment policy of RVPN.
(c) The payment of works up to the value of the work order shall be made irrespective of individual item quantities (including excess or extra) appearing in the relevant price schedules. However, approval of competent authority for excess / extra quantities shall be necessary before releasing final bill.
(d) The Contractor shall submit the complete materials account immediately after the work is completed and in any case not later than one month of completion of the work. The Work–In–Charge shall settle the MAS A/c within one month from the date of receipt of MAS A/c from the Contractor.
(e) Recovery of all material including structure material (on per MT basis) shall be affected at double the issue rate. The recovery of shortages of structure material shall be made only for short members / materials as per their weight.
(f) Payment shall be made to the Contractor through RTGS/NEFT for quick and safe transfer of funds across the country. The charges for transfer through RTGS/NEFT shall be on the part of the Contractor. The Contractor shall furnish particulars to the concerning Accounts Officer in prescribed format.
B) SUB STATION ERECTION WORKS:
(a) Running Account Bills and the Final Bill for 90% value of the erection work as per clause 8.0(B) (a) shall be submitted to the AEN–In–Charge of the works, who will in turn process the same and forward it to the XEN–In–Charge of the work for countersignatures and finally to the concerning Accounts Officer for payment. These bills shall be serially numbered.
(b) The refund of the performance security deposit for 10% value of the erection work deducted as per clause 8.0(B) (b) shall be submitted to the AEN–In-Charge of the work, who will in turn process the same and forward it to the XEN–In–Charge of the work for countersignatures and finally to the concerning Accounts Officer for payment.

10.0 QUANTITY OF WORK:
a) The quantities of various items of erection work indicated in the work orders shall be tentative / estimated. Final quantities shall be determined after completion of work. The Contractor has to carry out the work according to the quantities as determined so as to complete the work as required.
b) After completion of all works, the bill of quantity of the work shall be finalized as prescribed hereunder:
   (i) Initiation by Engineer –In–Charge & approval: Within 10 days
       his competence.
   (ii) Initiation by Engineer–In-Charge & submission: Within 5 days
       XEN if not in his competence.
   (iii) Approval by XEN if in his competence. Within 10 days of receipt from Engine
       Charge.
   (iv) Verification by XEN & submission to SE if not in his competence. Within 3 days of receipt from Engine
       Charge.
   (v) Approval by SE if in his competence. Within 10 days of receipt from XEN.
   (vi) Verification by SE & submission to CE / ZCE in his competence. Within 5 days of receipt from XEN.
   (vii) Approval by CE / ZCE in concurrence with SE. Within 10 days of receipt from SE Accounts Officer.
       SE/ XEN/ AEN shall approve the quantity with the concurrence of Circle AO.

11.0 INSPECTION BY NIGAM'S REPRESENTATIVE:
(a) All work, under or in the course of execution or executed in pursuance of the contract, shall at all
    times be open to inspection and supervision of the Engineer -In-Charge and his subordinates, and
    the Contractor shall at all times during the usual working hours and at all other times at which
    reasonable notice of the intention of the Engineer-In-Charge or his subordinate to visit the works
    shall have been given to the Contractor, either himself be present to receive orders and
    instructions, or have a responsible agent duly accredited in writing present for the purpose. Orders
    given to the Contractor’s agent shall be considered to have the same force as if they had been
    given to the Contractor himself.
(b) The AEN–In–Charge / XEN-In–Charge of the work or his representative will be free to visit the
    Contractor's site stores and erection site and also verify the NIGAM's materials in the custody of
    the Contractor as and when required.
(c) In addition to the above, the Junior Engineer / Assistant Engineer / Executive Engineer-In-Charge
    of the work shall take measurements of the works and also carry out test checking of such
    measurements in compliance of RVPN orders prescribing the norms for such measurements. It is
    also the responsibility of the Contractor to aid and assist in the above measurements.
(d) The Contractor shall, before covering up or otherwise placing beyond the reach of measurement
    any work, ensure that measurement / test check of measurement of the work has been made and
    correct dimensions thereof have been taken. If any work shall be covered up or placed beyond the
    reach of measurement without its measurement / test check of measurement having been taken,
    the same shall be uncovered at the Contractor’s expense, or in default thereof, no payment or
    allowance shall be made for such work or for the materials with which the same was executed.
12.0 TESTING AND COMMISSIONING:
The provisions of this Clause shall be applicable only for Sub Station Erection Works:
(a) After completion of the work as mentioned in Clause 1.0 “Scope” of Section – III A, the Contractor will ensure that all works connected with the Sub Station have been completed correctly as per Indian Electricity Rules and procedures. Any extra cost involved due to incompleteness of work or bad workmanship found out subsequently shall be set right forthwith by the Contractor at his cost. The Contractor shall arrange to handover the complete Work.

(b) TAKING OVER:
When the whole of the work has been completed and has passed all the tests on completion prescribed in the contract to the satisfaction of the Engineer–In–Charge, the Engineer–In–Charge shall issue to the Contractor a taking over certificate as proof of the final acceptance of the work executed. Such certificate shall not unreasonably be withheld nor will the Engineer–In–Charge delay the issuance thereof on account of minor omissions or defects which do not affect the commercial operation and / or cause any serious risk to the work or where failure of any equipment to pass prescribed tests cannot be attributed to the Contractor. Such certificate shall not relieve the Contractor of any of his obligation which otherwise become due by the terms and conditions of the contract. Contractor shall give an undertaking to finish any outstanding work expeditiously.

(c) The Sub Station / bay / equipment can be energized and taken over if the deficiencies do not materially affect the safety of the Sub Station/bay / equipment and can be attended while the same is in charged condition. However, the deficiencies shall be jointly listed and intimated to the order placing authority.

13.0 GUARANTEE:
(a) The provisions of this Clause shall be applicable for all Sub Station Erection Works and for the works of “Painting of unpainted steel Structure”, “Painting of old painted steel Structure” and “Painting of Transformers and Equipments” under Sub Station maintenance works.
(b) The above works will be covered under guarantee period against any defect arising from workmanship up to a period of 3 months from the date on which the Sub Station / bay / equipment/work is completed in all respects, handed over & settlement of material account to the satisfaction of the Work – In – Charge.

14.0 LABOUR LAWS:
(a) EMPLOYEES PROVIDENT FUNDS:
(i) The Contractor shall have to submit a certificate with every bill that his is an establishment covered under the Employees Provident Fund and Miscellaneous Provisions Act, 1952 and is having a separate code number with the Provident Fund commissioner and also that the Provident Fund Contribution in respect of all the employees employed by him along with employer’s share of contribution, etc. is being deposited with the Provident Fund Commissioner and shall also submit certified photo copies of the challans of deposits for the previous month. The contractors who are not registered with PF Commissioner will not be entitled to participate in the Bid.

(b) CONTRACTOR TO INDEMNIFY THE NIGAM:
The Contractor shall indemnify the NIGAM and every member, officer and employee of the NIGAM, also the Engineer–In–Charge and his staff against all actions proceedings, claims, demands, costs and expenses whatsoever, arising out of or in connection with the matters referred to herein above or elsewhere and against all actions, proceedings, claims, demands, costs and expenses which may be made against the NIGAM or Govt. for or in respect of performance of his obligation under the contract documents. The NIGAM shall not be liable for or in respect of or in consequence of any accident or injury to any workman or any other person in the employment of the Contractor, and the Contractor shall indemnify and keep indemnified the NIGAM against all claims, demands, proceedings, cost, charges and expenses whatsoever in respect thereof or in relation thereto.
(c) Contractor shall maintain a valid labour license under the Contract Labour (Regulation & Abolition Act) for employing necessary manpower required by him. In the absence of such license, the contract shall be liable to be terminated without assigning any reasons thereof.

All contracts/contractors with the Government shall require registration of workers under the Building & other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 & extension of benefit to such workers under the Act. Deduction of CESS at source will be made as per provisions of the said Act, in force from time to time.

**15.0 CLIMATIC AND ISOCERINIC CONDITIONS:**

The Contractor shall be required to execute the work in the tropical conditions such as high temperature, excessive humidity, dust and salt laden atmosphere as detailed below.

- a) Maximum ambient air temperature in shade: 50 deg. C
- b) Minimum temperature of air in shade: 0 deg. C
- c) Maximum relative humidity: 90%
- d) Minimum relative humidity: 10%
- e) Height above Mean sea level: Upto 530 meters
- f) Dust storms are liable to occur during the period from March to July
- g) Average number of thunder storm days per annum: 25
- h) Average number of tropical monsoon (condition) per annum: 4 months
- i) Average Rainfall: 10 cm to 100 cm

**16.0 MATERIAL AND WORKMANSHIP:**

All the work executed shall be of the best quality and capable of satisfactory operation under the climatic humid tropical conditions mentioned under clause 15.0 above. The workmanship shall be of the highest grade and the entire work shall be in accordance with the best modern Engineering practices.

**17.0 THE ELECTRICITY ACT, 2003:**

All the works covered by the Contract shall be in accordance with The Electricity Act, 2003 with the latest amendments and the Electricity rules made there under.

**18.0 SITE TESTS:**

The NIGAM reserves the right to carry out any site tests it may decide upon at its own expenses. In case the quality of work is not found as per work order, all expenses incurred during the site testing will be to the Contractor's account. In addition, all costs and expenses for the repair / rectification / replacement of the work found defective shall be to the Contractor’s account.

**19.0 CHANGE OF NAME OF THE BIDDER / CONTRACTOR:**

a) At any stage after placing of the work order, the NIGAM shall deal with the Contractor only in the name and at the address under which he has submitted the Bid. All the liabilities / responsibilities for due execution of the Contract shall be those of the Contractor and under no circumstances, he shall be relieved of any obligations under the Contract. The NIGAM may, however, at its discretion, deal with the Agents / Representatives / Distributors / Manufacturers / Associates / Principals / Sister Concerns and such dealings shall not absolve the Contractor(s) from his / their responsibilities / obligations / liabilities to the NIGAM under the contract.

b) Any change / alteration of name / Constitution / Organization of the Contractor shall be duly notified to the NIGAM and the NIGAM reserves the right to determine the Contract in case of any such Notification. In the event of such determination, the NIGAM may get the work executed from elsewhere.

**20.0 DEDUCTIONS FROM CONTRACT PRICES:**

All costs, damages or expenses which the Owner may have paid under the contract, for which the Contractor is liable, may be deducted by the Owner from any money due or becoming due by him to the Contractor under this or any other contract or may be recovered by suit or otherwise from the Contractor. Any sum of money due and payable to the Contractor (including performance security deposit returnable to him) under this contract may be appropriated by the Owner and set off against any claim of the Owner for the payment of a sum of money arising out of or under any other contract made by the Contractor with the Owner.
21.0 **BANKRUPTCY:**
If the Contractor shall commit any act of bankruptcy or, being a Corporation, commences to be wound up except for reconstruction purpose of carry on its business under a receiver, the executors, successors or other representative(s) in law of the Contractor or any such receiver, liquidator or any person in whom the Contract may become vested, shall forthwith give notice thereof in writing to the NIGAM and shall for one month during which he shall take all reasonable steps responsible to prevent stoppage of the works, have the option of carrying out the Contract subject to his or their providing such guarantee as may be required by the NIGAM but not exceeding the value of the work for the time being remaining executed. In the event of stoppage of the works, the period of the option under this clause shall be fourteen days only. Provided that should the above option not be exercised, the Contract may be determined by the NIGAM by notice in writing to the Contractor and it shall be lawful for the NIGAM to take the work, full or in part, out of the Contractor's hands and recontract at reasonable prices with any other person(s) and the NIGAM shall be entitled to retain and apply any balance which may be otherwise due on the Contract by it to the Contractor, or such part there of as may be necessary to the payment of the cost of executing such work as aforesaid.

22.0 **CONTRACT DOCUMENTS:**
The following shall be complied with by the contractor.

a) He shall have to execute, within 15 days from the date of receipt of detailed work order, the contract agreement in triplicate in the prescribed proforma on non–judicial stamp paper as per stamp duty applicable in Govt. of Rajasthan along with copy of the work order, copy of the “General Conditions of Contract” and “Specifications”. It is necessary that each and every page of the relevant documents shall be signed by an authorized person with stamp.

b) It may however be ensured that one copy of the work order, and other documents as above are signed by an authorized person.

c) The acknowledgement of above documents being in order shall be notified in due course of time. No payment shall be released without acceptance of the contract agreement.

23.0 **FURTHER CORRESPONDENCE:**
All correspondence pertaining to the work order or in respect of any clarification required on the terms and conditions, etc. should be addressed to the order placing authority.

24.0 **FORCE MAJEURE CONDITIONS:**
If at any time during the currency of the contract the performance in whole or in part be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, fire, floods, explosion, epidemics, quarantine restrictions, strikes, lockouts or acts of God (herein after referred to as ‘Events’) then, provided notice and adequate proof of the work having suffered on account of these events is given within 21 days from the date of occurrence thereof, the provisions of Clause 7.0 shall not be invoked by the Owner, provided further that the works under the contract shall be resumed as soon as practicable after such event(s) has ceased to exist. The decision of the Owner as to whether the works have been so resumed or not shall be final and conclusive provided further that in case the strike / lockout prolongs beyond a period of thirty days, the Contractor shall immediately inform about it to the Owner in which case the Owner reserves the right to get the work on order or part thereof executed from any other source or as deemed appropriate.

25.0 **DISPUTES:**

(i) All the disputes/differences whatsoever arising between the RRVPN L and the contractor upon or in relation to or in connection with the contract shall be deemed to have arisen at the places as mentioned in the work order only and no courts other than that shall have jurisdiction to entertain the same.
(ii) The disputes/differences whatsoever arising between the work order placing authority and the contractor will be referred to and settled as per grievance redress procedure as specified in the RTPP Rules-2013.

26.0 **ACCEPTANCE OF THE ORDER:**
The acceptance of the order shall be conveyed to the order placing authority at the address given therein within ten days of the receipt of the order in the prescribed proforma failing which it will be presumed that the terms and conditions incorporated in the order are acceptable to the Contractor.
RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LTD

OFFICE OF THE SUPERINTENDING ENGINEER (T&C-JAIPUR CITY)

SECTION – III A

TECHNICAL SPECIFICATIONS

1.0 SCOPE:
1.1 The erection work of Sub Stations covered under this section consists of the following:

TYPES AND AREAS OF WORK:
Construction of 6 Nos. New 33 kV Bays at 132 KV GSS, Jawahar Naga, Jaipur.

A) The works/activities which may be required to be got done under this specification for the work of Erection of Sub Station are as given below:
   a) Laying of earth mesh.
   b) Laying of Earth risers.
   c) Placing/ Driving of earth electrodes.
   d) Erection of Sub Station Steel Structures.
   e) Stringing of Bus bar of ACSR conductor.
   f) Stringing of Earth wire.
   g) Jumpering .
   h) Erection of EHV transformer (tank already placed on foundation with wheels)
   i) Erection of Circuit Breakers
   j) Erection of Station Transformer.
   k) Erection of current transformer/ potential transformer/ capacitive voltage transformer / Series Reactor / Residual Voltage Transformer / Neutral Current Transformer
   l) Erection of Lightening Arrestor.
   m) Erection of Isolator & Earthing Switches.
   n) Erection of Wave Trap.
   o) Erection of capacitor bank with series reactor and residual voltage transformer/Neutral current transformer.
   p) Erection of Post insulator.
   q) Erection of control relay panel / L.T Panel / D.C. Board / RTCC Panel / PLCC Panels, etc.
   r) Erection of marshalling kiosk / line matching unit / Line matching and distribution unit.
   s) Erection of Battery Charger.
   t) Erection of Battery Sets.
   u) Laying of control & Power cables & wiring etc.
   v) Painting of structures and equipments:
      i) Painting of unpainted steel structures.
      ii) Painting of old painted steel structures.
      iii) Painting of transformers and equipments.

B) The works/activities which may be required to be got done under this Labour Rate Contract for the work of Erection of 220KV/132KV/33KV/11KV Bays are as given below:
   i) Laying of earth mesh.
ii) Laying of Earth risers.
a) Placing/ Driving of earth electrodes.
b) Erection of Sub Station Steel Structures.
c) Stringing of Bus bar of ACSR conductor.
d) Stringing of Earth wire.
e) Jumpering.
f) Erection of EHV transformer (tank already placed on foundation with wheels)
g) Erection of Circuit Breakers
h) Erection of Station Transformer.
  i) Erection of current transformer/ potential transformer/capacitive voltage transformer / Series Reactor / Residual Voltage Transformer / Neutral Current Transformer
j) Erection of Lightening Arrestor.
k) Erection of Isolator & Earthing Switches.
l) Erection of Wave Trap.
m) Erection of capacitor bank with series reactor and residual voltage transformer/Neutral current transformer.
n) Erection of Post insulator.
o) Erection of control relay panel / RTCC Panel / PLCC Panels etc.
p) Erection of marshalling kiosk / line matching unit / Line matching and distribution unit.
q) Laying of control & Power cables & wiring etc.
r) Painting of structures and equipments:
   i) Painting of unpainted steel structures.
   ii) Painting of old painted steel structures.
   iii) Painting of transformers and equipments.

1.2 The Contractor shall be fully responsible for completing all the above works and till they are taken over by the NIGAM.

1.3 The methods of erection activities not dealt in details are left to the Contractor who shall exercise his own judgment with regard to actual handling of materials and in deciding upon the best methods to be adopted.

2.0 GENERAL INSTRUCTIONS
  (i) Transportation and unloading of the Sub Station material and equipment at the location shall be done in a safe manner so that they are not damaged or misplaced.
  (ii) All the material and equipment shall be checked as per Bill of Material (BOM).
  (iii) All support insulators and other fragile equipment shall be handled carefully preferably with cranes having suitable boom length and handling capacity.
  (iv) Sling ropes etc. should be of sufficient strength to take the load of the equipment to be erected. They should be checked for breakages of strands before being used for the erection of equipments.
  (v) The slings should be of sufficient length to avoid any damage to insulator or other fragile equipments due to excessive swing or scratching by sling ropes, etc.
  (vi) Mulmul cloth shall be used for cleaning the inside and outside of hollow insulators.
  (vii) Erection of equipment shall be carried out as per and in the manner prescribed in
The erection, testing and commissioning manual / instructions procedures of the manufacturer, to be provided by the Engineer-In-Charge.

The services of the manufacturer’s Engineer, wherever necessary may be utilized by RVPN on its own account for erection, testing and commissioning of Sub Station equipment.

Whenever the work is required to be got done at the existing GSS where the adjacent portions may be charged, effective earthing must be ensured for safety against induced voltages so that work can be carried out without any danger / hazard to the workmen.

Wherever EHT/HT/LT lines or installations are located in the land of the Sub Station, the Contactor shall ensure that adequate safety clearance is maintained during erection activities. In case shutdown of such lines or installations is required, the Contractor shall submit the request well in advance to the Work-In-Charge.

Whenever it is necessary to avail shutdowns of energized circuits for carrying out any work, the contractor shall request the work –In-charge for arranging the same. The Work – In -Charge shall submit a requisition to the Engineer In-charge of the GSS stating the date, time and duration of the shutdown and the section / portion which is to be kept out of circuit during the shutdown.

The Work-In-Charge shall ensure that the portion of the switchyard under shutdown has been isolated and that effective earthing of the equipment / bus bar, on which work is to be carried out, has been done and obtain the PTW. He will then issue PTW to the contractor.

The contractor shall ensure that the work is completed within the requisitioned time.

After completion of the erection work, all surplus material including bolts and nuts, templates, etc. shall be returned to the Nigam at site store. All unusable cut lengths of material such as conductor, earth wire, M.S. Rod and M.S. Flat, etc. shall not be treated as wastage and shall also be deposited in the store.

3.0 EARTHING:
PLACING / DRIVING OF EARTH ELECTRODE, LYING OF EARTHMAT AND LAYING AND FIXING OF EARTHING RISERS.

Note 1: The text and the drawings in this clause refer to some particular sizes of M.S. Rod or M.S. Flat. The reference is indicative only. The procedure/ method, etc. are typically applicable to all sizes of M.S. Rod/ M.S.Flat. The following basic principles shall be followed.

a) The minimum overlapping length for joints of M.S. Flat shall be equal to twice the width of the M.S. Flat.

b) The minimum overlapping length for joints of M.S. Rod shall be 100 mm for 25/28 mm dia and 200mm for 40mm dia. rod.

Note 2: The scope of work includes consumable items such as welding electrodes, bitumen compound, bitumen impregnated tape, red oxide paint, green paint and bentonite slurry except where specifically mentioned otherwise.

3.1 GENERAL INSTRUCTIONS:

(i) Earthing of the Sub Station shall be done as per the earth mat design provided by the Work-In-Charge.

The details of the earthing material generally used in a Sub Station are given below:
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Purpose</th>
<th>Description &amp; Size of Material</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>132 kV Sub Stations</td>
</tr>
<tr>
<td>1.</td>
<td>Main Earthing Conductor for Earth Mat.</td>
<td>25/28 mm dia. M.S. Rod</td>
</tr>
<tr>
<td>2.</td>
<td>Earthing Conductor for Risers (for equipments &amp; structures).</td>
<td>50 × 10 mm M.S. Flat</td>
</tr>
<tr>
<td>3.</td>
<td>Earthing of LT panels, DC panel, C&amp;R Panels, marshalling boxes, Compressors, MOM boxes, junction boxes, lighting panels, etc.</td>
<td>50 × 6 mm M.S Flat</td>
</tr>
<tr>
<td>4.</td>
<td>Earth Electrodes</td>
<td>25/28 mm dia. M.S. Rod, 3250 mm long</td>
</tr>
</tbody>
</table>

(ii) All equipments and structures are required to be earthed by two separate and distinct connections with earth mat.

(iii) The neutrals of all voltage levels of transformers shall be earthed through independent earthing. All these earthing points should be interconnected with the Sub Station earth mat. Each earthing lead from the neutral of the power transformer shall be directly connected to two earth electrodes separately which, in turn, shall be connected to the earth mesh. The transformer tanks as well as associated accessories like separate cooler banks shall also be connected to the earth mat at two points.

(iv) Capacitor Voltage Transformers & Lightning Arresters shall be earthed through two independent risers directly connected to earth electrodes which should in turn be connected to the Sub Station earth mat. The distance between the electrodes should not be less than 4.0 metres.

(v) All other equipments such as Circuit Breakers, CTs, Isolators, Post Insulators, etc. shall also be earthed at two points.

(vi) Bus Bar structures and equipment structures shall be earthed at two points.

(vii) Marshalling boxes, cubicles, C&R Panels and all other metallic enclosures, which are normally not carrying any current, shall also be earthed.

(viii) All the earthing connections to the earth mat shall be by 2 nos. direct earthing risers free from kinks and of the shortest length. The two earthing connections / risers should be connected to the different sides of the earth mat enclosing the structure / equipment to be earthed.

(ix) For equipment earthing (including isolators), the earthing risers should be connected to the earthing terminal / pad of equipment and brought down along the leg / main member of structure and connected to the earth mat. The structure shall not be used as a part of the earthing.

3.2 BURIAL OF EARTHING CONDUCTOR:

(i) The alignment of the earth mat conductor can be changed by forming U – loops in case it fouls with equipment / structure foundations. The average spacing for East - West rows and for North - South rows of the earth mat
shall, however, be kept as near as possible to the spacing indicated in the earth mat design.

(ii) Earthing conductors in the switchyard area shall be buried at a depth of at least 800 mm from top level of foundations unless stated otherwise.

(iii) Earthing conductor around any building shall be buried in earth at a minimum distance of 1500 mm from the outer boundary of the building.

(iv) In case high temperature is encountered at any location, the earthing conductor shall be laid at a minimum distance of 1500 mm away from such location.

(v) Earthing conductors, if embedded in the concrete, shall have approximately 50 mm concrete cover.

(vi) Earthing conductors laid in cable trenches, ladder columns, beams, walls, etc. shall be supported by suitable welding / cleating at intervals of 750 mm.

(vii) The earthing conductors shall be clamped with the equipment support structures at 1000 mm interval.

(viii) Transformer / Railway tracks within the switchyard area shall be earthed at a spacing of 30 meters and also at both ends.

(ix) Flexible earthing connectors shall be provided for the moving parts of equipments such as earthing switches and operating handles of isolators, etc.

(x) All lighting panels, lighting fixtures, junction boxes, receptacles, conduits, etc. shall be earthed.

(xi) Earthing risers shall be run from the peaks of structures to the main earth mesh. The earthing bonds of the earth wire tension hardware shall be connected at the top of this earthing riser with bolts and nuts.

(xii) Bending of earthing rod and flat shall preferably be done by gas heating.

(xiii) Fencing should be separately earthed. Independent earthing conductor for earthing of fencing, buried at a depth of 600 mm, shall be provided 2 metres outside the switchyard fence. All the gates and every alternate post of the fence shall be connected to this earthing conductor at the corners and at every 20 metres.

3.3 EARTH ELECTRODES:

(i) The length of earth electrodes shall not be less than 3250 mm and shall be of one piece.

(ii) Except where rock is encountered, Rods shall be driven to a depth of at least 3000 mm.

(iii) Where rock is encountered at a depth of less than 3600 mm, the electrodes can be buried inclined to the vertical at an angle not more than 30° from the vertical. In all other cases, drilling shall be done for providing the pit for the electrode.

(iv) To reduce the depth of burial of an electrode in case of rocky soil without increasing the resistance, a number of rods shall be connected together in parallel as advised by the work-In-charge. The distance between two electrodes in such a case shall preferably be not less than twice the length of the electrode.

3.4 JOINTS:

(i) Minimum joints shall be made in the earth mat conductor as well as in preparing the risers.

(ii) All joints in the steel earthing system, except those where earth mat may have to be separated from equipment, etc. for testing, shall be made by
electric arc welding. Welded surfaces should be painted with bitumen compound and afterwards coated with bitumen tape to protect them from rusting and corrosion.

(iii) Joints in the earthing conductor between the switchgear units and such other Points which may be required to be subsequently opened for testing should be Bolted type. The bolted connections, after being checked and tested, shall be painted with anticorrosive paint / compound. These joints should be accessible for supervision.

(iv) Earthing connections with equipment earthing pads shall be bolted type. Contact surfaces shall be free from scale, paint, enamel, grease, rust or dirt.

(v) Steel to copper connections shall be first bolted, then brazed and shall be coated with bitumen tape to avoid moisture ingestion.

(vi) All welded joints shall be allowed to cool down gradually to atmospheric temperature. Artificial cooling should not be used.

3.5 PLACING OF EARTH ELECTRODES:
(See Annexure – A: (I) EARTH ELECTRODE)

3.5.1 Cut M. S. Rod of the applicable diameter to approximate length of 3.25 meters and, if required, prepare one end as spike for placing / driving into the ground.

3.5.2 Earth Electrode in Loose / Sandy Soil:
(i) Excavate a pit approximately1 M. x 1 M up to 0.6 meter depth.
(ii) Place the earth electrode in the excavated pit and drive it in the ground with a sledgehammer such that the top of the electrode is 0.55 meter below the foundation top level. This will leave 0.25 meters of the electrode above the ground for connecting it to the earth mat rods.

3.5.3 Earth Electrode in Hard Soil:
(i) Excavate a pit approximately1 M. x 1 M. up to 0.6 meter depth.
(ii) Augur a hole in the ground to a depth of 3 meters inside this pit.
(iii) Place the electrode in the augured hole such that the top of the electrode is 0.55 meter below the foundation top level.
(iv) Backfill the excavation and compact the soil after completion of the work.

3.5.4 Earth Electrode in Rocky Soil (Normal Depth):
(i) Where rock is encountered at a depth of less than 3600 mm below the foundation level, excavate a trench which is inclined to the vertical at an angle not more than 30° from the vertical.
(ii) In all other cases, carry out drilling of the rocky soil for providing the pit for the electrode.
(iii) For connecting the electrode to the earth mat, clamp / hold the M. S. Rods of the electrode and the earth mat together. First weld these together at the crossing point.
(iv) Fabricate four cleats in the shape of M. S. Angles from M. S. Flat of size to be used for earthing risers and of length equal to 10 times the diameter of the M. S. Rod. Weld these at all the corners of the joint. A typical joint is shown in Annexure – A, (II): JOINT OF M.S. ROD TO M.S. ROD AT EARTH ELECTRODE AND AT MESH CROSSINGS.
(v) After welding, apply bituminous compound to the hot joints, and cover the joints with bitumen impregnated tape.

(vi) Backfill the excavation and compact the soil after completion of the work.

(vii) If advised by the Engineer – In-Charge, the backfilling shall also have to be done with Bentonite, or a combination of bentonite and black cotton soil in the ratio of 1:6, to reduce the resistance to earth. The Bentonite & black cotton soil shall be arranged by RVPN in such case.

3.5.5 Earth Electrode in Rocky Soil (8 Meter Depth):

(i) Drill the earth pit having a throughout bore of 200mm dia to a depth of 8.0 meters from the top level of the foundations. This is to be done in all type of rocks by DTH system and over burden to be arranged by contractor.

(ii) Cut M.S. rod of applicable diameter to approximate length of 7.5 meters.

(iii) Place the earth electrode in the excavated pit such that the top of the electrode is 0.55 meters below the foundation top level.

(iv) For connecting the electrode to the earth mat, clamp / hold the M. S. Rods of the electrode and the earth mat together. First weld these together at the crossing point.

(v) Fabricate four cleats in the shape of M. S. Angles from M. S. Flat of size to be used for earthing risers and of length equal to 10 times the diameter of the M. S. Rod. Weld these at all the corners of the joint. A typical joint is shown in Annexure – A, (II): JOINT OF M.S. ROD TO M.S. ROD AT EARTH ELECTRODE AND AT MESH CROSSINGS.

(vi) After welding, apply bituminous compound to the hot joints, and cover the joints with bitumen impregnated tape.

(vii) Back fill the pit with Bentonite slurry (to be arranged by the Contractor) and compact it after completion of the work.

3.6 LAYING OF EARTH MAT:

(i) Excavate trenches along the specified alignments to a depth of 0.80 meter below the foundation top level.

(ii) Where different ground levels are provided in the switchyard, uniformly increase the depth of excavation in the higher level from a distance of 5 metres from the lower level so as to attain the required depth of excavation in the lower level.

(iii) Wherever the earth mat is to cross cable trenches, underground service ducts, pipes, transformer tracks, etc., increase the depth of excavation so that it can be laid at a minimum depth of 300 mm below them.

(iv) Wherever the earth mat is to cross a road, increase the depth of excavation so that it can be laid 300 mm below the road or at a greater depth to suit the site conditions.

(v) Lay the M. S. Rod in the excavated trenches.

3.7 JOINTS IN EARTHING:-

3.7.1 Straight Joints of M. S. Rods in the Earth Mat:

(i) Place the rods so that they overlap each other by 4 times their diameter, e.g., 100 mm in case of M. S. Rod of 25 mm diameter. Clamp / hold these two lengths of M.S. Rods together and weld them on both sides.
(ii) Thereafter, place two pieces of M. S. Flat of size to be used for earthing risers and length 4 times the diameter of the rods on both sides of this joint, and weld these pieces on the rods. A typical joint is shown in Annexure – A, (III): JOINT OF M.S. ROD TO M.S. ROD IN EARTH MAT.

(iii) After welding, apply bituminous compound to the hot joints, and cover the joints with bitumen impregnated tape.

3.7.2 Cross Joints of M. S. Rods in the Earth Mat:
(i) Clamp / hold together the two M. S. Rods crossing each other. First weld these together at the crossing point.
(ii) Fabricate four cleats in the shape of M. S. Angles from M. S. Flat of size to be used for earthing risers and of length equal to 10 times the diameter of the M. S. Rod. Weld these at all the corners of the joint. A typical joint is shown in Annexure – A, (II): JOINT OF M.S. ROD TO M.S. ROD AT EARTH ELECTRODE AND AT MESH CROSSINGS.
(iii) After welding, apply bituminous compound to the hot joints, and cover the joints with bitumen impregnated tape.

3.7.3 Joint of M. S. Rod and Earth Electrode:
(i) Clamp / hold together the M.S. Rod and the earth electrode. First weld these together at the crossing point.
(ii) Fabricate two cleats in the shape of M. S. Angles from M. S. Flat of size to be used for earthing risers and of length equal to 10 times the diameter of the M. S. Rod. Weld these at the joint. A typical joint is shown in Annexure – A, (IV): JOINT OF M.S. ROD TO M.S. ROD AT EARTH ELECTRODE.
(iii) After welding, apply bituminous compound to the hot joints, and cover the joints with bitumen impregnated tape.
(iv) Backfill the excavation and compact the soil after completion of the work.

3.8 PREPARATION AND FITTING OF RISERS:
(i) Excavate trench from the equipment / structure foundation to the nearest rod of the earth mat. The depth shall be 0.80 meter below the foundation top level.
(ii) Cut M. S. Flat of the required length and form / bend it, by heating if required, to form a smooth and regular shape to match with the shape / form of the equipment / structures / foundation. The shape of the risers should be same / similar for the same type of equipment / structure.
(iii) Lay the prepared M. S. flat riser from the equipment / structure / peak of the structure (for grounding of earth wire) to the rod of the earth mesh in the excavated trench and then connect it to the equipment or structures or structure peak. The fitting to the equipment / structure may be bolted type (earthing terminal / pad of the equipment) or welded type (structure). For bolted type fitting, drill necessary holes in the riser and fix it with bolts & nuts. For welded type fitting, weld a length equal to at least twice the width of the M. S. Flat.
(iv) In case joints are required to increase the length of the M. S. Flat risers, the two lengths of the M. S. Flat should overlap each other by twice the width of the M. S. Flat. After placing the M. S. flats one above the other as above, clamp / hold them together to provide good surface contact. Weld the two
sides of the joint as well as the part between the flats on the top surface. A typical joint is shown in Annexure – A, (V): JOINT OF M.S. FLAT TO M.S. FLAT.

(v) Weld the M. S. Flat riser to the rod of the earth mat after fitting / welding it to the equipment / structure / structure peak. Place the M. S. Flat below the rod, clamp / hold them together, and weld on both sides of the rod. Then form a piece of M. S. Flat 50 × 6 mm into a stirrup (as shown in the drawing) and place on the joint of the rod and flat. Alternatively, cut two pieces of M. S. Angle 50 x 50 x 6 mm of length equal to the width of the M. S. Flat and place these on both sides of the joint of the rod and flat. Weld these to both the rod and the flat. A typical joint is shown in Annexure – A; (VI) JOINT OF M.S. FLAT TO M.S. ROD OF EARTH MAT.

(vi) After welding, apply bituminous compound to the hot joints and cover the joints with bitumen impregnated tape.

(vii) Clamp the earthing risers with the equipment support structures at 1000 mm intervals.

(viii) Backfill the excavation and compact the soil after completion of the work.

(ix) Apply red oxide paint and then green enamel paint on the portion of the risers above ground level.

(x) A drawing showing the typical arrangement for earthing of equipment and its structure is given at Annexure–A.
VIEW A - A
TYPICAL EXAMPLE OF EARTHING OF SUB-STATION EQUIPMENT
4.0 ERECTION OF SUB STATION STEEL STRUCTURES

4.1 General Instructions

(i) The structure material shall be stacked member / item wise.
(ii) The following shall be made available by RVPN to the contractor for erection of Sub Station structures / beams and equipment structures:
   a) Drawings and bills of material of structures / beams / equipment structures.
   b) Templates of structures.

4.2 Type of Structures:

The types of structures generally used at Sub Stations are given below:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Structure</th>
<th>Type of Structure</th>
<th>Height of Column / Height of Conductor (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>220 kV Structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>AT1</td>
<td>Column with Peak</td>
<td>20.0 / 14.5</td>
</tr>
<tr>
<td>2.</td>
<td>AT3</td>
<td>Column without Peak</td>
<td>15.0 / 14.5</td>
</tr>
<tr>
<td>3.</td>
<td>AT4</td>
<td>Column with Peak and Beams at two levels for Bus Bar stringing</td>
<td>20.0 / 14.5 and 9.5</td>
</tr>
<tr>
<td>4.</td>
<td>AT6</td>
<td>Column without Peak</td>
<td>10.0 / 9.5</td>
</tr>
<tr>
<td>5.</td>
<td>AT8</td>
<td>Column with Peak</td>
<td>15.0 / 9.5</td>
</tr>
<tr>
<td>6.</td>
<td>AB</td>
<td>Beam</td>
<td>16.6 (Width)</td>
</tr>
<tr>
<td>B.</td>
<td>132 kV Structures:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>BT1</td>
<td>Column with Peak</td>
<td>16.0 / 11.5</td>
</tr>
<tr>
<td>2.</td>
<td>BT3</td>
<td>Column without Peak</td>
<td>12.0 / 11.5</td>
</tr>
<tr>
<td>3.</td>
<td>BT4</td>
<td>Column with Peak and Beams at two levels for Bus Bar stringing</td>
<td>16.0 / 11.5 and 7.5</td>
</tr>
<tr>
<td>4.</td>
<td>BT6</td>
<td>Column without Peak</td>
<td>8.0 / 7.5</td>
</tr>
<tr>
<td>5.</td>
<td>BT7</td>
<td>Column with Peak</td>
<td>12.0 / 7.5</td>
</tr>
<tr>
<td>6.</td>
<td>BB</td>
<td>Beam</td>
<td>12.2 (Width)</td>
</tr>
<tr>
<td>7.</td>
<td>P</td>
<td>Peak</td>
<td>2.5</td>
</tr>
<tr>
<td>8.</td>
<td>Q</td>
<td>Column</td>
<td>7.5 / 7.5</td>
</tr>
<tr>
<td>9.</td>
<td>R</td>
<td>Extension</td>
<td>3.0</td>
</tr>
<tr>
<td>10.</td>
<td>GD</td>
<td>Beam</td>
<td>10.0 (Width)</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of Structure</td>
<td>Type of Structure</td>
<td>Height of Column / Height of Conductor (Meters)</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------</td>
<td>-------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td><strong>C. 33 kV and 11 kV Structures:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. X</td>
<td>Peak</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>2. Y</td>
<td>Column</td>
<td></td>
<td>5.5 / 5.5</td>
</tr>
<tr>
<td>3. Z</td>
<td>Extension</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>4. GF – 5.4</td>
<td>Beam for 33 kV</td>
<td></td>
<td>5.4 (Width)</td>
</tr>
<tr>
<td>5. GF – 4.6</td>
<td>Beam for 11 kV</td>
<td></td>
<td>4.6 (Width)</td>
</tr>
<tr>
<td><strong>D. Equipment Structures:</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1. AO1</td>
<td>220 kV Isolators</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>2. AO1 (T)</td>
<td>220 kV Tandem Isolators</td>
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<td>--</td>
</tr>
<tr>
<td>3. AO3</td>
<td>220 kV CT</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>4. AO4</td>
<td>220 kV CVT</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>5. AO5</td>
<td>220 kV LA &amp; 132 kV CT, CVT / PT, LA</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>6. BO1</td>
<td>132 kV Isolator</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>7. BO1 (T)</td>
<td>132 kV Tandem Isolator</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>8. X – 15</td>
<td>33 kV &amp; 11kV Isolators</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>9. X – 15 (T)</td>
<td>33 kV &amp; 11kV Tandem Isolators</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>10. CT Structure</td>
<td>33 kV &amp; 11kV CT, PT</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>11. PI Structure</td>
<td>220 kV, 132kV, 33 kV &amp; 11 kV PI</td>
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<td>--</td>
</tr>
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</table>
### The Weights of Various Type of Structures are Detailed Below for Reference:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of Structure</th>
<th>Unit Wt. of Structure along with Bolts &amp; Nuts</th>
<th>Wt. of Step Bolts &amp; Nuts &amp; Sp. Washers (MT)</th>
<th>Wt. of Structure in MT</th>
<th>Wt. of GI Bolts &amp; Nuts (KG)</th>
<th>Wt. of Step Bolts &amp; Nuts (KG)</th>
<th>Wt. of Spring Washers (KG)</th>
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<tr>
<td>1</td>
<td>AT1</td>
<td>2.578</td>
<td>2.47800</td>
<td>77.705</td>
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<tr>
<td>2</td>
<td>AT3</td>
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<td>1.608</td>
<td>54.139</td>
<td>13.802</td>
<td>3.861</td>
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<tr>
<td>3</td>
<td>AT4</td>
<td>3.453</td>
<td>3.305</td>
<td>123.758</td>
<td>16.036</td>
<td>8.064</td>
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<tr>
<td>4</td>
<td>AT6</td>
<td>0.989</td>
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<td>5</td>
<td>AT8</td>
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<td>1.57</td>
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<tr>
<td>6</td>
<td>AB</td>
<td>1.544</td>
<td>1.468</td>
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<td>4.971</td>
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<tr>
<td>7</td>
<td>BT1</td>
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<td>8</td>
<td>BT3</td>
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<td>9</td>
<td>BT4</td>
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<td>2.484</td>
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<td>10</td>
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<td>0.669</td>
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<td>7.17</td>
<td>2.178</td>
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<tr>
<td>11</td>
<td>BT7</td>
<td>1.196</td>
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<td>51.418</td>
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<td>12</td>
<td>BB1</td>
<td>0.8098</td>
<td>0.76000</td>
<td>46.5000</td>
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<tr>
<td>13</td>
<td>P1S</td>
<td>0.1715</td>
<td>0.164</td>
<td>6.887</td>
<td>NIL</td>
<td>0.495</td>
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</tr>
<tr>
<td>14</td>
<td>AO1</td>
<td>1.0972</td>
<td>1.0724</td>
<td>23.131</td>
<td>NIL</td>
<td>1.683</td>
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</tr>
<tr>
<td>15</td>
<td>AO1(T)</td>
<td>0.237</td>
<td>0.229</td>
<td>6.963</td>
<td>NIL</td>
<td>0.513</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>AO3</td>
<td>0.2654</td>
<td>0.2551</td>
<td>9.568</td>
<td>NIL</td>
<td>0.72</td>
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<tr>
<td>17</td>
<td>AO4</td>
<td>0.230844</td>
<td>0.22132</td>
<td>8.885</td>
<td>NIL</td>
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<tr>
<td>18</td>
<td>AO5</td>
<td>0.196</td>
<td>0.18300</td>
<td>12.7000</td>
<td>NIL</td>
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<td></td>
</tr>
<tr>
<td>19</td>
<td>BO1</td>
<td>0.5937</td>
<td>0.57460</td>
<td>17.7300</td>
<td>NIL</td>
<td>1.32</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>BO1(T)</td>
<td>0.1714</td>
<td>0.16420</td>
<td>6.6970</td>
<td>NIL</td>
<td>0.495</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>P</td>
<td>0.0895</td>
<td>0.08170</td>
<td>7.2960</td>
<td>NIL</td>
<td>0.504</td>
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</tr>
<tr>
<td>22</td>
<td>Q with Stub</td>
<td>0.7133</td>
<td>0.68850</td>
<td>23.2260</td>
<td>NIL</td>
<td>1.602</td>
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<tr>
<td>23</td>
<td>Q W/O Stub</td>
<td>0.6164</td>
<td>0.5989</td>
<td>16.342</td>
<td>NIL</td>
<td>1.134</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>R</td>
<td>0.441</td>
<td>0.42850</td>
<td>11.6720</td>
<td>NIL</td>
<td>0.792</td>
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</tr>
<tr>
<td>25</td>
<td>GD Beam</td>
<td>0.5403</td>
<td>0.51320</td>
<td>25.1700</td>
<td>NIL</td>
<td>1.9</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>X</td>
<td>0.05</td>
<td>0.04400</td>
<td>5.8590</td>
<td>NIL</td>
<td>0.423</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Y with Stub</td>
<td>0.385</td>
<td>0.36500</td>
<td>18.8500</td>
<td>NIL</td>
<td>1.37</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Y W/O Stub</td>
<td>0.332</td>
<td>0.3130</td>
<td>17.8400</td>
<td>NIL</td>
<td>1.30</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Z</td>
<td>0.298</td>
<td>0.28900</td>
<td>8.8830</td>
<td>NIL</td>
<td>0.63</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>GF 5.4 mtr.</td>
<td>0.25</td>
<td>0.23000</td>
<td>18.7800</td>
<td>NIL</td>
<td>1.22</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>33 KV CT &amp; PT Str.</td>
<td>0.196</td>
<td>0.19030</td>
<td>5.3300</td>
<td>NIL</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>X-15</td>
<td>0.248734</td>
<td>0.241314</td>
<td>6.9160</td>
<td>NIL</td>
<td>0.504</td>
<td></td>
</tr>
</tbody>
</table>

The weights mentioned above are indicative only. The actual weights shall be taken as per approved BOM of supplied structures for the purpose of payment.
4.3 SETTING OF STUB / FOUNDATION BOLTS, LEVELLING AND PREPARING FOR GROUTING:

(i) In case of structures with foundation bolts, the template, along with the foundation bolts tightened on it with nuts on both sides, shall be placed on the foundation. The length of the foundation bolts above the template shall be sufficient so that all parts of the base plate assembly of the structure, washers, nuts and lock nuts can be tightened fully and 2 – 3 threads are left above the lock nut.

(ii) The template shall be levelled & centered with reference to its location on the foundation. The foundation bolts shall thereafter be grouted ensuring that there is no displacement during the placing of the concrete and use of vibrator. (Grouting work, i.e., concreting in the pockets of the foundations along with material, will be in the scope of RVPN)

(iii) In case of structures with stubs, the template with stubs shall be placed on the foundation. In case of structures in which the lowest member is used as a stub, the assembled lower part of the structure shall be placed on the foundation. This shall be levelled & centered with reference to its location on the foundation. The stubs / lowest member shall thereafter be grouted ensuring that there is no displacement during the placing of the concrete and use of vibrator. (Grouting work, i.e., concreting in the pockets of the foundations along with material, will be in the scope of RVPN)

(iv) While leveling and centering the structure / template, the following points shall be checked:
   a) Level of structure / template with reference to the finished foundation level or the ground level.
   b) The level of the structure / template with reference to level of other similar structures.
   c) Distance of centre line of the structure from the center line of other structures or from a reference point.
   d) Centre to centre distance between structures, particularly structures which are to be connected together, for example, by a common beam.

4.4 ERECTION OF STRUCTURES:

4.4.1 Method of Erection:
The contractor shall be at liberty to choose any of the three methods of erection of structures which are as below:
   i) Ground assembly method.
   ii) Section method.
   iii) Built up method or piecemeal method.

He shall however be responsible for any damage to the structures/structure material or any adjacent structures/equipment.

4.4.2 Ground Assembly Method:
   (i) This method is used for erection of equipment structures and is the preferred method for erection of Sub Station structures when crane facility is available.
   (ii) This method consists of assembling the structure on the ground and erecting it as a complete unit.
The complete structure is assembled in a horizontal position near its location. On sloping or uneven ground, suitable packing is provided in the lower level area before or during assembly, as required, to eliminate / minimize stress on the structure members. After the assembly is complete, the structure is picked up from the ground with the help of a crane and set on its foundation.

**Section Method:**
(i) This method is used for large and heavy structures when crane facility is available.
(ii) A mobile crane is used for erecting the structures.
(iii) The two faces / sides of the complete structure are assembled on the ground and then erected. Alternatively, the two faces / sides of the major sections of the structure are assembled on the ground and the same are erected as units.
(iv) Each assembled side is then lifted clear of the ground with the crane and is lowered into position on its foundation or fitted on to stubs or foundation bolts which are already grouted. One side is held in place with props or rope guys while the other side is being erected. The two opposite sides are then connected together with cross members.
(v) In case where the major sections of the structure have been assembled, the first face of the second section is erected. After the two opposite faces have been erected, the bracings on the other two sides are bolted up. The last lift raises the top of the structure. After the structure top is erected and all side bracings have been bolted up, all the guys are thrown off.

**Built up method or piecemeal method:**
(i) This method is used for large and heavy structures when crane facility is not available.
(ii) This method consists of erecting the structure member by member. The structure members are kept on ground serially according to erection sequence so that they can be sent up conveniently.
(iii) The erection progresses from the bottom upwards. The four main corner leg members of the first section of the structure are first erected.
(iv) The cross bracings of the first section are raised one by one and bolted to the already erected corner leg angles. If these have been assembled on the ground, then they are lifted up as a unit.
(v) For assembling the second section of the structure, a derrick is placed on one of the corner legs. This derrick is used for raising parts of second section. The leg members and bracings of this section are then hoisted and assembled.
(vi) The derrick is then shifted to the corner leg members on the top of second section to raise the parts of third section of the structure in position for assembly. The derrick is thus moved up as the structure grows. This process is continued till the complete structure is erected.
4.5 ERECTION OF BEAMS:
(i) The two faces of the beam are assembled on the ground.
(ii) Each face of the beam is raised with the help of crane or using derricks which are placed on the top of the already erected structures on both the sides of the beam. Single or multi-way pulleys with polypropylene / steel ropes are used as per load requirement. The ends of the beam are connected to the column as per fixing arrangement provided on the columns.
(iii) The bracings of the upper and lower faces of the beam are then raised up and fitted.

4.5.1 The columns shall be truly vertical and the beams truly horizontal after erection. Measures taken to bring the column to verticality and beam to horizontality should not result in strain on the structure members so as to cause distortion / bending of the members.

4.5.2 The work of erection of beams on erected columns and erection of equipment on erected structures shall not be taken up until these have been checked for tightening of the bolts & nuts.

4.5.3 All bolted connections shall be well tightened using spring washers & then punched at three points on the circumference of the bolt.

5.0 STRINGING OF BUS BARS OF ACSR CONDUCTOR, STRINGING OF SHIELD/ EARTH WIRE AND JUMPERING ETC.

5.1 General Instructions
Note: The binding wire to be used for these works shall be arranged by the Contractor.
(i) Care shall be taken during sagging operations so that no damage or deformation is caused to the structures.
(ii) The ends of the cut piece of conductor / earth wire shall be tied with at least two rounds of binding wire so that the strands do not open out. The tying of the binding wire shall be done such that the binding wire does not get tightened in the groove of the T – Clamps or the PG (Parallel Groove) – Clamps or the terminal connectors of the equipment.
(iii) Cut lengths of conductor and earth wire left after stringing of bus bars and earth wire can be used for jumpering work.
(iv) Compression machine, if required, shall be provided on rent free basis by RVPN.

5.2 BUS BAR MATERIAL:
The bus bar material generally used in 220 kV & 132 kV sub Stations is given below:
<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Bus Bar and Jumper Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>220 kV Main Bus</td>
<td>Twin ACSR Zebra</td>
</tr>
<tr>
<td>2</td>
<td>220 kV Auxiliary Bus</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td>3</td>
<td>220 kV equipment interconnection</td>
<td>Twin ACSR Zebra / Single ACSR Zebra</td>
</tr>
<tr>
<td>4</td>
<td>220 kV overhead bus &amp; droppers in all bays.</td>
<td>Twin ACSR Zebra / Single ACSR Zebra</td>
</tr>
<tr>
<td>5</td>
<td>132 kV Main Bus</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td>6</td>
<td>132 kV Auxiliary Bus</td>
<td>ACSR Panther</td>
</tr>
<tr>
<td>7</td>
<td>132 kV equipment interconnection</td>
<td>ACSR Zeba / ACSR Panther</td>
</tr>
<tr>
<td>8</td>
<td>132 kV overhead bus &amp; droppers in all bays.</td>
<td>ACSR Panther</td>
</tr>
<tr>
<td>9</td>
<td>33 kV Main Bus</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td>10</td>
<td>33 kV Auxiliary Bus</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td>11</td>
<td>33 kV equipment interconnection, overhead bus and droppers:</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td></td>
<td>(i) Bus coupler &amp; transformer bay</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td></td>
<td>(ii) Feeder bay</td>
<td>ACSR Panther</td>
</tr>
<tr>
<td>12</td>
<td>11 kV Main Bus</td>
<td>Twin ACSR Zebra</td>
</tr>
<tr>
<td>13</td>
<td>11 kV Auxiliary Bus</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td>14</td>
<td>11 kV equipment interconnection, overhead bus and droppers:</td>
<td>Twin ACSR Zebra / Single ACSR Zebra</td>
</tr>
<tr>
<td></td>
<td>(i) Transformer bay</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td></td>
<td>(ii) Bus coupler</td>
<td>ACSR Zebra</td>
</tr>
<tr>
<td></td>
<td>(iii) Feeder bay</td>
<td>ACSR Panther</td>
</tr>
</tbody>
</table>

5.3 STRINGING OF CONDUCTOR BUS BARS:

(i) The conductor shall be handled with care to prevent scratches on it or damage to the strands of the conductor. When the conductor is to be taken from drums, small lengths can be unwound from the drum. For longer lengths, the conductor drum shall be placed on a turn table or jacked up on a suitable size of steel shaft. The conductor shall be paid out in a manner so that there are no scratches or damages caused to the conductor due to rubbing on the sides of the drum.

(ii) Disc insulators shall be cleaned and examined for any cracks / chipping, etc. Disc insulators having any hair cracks or chipping or defective glazing or any other defect shall not be used. The limits of the area of defective glazing are given by the following formulas.
a) Single Glaze Defect = \(0.5 + \frac{D \times F}{2000}\) Sq. cm.

b) Total Glaze Defect = \(1.0 + \frac{D \times F}{2000}\) Sq. cm.

where,
\(D\) = Diameter of the disc in cm.
\(F\) = Creepage distance in cm.

(v) The disc insulators shall be assembled on the ground to form the suspension and tension strings as given below.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>System Voltage</th>
<th>Suspension String</th>
<th>Tension String</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Nos.</td>
<td>E &amp; M Strength (kN)</td>
</tr>
<tr>
<td>1</td>
<td>220 kV</td>
<td>13</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>132 kV</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>33 kV</td>
<td>3</td>
<td>45</td>
</tr>
<tr>
<td>4</td>
<td>11 kV</td>
<td>3</td>
<td>45</td>
</tr>
</tbody>
</table>

(iv) After assembly of the strings, the mouth of the W – clips / R – clips shall be widened to prevent any inadvertent removal during service.

(v) The suspension and tension hardware shall be assembled as per their respective drawings to be provided by RVPN and the disc insulator string shall be fitted in the requisite portion of the hardware assembly.

(vi) For stringing of bus bars, the conductor shall be fixed and tightened in the clamp of the tension hardware on one side of the bus. Thereafter, the complete hardware assembly with the conductor shall be hoisted up and fixed on the beam at this end. Sagging arrangement shall be made on the other end of the bus and the conductor shall be tensioned.

(vii) Measurement of length of conductor required for the bus shall be made thereafter and the conductor shall be released so that it returns to the ground. The conductor shall be cut to the marked length after deducting the length of the tension hardware with insulators and fixed in the clamps of the tension hardware. The conductor along with tension hardware set shall then be again pulled up and connected to the beam.

(viii) Equalizing of tension in the different sub – conductors of the same phase and in the different phases shall be done, if required, to ensure equal sag of all the sub – conductors or between phases of the bus section as well as that of adjacent or parallel sections.

(ix) The spacers shall be fitted on the twin conductor bus bars at the spacing shown in the drawing (to be provided by RVPN). The spacers shall also be provided at points where jumpers are taken from the bus bar using T – clamps and / or P. G. clamps. Spacers are not used at jumper points in case T – Spacers are used for taking jumpers from multi conductor bus bars.

5.4 JUMPERING:
5.4.1 **Jumpering of Conductors:**

(i) The jumpers connecting different sections of the bus bars as well as those connecting equipment to bus bars shall be of Y – type.

(ii) A typical diagram of Y – type jumpering is given below.

(iii) For making Y – type jumpers, the jumper conductor(s) shall be first connected to the bus bar conductor(s) using T – Clamp / Spacer T – Clamp which is suitable for clamping the respective conductors, i.e., bus bar conductor(s) and the jumper conductor(s). Thereafter, the bus bar conductor(s) shall be again connected with the jumper conductor(s) using properly curved & shaped Y – conductor(s) and 2 nos. PG – clamps as shown in the diagram above.

(iv) The jumpering between equipment shall be done with single / twin conductors as per the terminal connectors provided on the equipment.

(v) In case of jumpers for twin conductors, the spacers shall also be fitted at a suitable spacing on the jumpers in order to maintain their shape.

5.4.2 **Jumpering of Busbars:**

(i) For jumpering of different sections of bus bars on the beam, the suspension hardware set along with disc insulators shall first be hoisted and fitted on the beam.

(ii) Conductor of approximately the length required for the jumper shall be cut and straightened so that kinks are removed. This shall be connected to the bus bar conductor on one side of the beam after taking into consideration the natural curve of the conductor.

(iii) This shall then be passed through the clamps on the suspension hardware so that the proper curve is obtained. The other end of the conductor shall then be taken up to the bus bar conductor on the other side and measurement of the length shall be taken. The conductor shall be cut to the appropriate length and then connected to the bus bar conductor on the other side. The length of the conductor used and its natural curve should be such that a neat and proper curve is obtained in the jumper without any kinks or bends. The clamp of the suspension hardware shall then be tightened after ensuring proportional lengths of the conductor on both the sides of the beam.
5.4.3 **Jumpering from Busbar to Equipment:**

(i) Approximate length of the conductor required for the jumper shall be cut and then connected to the bus bar conductor.

(ii) In case the jumper is to be connected to equipment near or under a beam, the suspension hardware along with disc insulators is first fitted on the beam. The conductor shall be passed through the clamp of the suspension hardware.

(iii) The end of the conductor shall be taken up to the terminal connector of the equipment. The measurement of length of the conductor up to the equipment shall be made.

(iv) After cutting the conductor to the required length, it shall be connected to the equipment.

(v) The clamps of the suspension hardware shall be tightened thereafter.

5.4.4 **Jumpering between Equipments:**

(i) The distance between terminal connector of one equipment and terminal connector of other equipment is first measured. The appropriate length of the conductor shall be cut and then straightened so that curves and kinks are removed.

(ii) The jumper conductor shall then be connected to the terminal connectors of both the equipments and straightened or shaped as per site condition to give a neat and proper look.

(iii) Vertically supported insulators of equipments and Post Insulators should be checked for verticality again after jumpering on both sides and corrected if required.

5.5 **STRINGING OF SHIELD / EARTH WIRE:**

(i) The shield / earth wire shall be handled with care to prevent scratches on it or damage to the strands of the wire. When the shield / earth wire is to be taken from drums, small lengths can be unwound from the drum. For longer lengths, the earth wire drum shall be placed on a turn table or jacked up on a suitable size of steel shaft. The shield / earth wire shall be paid out in a manner so that there are no scratches or damages caused to the shield / earth wire due to rubbing on the sides of the drum.

(ii) The earth wire shall be strung from one peak to another peak of the structures as per layout of the GSS.

(iii) The tension hardware shall be assembled as per the relevant drawings to be provided by RVPN.

(iv) The shield / earth wire shall be fitted and tightened in the clamp of the tension hardware on one side. Thereafter, the complete hardware assembly along with the shield / earth wire shall be hoisted up and fixed on the peak of the structure at one end.

(v) Sagging arrangement shall be made on the other end and the shield / earth wire shall be tensioned. Measurement of length of shield / earth wire required shall be made thereafter and the shield / earth wire shall again be
released so that it is returned to the ground. The shield / earth wire shall be cut to the marked length after adding the length of the wire required for jumpering and fitted in the clamp of the tension hardware at the marked point. The shield / earth wire along with tension hardware set shall then be pulled up again and connected to the peak of the structure.

(vi) Adjustment of tension in the earth wire may be done, if required, to ensure equal sag of all the earth wires in adjacent or parallel sections.

5.6 **JUMPERING OF SHIELD / EARTH WIRE:**

(i) The lengths of the earth wire which remain outside the tension hardware on the peak of the structures shall be cut, if required, so that these lengths when joined together form a smooth and proper curve. These shall be connected together using a PG – Clamp.

(ii) The earth bond provided with the earth wire tension clamp shall be connected to the specified point on the peak of the structure and to the earthing riser, which is used as a down conductor from the peak, for the purpose of connecting the shield / earth wire to the earth mesh of the Sub Station.

6.0 **ERECTION ACTIVITIES IN RESPECT OF VARIOUS EQUIPMENTS.**

A. **STATION TRANSFORMER:**

I) **ERECTION OF STATION TRANSFORMERS**

i) Transportation of the station transformer and accessories, (if any provided loose) along with clamps and connectors from the site store to location carefully.

ii) Cleaning of the transformer and the bushings.

iii) Erecting the transformer on existing masonry platform by placing it properly, i.e., HV side towards 33 KV or 11 KV as the case may be.

iv) Fitting of the accessories, (if any which have been provided loose).

v) Checking that all the accessories as per the bill of material have been provided and the same are in position.

vi) Making arrangements for locking the wheels of the transformer.

vii) Fitting of the terminal connectors/ clamps, etc.

viii) Tightening of nuts, bolts, etc. complete in all respect.

II) **ERECTION OF HORN GAP FUSE SET:**

Transportation of Horn Gap fuse set and its accessories along with clamps and connectors and structures from site store to location.

i) Assembling (if required) of structure of Horn Gap fuse set

ii) Fixing of structure of Horn Gap fuse set and leveling thereof.

iii) Assembling of Horn gap fuse set as per drawing.

iv) Mounting of Horn Gap fuse set on the structure.

v) Fitting of clamps and connectors, etc.

vi) Tightening of nuts, bolts, etc. complete in all respect.

III) **JUMPERING FROM ISOLATOR TO HORN GAP FUSE & HORN GAP FUSE TO SUB STATION TRANSFORMER.**

i) Transportation of conductor from site store to location.
ii) Carrying out jumpering between Isolator to Horn Gap fuse set and then from Horn Gap fuse set to Sub Station Transformer as detailed in clause 5.4.4 “JUMPERING BETWEEN EQUIPMENTS”.

B. CURRENT TRANSFORMERS:

I) GENERAL INSTRUCTIONS
i) While erecting the current transformers, the P1 terminal of the current transformer shall be kept as per the instructions of Engineer-In-Charge.

II) ERECTION
i) Transportation of complete current transformers and their accessories, etc. along with clamps & connectors, etc. from site store to location.
ii) Carrying out leveling of already erected structure(s) and minor fabrication work, if required, for erection of the Current Transformer.
iii) Cleaning of the insulator of the Current Transformer.
iv) The IR values of primary terminals to earth will be measured by RVPN with 5 kV Megger.
v) Erecting of the Current Transformer on the structure.
vi) Fitting of the terminal connectors on the Current Transformer.
vii) Tightening of the nut, bolts, etc. complete in all respect.

C. CAPACITOR VOLTAGE TRANSFORMERS (CVT) / POTENTIAL TRANSFORMERS (PT)

i) Transportation of complete CVT/PT and its accessories along with terminal connectors, etc. from site store to location.
ii) Carrying out leveling of already erected structure(s) and minor fabrication work, if required, for erection of the Capacitor Voltage Transformers / Potential Transformers.
iii) Cleaning of the insulators of the VTs.
iv) Assembling the different units of the same serial number of the CVT, if applicable.
v) The IR values of primary terminal to earth will be measured by RVPN with 5 kV Megger.
vi) Erecting the Capacitor Voltage Transformer / Potential Transformer on the structure.
 vii) Fitting of the covers on the joints between different units of the CVT, if applicable.
 viii) Fitting of the terminal connectors on the VT’s.
 ix) Tightening of the nuts, bolts, etc. complete in all respect.

D. SERIES REACTORS / RESIDUAL VOLTAGETRANSFORMER/NEUTRAL CURRENT TRANSFORMER.

i) Transportation of complete Series Reactor / RVT/ NCT and its accessories along with terminal connectors, etc. from site store to location.
ii) Carrying out leveling of already erected structures and minor fabrication work if required for erection of the equipments.
iii) Cleaning of the insulators of the Series Reactors / Residual Voltage Transformers/ Neutral Current Transformers.

iv) The IR values to earth of Series Reactors will be measured by RVPN with 5 KV Megger.

v) The IR values between primary terminal to earth and primary terminal to secondary terminals of Residual Voltage Transformers/ Neutral Current Transformers will be measured by RVPN with 5 KV megger.

vi) Erecting the Series Reactors / Residual Voltage Transformers/ Neutral Current Transformers.

vii) Fitting of the terminal connectors.

viii) Tightening the nuts, bolts, etc. complete in all respect.

E) LIGHTNING ARRESTERS

I) GENERAL INSTRUCTIONS:

i) The serial number of all the units of a multi-unit Lightning Arrester (LA) should be the same.

ii) The units of a multi-unit Lightning Arrester should be assembled in the sequence shown on the rating plate of the LA or in the catalogue of the manufacturer to be provided by the Engineer-In-Charge.

iii) The insulated base unit should be erected in case of Lightning Arresters provided with surge monitors.

iv) The installation of the Lightning Arresters should be such that the direction of the open end of the explosion release vent (at top and bottom) is away from adjacent expensive equipment such as transformers.

II) ERECTION OF LAs OF 132 KV CLASS & 220 KV CLASS:

i) Transportation of complete LAs along with accessories, clamps and connectors, etc. from site store to location.

ii) Leveling of the already erected supporting structure(s) and carrying out minor fabrication work thereon for erection of the Lightning Arresters and surge monitors, as required.

iii) Cleaning of the insulators of the Lightning Arresters.

iv) Assembling the different units of the same serial number of the Lightning Arresters, if applicable. Also, fitting of the corona rings between different units, if provided.

v) Erecting the Lightning Arresters on the already erected and leveled supporting structure(s).

vi) Fitting of the Surge Monitor on the structure and connecting it to the lowest unit of the Lightning Arrester above the base insulator.

vii) Fitting of the corona / grading ring on the top of the Lightning Arrester, if provided.

viii) Fitting of the terminal connectors on the Lightning Arresters.

ix) Tightening of the nuts, bolts, etc. complete in all respect.

III) ERECTION OF 33 KV & 11 KV LAs:

i) Transportation of complete LAs along with accessories, clamps and connectors, etc from site store to location.

ii) Making of the mounting arrangements on the beam of the already erected Sub Station structures.

iii) Cleaning of the insulators of the Lightning Arresters.
iv) Erecting the Lightning Arresters on the already prepared arrangement on
the beam of the Sub Station structures.

v) Fitting of the terminal connectors on the Lightning Arresters.
vi) Tightening of the nuts, bolts, etc. complete in all respect.

F. ISOLATORS

1) ERECTION OF ISOLATORS:
i) Transportation of complete isolator with accessories, Post Insulators
   operating mechanism box, clamps and terminal connectors, etc. from site
   store to location.

ii) Leveling of already erected structure(s) and carrying out minor
    fabrication works, if required, for erection of the Isolator and operating
    mechanism(s).

iii) Erecting the 3 nos. base frames of individual phases on the structure(s).

iv) Carrying out leveling and centering of the base frames.

v) Fixing of the link pipes on the rotating parts of the base frames of the
   individual phases.

vi) Cleaning and assembling of the polycone insulator / insulator stack, as
    applicable. For single break isolators, there will be six polycone
    insulators / insulator stacks whereas for double break Isolators, the
    quantity will be nine.

vii) Fitting of the male and female contact arms on the polycone insulators /
    insulator stacks in case of single break Isolator. In case of double break
    Isolator, 6 nos. fixed contacts and 3 nos. moving contacts are fitted on
    the polycone insulators / insulator stacks.

viii) Fitting of the fixed contacts of earth blades in case of Isolator with Earth
     Switch.

ix) Fixing of the arcing horns (make before & open after the main contacts)
    or corona rings, as applicable.

x) Erecting the above assemblies on the rotating parts of the base frames.

xi) Carrying out adjustment / alignment of individual phases for smooth
    opening and closing and proper making of contacts.

xii) Fitting of the inter – phase connecting pipes between the rotating parts of
     the base frames of the individual phases, including fixing of hardware
     for interlocking with earth switch wherever provided.

xiii) Fitting of the operating mechanism box for the Isolator.

xiv) Fitting of the main operating down pipe to operating mechanism for the
     Isolator.

xv) Checking of the operation and final adjustment / alignment of all the
    three phases of main Isolator for smooth, synchronized and complete
    operation as one unit.

xvi) Adjustment of the mechanical end stoppers on the base channel for both
     the closed and open positions.

xvii) Fitting of the terminal connectors on the Isolator.

xviii) Tightening of the nuts, bolts, etc. complete in all respect.

II ERECTION OF EARTH SWITCHES:
i) Transportation of complete Earth Switch along with accessories and operating mechanism box, clamps and connectors, etc. from site store to location.

ii) Fixing of the earth blade mounting arrangements on the base frames of all the three phases.

iii) Fitting of the moving contact (earth blade) of the earth switches and counterweights, wherever provided.

iv) Carrying out the operation and adjustment / alignment of earth switch of each phase for smooth opening and closing and proper making of contacts.

v) Fitting of the inter – phase connecting pipes between the earth switches of the individual phases, including fixing of hardware for interlocking with main Isolator.

vi) Fitting of the operating mechanism box for the earth switches.

vii) Fitting of the main operating down pipe to operating mechanism for the earth switch.

viii) Checking the operation and final adjustment / alignment of all the three phases of the earth switch for smooth, synchronized and complete operation as one unit.

ix) Carrying out the adjustment and setting of mechanical interlock between main Isolator and earth switch to ensure that earth switch does not operate if the main Isolator is closed, and that main Isolator does not operate if the earth switch is closed.

x) Carrying out the adjustment of mechanical end stoppers for the OPEN and CLOSED positions of earth switch.

xi) Fitting of the earth bonds and other accessories as provided.

xii) Tightening of the nuts, bolts, etc. complete in all respect.

III  ERECTION OF OPERATING MECHANISM:

i) Carrying out the adjustment and setting of auxiliary switches.

ii) Carrying out the adjustment of limits switches in CLOSED and OPEN positions of isolators in case of motor operated mechanism.

iii) Carrying out the adjustment of mechanical end stoppers for both the CLOSED and OPEN positions.

iv) Carrying out the adjustment of interlocking coil and plunger in CLOSED and OPEN positions.

v) Rechecking the adjustment/ alignment of the isolator main contacts for smooth opening and closing and proper making of contacts after jumpering on both sides.

G.  WAVE TRAPS

I  GENERAL INSTRUCTIONS:

i) The Wave Traps are erected as below.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Line</th>
<th>Type of Coupling</th>
<th>Phases on which Wave Traps are to be erected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Single Circuit</td>
<td>Phase to Phase</td>
<td>Two phases of the line</td>
</tr>
<tr>
<td>2.</td>
<td>Double Circuit</td>
<td>Inter – circuit</td>
<td>Same phase of both the circuits</td>
</tr>
</tbody>
</table>
ii) For single circuit lines, the Wave Traps are generally erected on R & B phases.

iii) For double circuit lines, the Wave Traps are generally erected on the Y phase of both the circuits.

iv) The Wave Traps may be required to be erected on phases different from those mentioned at para (ii) and para (iii) above in case the end to end return loss is not found satisfactory during testing of the PLCC Carrier Sets.

II ASSEMBLY:

i) Transportation of complete Wave Trap and its accessories, hard wares, clamps and connectors, etc. from site store to location.

ii) Cleaning of the Wave Trap and its associated equipment.

iii) Fitting of the tuning pot and associated equipment in the Wave Trap by RVPN.

iv) Fitting of the end covers on the wave traps, and positioning them correctly by RVPN.

v) Fitting of the terminal connectors on the Wave Traps.

vi) Tightening of the nuts, bolts, etc. complete in all respect.

III ERECTION OF SUSPENSION TYPE WAVE TRAPS:

i) Fitting of the hardware for fixing the Wave Trap to the suspension string assemblies of the designated phases.

ii) Hoisting the Wave Trap through lifting arrangement on the beam of the Sub Station structure.

iii) Fitting of the Wave Trap on the already erected suspension string assemblies through suitable attachment.

iv) Tightening of the nuts, bolts, etc. complete in all respect.

IV ERECTION OF PEDESTAL TYPE WAVE TRAPS:

i) Leveling of the top plate of the already erected structure for wave trap.

ii) Assembling of the parts of the Polycone Insulators, if applicable.

iii) Erecting the polycone insulator(s) on the supporting structure.

iv) In case three Polycone Insulators are provided for each Wave Trap and these are in parts, then the connecting plate between the joints of the parts of the Polycone Insulators are also to be fitted.

v) Erecting the Wave Trap on the polycone insulators.

vi) Tightening of the Wave Trap on the polycone insulators.

vi) Tightening of the nuts, bolts, etc complete in all respect.

H. CAPACITOR BANKS

I GENERAL INSTRUCTIONS:

i) DURING ERECTION WORK ON CAPACTIOR BANKS, THE CAPACITOR UNITS SHALL BE KEPT SHORDED AND EARTHED TO PREVENT ELECTRIC SHOCK DUE TO ACCUMULATED CHARGE.

II ERECTION OF STRUCTURES:

i) Transportation of Complete structure members, etc from site store to location.
ii) Assembling the structures for the Capacitor Banks, Series Reactors and Residual Voltage Transformers / Neutral Current Transformers, if the members are received in loose condition.

iii) Erecting the supporting structures on the foundation, carrying out their leveling, centering and preparation for grouting. (Grouting work, including, material, will be in the scope of RVPN).

iv) Leveling the top of the above erected supporting structures and checking their verticality.

III  ERECTION OF CAPACITOR BANKS:
   i) Transportation of Capacitor Banks with accessories, clamps & connectors, etc. from site store to location.
   ii) Leveling the top plate of already erected structures.
   iii) Cleaning of the post insulators/ Assembling of the post insulators, if required.
   iv) Erecting the post insulators on the already erected structure(s).
   v) In case individual structures are provided for each phase, erecting the frame of each phase of the Capacitor Bank on the post insulators.
   vi) In case only one structure is provided for all the three phases, erecting the frame of the first phase on the post insulators. Erecting the frame of the second phase after erecting post insulators on the frame of the first phase. Similarly, erecting the frame of the third phase after erecting post insulators on the frame of the second phase.
   vii) Erecting the capacitor units on the already erected frames as per the erection plan of the manufacturer so that the capacitances of all the phases are balanced. In case no erection plan is provided, measurement of the capacitance of all the units shall be done by RVPN and phase wise combinations will be advised to the contractor so that the capacitances of all the phases are balanced.
   viii) Interconnecting the capacitor units and phases as per manufacturer’s general arrangement drawing, including fitting of external fuses if provided. (Drawing will be provided by the Engineer -In-Charge)
   ix) Fitting of the post insulators and connecting strips for jumpering as per manufacturer’s general arrangement drawing.

IV  ERECTION OF ASSOCIATED EQUIPMENT:
   As detailed at Sub clause 6.0 (D) above.

I.  POST / POLY Cone INSULATORS
   i) Transportation of complete Insulators & their accessories, clamps and connectors from site store to location.
   ii) Leveling the top plate of the already erected structure for Post / Polycone Insulators.
   iii) Cleaning the Post / Polycone Insulators.
   iv) Assembling the parts of Post / Polycone Insulators, if required.
   v) Erecting the Post / Polycone Insulators on the already erected supporting structure.
vi) Fitting the corona ring on the Post / Polycone Insulators, if provided.
vii) Fitting the clamps on the Post / Polycone Insulators.
viii) Tightening the nuts, bolts, etc. complete in all respect.

J. **CONTROL & RELAY PANELS**

i) Transportation of Control and relay panels complete in all respect from site store to control room.

ii) Placing the panels at their designated locations on the trenches in the Control Room as per layout / instructions of Engineer-In-Charge.

iii) Fixing or bolting the panels (as per requirement of installation of the panels) on the channel / M. S. Angle fitted on the top of the walls of the trench or on the base frame, as provided, in the Control Room.

iv) Leveling the panels and checking their verticality.

v) In the case of Duplex type of panels, connecting the control panel to the relay panel across the corridor using the fittings provided with the panels. Also fitting the covers for the corridor portion.

vi) Where a number of panels are to be placed adjacent to each other to form a Board or where a panel is to be placed adjacent to an existing Panel / Board, these shall be bolted together. There shall be no gap between panels which are placed adjacent to each other.

vii) Connecting the Bus wiring / interconnecting wiring between the control & relay panels of the Duplex type. Also connecting the similar wiring between control panel to control panel and / or relay panel to relay panel where a Board formation is made or where panels are connected to an existing Board / panel as per their relevant schematic drawings to be made available by the Engineer-In-Charge.

viii) Connection of earthing to existing earth strip in control room.

K **LT PANELS**

i) Transportation of L.T. Panel complete in all respect from site store to control room.

ii) Checking the LT Panel for any mechanical damage before installation.

iii) The insulation resistance of panel wiring and the LT Bus Bar (phase to phase and phase to earth) will be measured by RVPN with 500 V Megger before connecting any cable.

iv) Placing the LT Panel at its designated location in the control room as per layout / instructions of the Engineer-In-Charge.

v) Fixing / bolting the LT Panel on the trench provided in the floor of the control room.

vi) Connection of earthing to existing earth strip in control room.

L. **DC PANELS:**

i) Transportation of D.C. Panel complete in all respect from site store to control room.

ii) Checking the DC Panel for any mechanical damage before installation.

iii) Placing the DC Panel at its designated location in the control room as per layout / instructions of the Engineer-In-Charge.

iv) Fixing / bolting the DC Panel on the trench provided in the floor of the control room or on the base frame if provided.

v) Connection of earthing to existing earth strip in control room.
M. PLCC PANEL
i) Transportation of PLCC Panel complete in all respect from site store to control room.
ii) Fabricating the structure / frame as per the fixing dimensions of the Carrier sets. The structure/ frame should have a height of at least 150 mm from floor level to facilitate cable entry into the panel.
iii) Placing the structure / frame near the cable trenches in the PLCC room in such a manner that sufficient space is available for accessing the Carrier sets from the rear for maintenance as well as from the front for setting up test instruments. Preparing for grouting of the structure / frame(grouting work, i.e., concreting in the pocket of the foundation along with material, will be in the scope of RVPN).
iv) Checking the Carrier sets for any mechanical damage during transportation.
v) Erecting the Carrier sets at their locations on the fabricated structures / frames. (A minimum spacing of 30 mm between two carrier sets on both the sides shall be maintained for proper ventilation.)
vi) Leveling of the Carrier Sets and fixing them on the structure / frame.
vii) Cleaning the interior of the rack of the Carrier sets.
viii) Inserting the modules, if received separately, in their designated locations in the Carrier Terminal by RVPN.
ix) Connection of earthing to existing earth strip in control room.

N. RTCC PANEL:
i) Transportation of RTCC Panel complete in all respect from site store to control room.
ii) Checking the RTCC panel for any mechanical damage before installation.
iii) The insulation resistance of panel wiring will be measured by RVPN with 500 V Megger before connecting any cable.
iv) Placing the RTCC Panel at its designated location in the control room as per layout / instructions of the Engineer-In-Charge.
v) Fixing / bolting the RTCC Panel on the trench provided in the floor of the control room.
vi) Connection of earthing to existing earth strip in control room.

O. MARSHALLING KIOSKS:
i) Transportation of Marshalling Kiosks complete in all respect from site store to location.
ii) Placing the Marshalling Kiosks on the foundation/ cable trench as per the instructions of Engineer-In-Charge.
iii) Carrying out centering and leveling of the Marshalling Kiosks including preparation for grouting work (grouting work, i.e., concreting in the pockets of the foundation along with material, will be in the scope of RVPN)
iv) After grouting, tightening of the nuts, bolts, etc. complete in all respect.
P. **LINE MATCHING UNIT (LMU) /LINE MATCHING DISTRIBUTION UNIT (LMDU)**
   
i) Transportation of Line Matching Unit / Line Matching Distribution unit & its accessories from site store to location.

ii) Making arrangements / carrying out minor fabrication work (if required) on the supporting structure of the 2 nos. designated Capacitor Voltage Transformers (as per coupling requirement) for fixing of Line Matching Unit (LMU) / Line Matching Distribution Unit (LMDU). These CVTs shall be of the same phase on which the wave traps have been / are to be erected.

iii) Fitting of the LMU / LMDU on the already erected structure.

iv) Connecting the HF terminal of the Capacitor Voltage Transformer to the HF terminal of the LMU / LMDU.

v) Tightening of the nuts, bolts, etc. complete in all respect.

Q. **BATTERY CHARGERS**

I. **GENERAL INSTRUCTIONS:**
   
i) Maintain a minimum spacing of 15 cm. between the battery charger and other panels on both sides for proper ventilation.

II. **ERECTION:**
   
i) Transportation of battery charger along with accessories if any from the site store to control room.

ii) Checking the Battery Charger for any mechanical damage before installation.

iii) Placing the Battery Charger at its designated location in the control room as per layout/ instruction of Engineer-In-Charge.

iv) Fixing / bolting the Battery Charger on the trench provided in the floor of the control room.

v) Tightening the nuts, bolts, etc. complete in all respect.

R. **BATTERY SETS (VALVE REGULATED LEAD ACID / VRLA)**

I. **ERECTION:**
   
i) Transportation of cells, battery stand, accessories, clamps & connectors, etc. from site store to battery room.

ii) Assembling if required, and installing the mounting frame / stand in the battery room.

iii) Erecting the modules containing the cells on the mounting frame / stand as per the Manufacturer’s manual and erection drawings to be made available by the Engineer-In-Charge.

iv) Cleaning terminal surfaces of the cells with clean dry cotton cloth.

v) Making inter cell connections as per manufacturer’s general arrangement drawings using the inter cell connectors after applying a thin layer of petroleum jelly on the bolts (only the bolts supplied with the Battery Set should be used).

vi) Tightening of the terminals and inter cell connectors.

vii) Fitting of battery identification label (serial no.), front cover, top cover and instruction labels, as supplied, on the cells.
II  FRESHENING CHARGE
i) Give a freshening charge to the Battery Set by gradually increasing the voltage. The current should not be allowed to exceed 20 % of the 10 hour capacity of the Battery Set or the capacity of the battery charger. The voltage should not be allowed to exceed 2.30 volts / cell.

ii) The duration of the freshening charge and the voltage at which the Battery Set is to be charged, with reference to the ambient temperature, are given below. Either of the two options given in the table below can be adopted.

<table>
<thead>
<tr>
<th>Option</th>
<th>Temperature</th>
<th>Above 32 °C</th>
<th>15 – 32 °C</th>
<th>Below 15 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cell Voltage</td>
<td>2.23</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>30 hrs.</td>
<td>30 hrs.</td>
<td>60 hrs.</td>
</tr>
<tr>
<td>2.</td>
<td>Cell Voltage</td>
<td>2.28</td>
<td>2.30</td>
<td>2.30</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>12 hrs.</td>
<td>12 hrs.</td>
<td>24 hrs.</td>
</tr>
</tbody>
</table>

III  DISCHARGE / CAPACITY TEST:

i) The Battery Set shall be discharged after keeping it open circuit for not less than 2 hours and not more 24 hours from the completion of full charge.

ii) Discharge the Battery Set at its 10 hour rate, i.e., at a current equal to 10 % of its rated ampere hour capacity till the voltage of any one cell reaches 1.75 volts or the total battery close circuit voltage reaches 1.75 × n (where n is the number of cells in the Battery Set), whichever is earlier.
   a) Maintain the discharge current within ± 1 percent of the specified rate of discharge.
   b) Record the voltmeter and ammeter readings every 5 minutes for the first 15 minutes, and thereafter every 15 minutes up to the end voltage.
   c) Note the time in hours elapsing between the beginning and end of the discharge. This shall be taken as the period of discharge.
   d) The average temperature of the electrolyte during discharge shall be the average of the temperature readings noted at hourly intervals during discharge. The temperature of the battery terminal shall be measured as it will be almost the same as the electrolyte.

iii) During the above discharge test, the cell voltages shall not be less than the following values.
   a) After six minutes from the start of discharge: 1.98 Volts
   b) After six hours of discharge: 1.92 Volts
   c) At ten hours of discharge: 1.75 Volts

iv) The capacity of the Battery Set is obtained by multiplying the discharge current in amperes by the time in hours as observed above. This capacity is corrected to 27 Deg. C by the formula:

\[
C_{27} = C_t + \frac{C_t \times 0.43 \times (27 - t)}{100},
\]

where

\[
C_t = \text{Capacity at } t \text{ degrees C}
\]
‘t’ is the average ambient temperature of the battery room, ‘C27’ is the Capacity of the Battery Set at 27 Deg. C, and ‘C,’ is the measured Capacity of the Battery Set at ‘t’ Deg. C.

v) If 100% or more capacity is achieved at any time during the above discharge test, equalize the voltage of all the cells as given at sub para (vii) below. Finally charge the Battery Set as per para IV and put it in operation in the floating mode as per para VI.

vi) The minimum acceptable capacity of the Battery Set (corrected to 27°C) which is to be achieved during the above discharge test is 85 % of the rated capacity. If this is not achieved, the matter should be referred to the manufacturer.

vii) If 85% or more capacity is achieved during the above discharge test, then equalize the voltage of all the cells as given below.

a) Bypass the cell that has first reached 1.75 V.
b) Continue discharging the Battery Set at its 10 hour rate.
c) Keep bypassing the cells that reach 1.75 V until the voltage of all the cells reaches 1.75V.

viii) Charge and discharge the Battery Set until 100 % capacity is achieved. If 100% capacity is achieved within another four discharges, finally charge the Battery Set and put it in operation in the floating mode.

IV CHARGING / RECHARGING:

i) Immediately after the discharging is completed, the Battery Set should be charged by gradually increasing the voltage. The current should not be allowed to exceed 20% of the 10 hour capacity of the Battery Set or the capacity of the battery charger. The voltage should not be allowed to exceed 2.30 volts / cell.

ii) Continue the charging till the charging current reduces to a negligible value.

V DISCHARGING:

i) Discharging of the Battery Set is to be done as per procedure given at paras III (i) and III (ii).

ii) If this discharge is a capacity test, note the time in hours elapsing from the beginning to the end of the discharge. Calculate the capacity as given at para III and take necessary action as required.

VI

(i) If the Battery set has achieved 100% capacity, then charge the Battery set as per para IV (i).

(ii) After the Battery Set has been fully charged as per para IV (ii), switch off the boost charger. Switch on the float charger after setting its output voltage as per manufacturer’s recommendations.

(iii) Measure the voltages of all the cells of the Battery Set and record for future reference.

S. CABLE LAYING AND TERMINATIONS:-

Note: The cable tags/marking strips, G.I. wire, cable glands, thimbles/lugs, ferrules, PVC perforated straps, sand and bricks are in the scope of supply of the Contractor.

I GENERAL INSTRUCTIONS:
i) The number of cables of each size and their lengths shall be assessed and intimated to the contractor by the Engineer In-charge. The cable laying schedule shall then be prepared by the Engineer In-charge so that maximum length of the cable in a drum can be utilized, leaving minimum scrap lengths.

ii) Cable drums shall be unloaded, handled and stored properly.

iii) Rolling of drums shall be avoided as far as possible. The drums may be rolled for short distances provided they are rolled slowly and in the direction marked on the drum. In the absence of any indication, the drums may be rolled in the same direction as it was rolled during winding.

iv) Pulling out of cables from stationary drums shall not be permitted.

v) Cables shall not be bent below the minimum permissible limits given below:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Type of cable</th>
<th>Minimum bending radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Power cable</td>
<td>12 D</td>
</tr>
<tr>
<td>2.</td>
<td>Control cable</td>
<td>10 D</td>
</tr>
</tbody>
</table>

Where ‘D’ is overall diameter of the cable.

vi) Cut lengths of cable which are available as surplus / left over material from other works should preferably be used first. Small cut lengths of cable left after laying long lengths can be used for bus wiring and looping.

II PAYING OUT OF CABLES:

i) Transportation of cable drums from the site store to location.

ii) Handle the cable with care to prevent forming of kinks and damage to the insulation of the cable.

iii) When the cable is to be taken from drums, small lengths can be unwound from the drum.

iv) For longer lengths, place the cable drum on a turn table or jack up the drum on a suitable size of steel shaft. The cable shall be laid in a manner so that there are no scratches or damages caused to the cable due to rubbing on the sides of the drum.

v) The required lengths of cables are to be laid between the following equipments:
   a) C&R Panels in Control Room to Marshalling Kiosk.
   b) Marshalling Kiosk to Equipment.
   c) Marshalling Kiosk to Marshalling Kiosk.
   d) Equipment to Equipment in switchyard.
   e) C&R Panel to C&R Panel / other panels in Control room, etc.

vi) The cables shall be cut after taking into account the length required for connecting to the farthest terminals of the terminal block in the Control & Relay Panel / MK / equipment at both the ends.

III LAYING OF CABLES IN TRENCHES:
i) The removing of trench covers and the refixing after completion of work will be done by the contractor.

ii) The cables shall be placed in the racks in cable trenches. Power and control cables shall be laid in separate tiers. The order of placing cables (other than those directly buried) in cable trenches shall be as follows:
   a) Bottom tiers: Power Cables / Cables having A. C. supply.
   b) Middle tiers: Cables from CT / CVT / PT.
   c) Upper most tiers: Cables having D.C. supply.

iii) The cables shall be securely fixed on the racks in the cable trenches. Particular care shall be taken when cables are laid in vertical & inclined cable trenches / galleries / vaults or supports.

IV MARKING AND TAGGING:

   i) Cable tag / marking strip shall be provided on all cables at both ends (just before entry into the equipment enclosure), on both sides of a wall / floor crossing & on each duct / conduit entry for identification of the cable. Cable tags shall also be provided inside the switchgear, control and relay panels, etc., wherever required for cable identification.

   ii) The numbering of cables on the tags shall be done as per cable schedule. Generally Cable size, identification of initial point and terminating end of equipment / Panel and a cable number shall be punched on the cable tag / marking strip by the Contractor.

   iii) Rectangular shaped cable tag / marking strip of 1.0 mm thick aluminum with the description punched on it shall be securely attached to the cable by not less that two turns of 20 SWG GI wire

V LAYING OF UNDERGROUND POWER CABLES:

   i) Excavation of trench of 30 cm width and 75 cm depth along the proposed route / alignment. The width may be increased in case a number of cables are to be laid. At crossings of cable trenches / roads / transformer tracks / pipes / earth mat conductor, etc., the depth shall be increased such that the bottom of the trench is 40cm below them.

   ii) Covering the bottom of the trench with a layer of sand 25 cm thick.

   iii) Laying the cable in the excavated trench.

   iv) Covering the cable with bricks and backfilling the trench with the excavated sand. Compacting the sand by ramming.(Supply of sand & bricks are in the scope of work of the contractor)

   v) Securing the cables on the supports above ground level.

VI MARKING AND TAGGING:

   i) Directly buried underground cables shall be clearly identified with cable marker made of iron plate (Cable marker will be provided by RVPN).

   ii) Location of underground cable joints shall also be indicated with cable marker with an additional inscription "Cable joints".( Cable marker will be provided by RVPN).
iii) The markers shall project 150 mm above ground and shall be placed at intervals of 30 meters and at every change in direction. They shall also be located on both sides of road and drain crossings.

VII CABLE TERMINATION:

i) Drilling the required holes in the gland plates of the panels / equipment, etc. for fixing the cables.

ii) Stripping off the insulation of the cable for sufficient length so that any wire of the cable can be terminated at the farthest terminal in the terminal blocks.

iii) For unarmoured cable, stripping off the outer and inner insulation sheaths of the cable. Fixing the cable gland on the cable end and then fixing the cable gland on the gland plate of the equipment / panel.

iv) For armoured cables, stripping off the outer and inner insulation sheaths of the cable including cutting off the armouring for the stripped off length keeping a small length for fitting in the cable gland. Fitting the gland nut in the cable. Bending the armouring to fit the gland. Fitting the gland nut and tightening. Fitting the cable gland on the gland plate of the equipment/ panel.

v) Sealing all unused openings for cables in the cable gland plate to prevent entry of vermin and dust.

VIII WIRE TERMINATION:

i) Identification of each core of the cable either by its physical location / marking / numbering or by testing continuity from both ends.

ii) Marking each core of the cable at both ends with a tag / ferrule as per cable schedule / schematic drawing as per instructions of Engineer-In-Charge. In panels in which a large number of cables are terminated, wire identification may be difficult, therefore, the complete cable number shall also be included in the tag / ferrule on each core if advised by the Engineer In-charge.

iii) Cutting each wire at the length required for terminating it on the terminal block. This should be done after proper dressing of the wire in the wiring trough.

iv) Stripping off the insulation of each core of the cable which is to be connected. Crimping the termination end / thimble / lug (pin or ring type, as required) of appropriate size on the wire as approved by the Engineer-In-Charge.

v) Connecting the wire to its terminal on the terminal block and tightening to ensure secure and reliable connection.

vi) Marking all the spare cores of the cables with tags / ferrules indicating the cable number.

vii) All the wires in the Control & Relay panels, equipments, etc. shall be neatly bunched, clamped and tied with nylon strap or PVC perforated strap to keep them in position.

T. PAINTING:-

I PAINTING OF UPAINTED STEEL STRUCTURES:

i) Painting work is to be done on the structures as intimated by the Work - In - charge.
The Work - In - charge shall assess the requirement and arrange shutdown as and when required for the painting work.

Before starting the painting work, the Contractor shall ensure that the shutdown / PTW, if required, of the bay/section in which the structures are to be painted has been provided by the Work - In - charge.

All the material used in the painting work such as Paints, wire brush, Paint Brush, Emery Paper, Cloth & Solvents shall be arranged by the Contractor.

The paint used in the work shall be of approved / recognized manufacturer such as Asian / Nerolac / Berger / Johnson / Nicholson and must be got approved from the Work - In - charge before starting the painting work.

Each step of painting work shall be in the supervision of person authorized by the Work - In – charge.

The surface of structure members shall first be cleaned with wire brush and emery paper.

Thereafter, the surface of member(s) shall be cleaned with cloth to remove the rust, dust or any other deposits on it.

One coat of red oxide paint shall be applied on the members after cleaning, and allowed to dry in air.

After drying of the coat of red oxide paint, two coats of Aluminum paint shall be applied on all the members of the structure. Each coat shall be applied only after the previous coat has dried up.

The painters working on the structures shall maintain a safe distance from the conductors / jumpers on the beams and nearby equipment so that they are protected from electric shock due to voltage induced in the conductors / jumpers.

All material, T&P and labour shall be arranged by the Contractor.

II PAINTING OF OLD PAINTED STEEL STRUCTURES:

Painting work is to be done on the structures as intimated by the Work - In - charge.

The Work - In - charge shall assess the requirement and arrange shutdown as and when required for the painting work.

Before starting the painting work, the Contractor shall ensure that the shutdown / PTW, if required, of the bay/section in which the structures are to be painted has been provided by the Work - In - charge.

All the material used in the painting work such as Paints, wire brush, Paint Brush, Emery Paper, Cloth & Solvents shall be arranged by the Contractor.

The paint used in painting work shall be of approved / recognized manufacturer such as Asian / Nerolac / Berger / Johnson / Nicholson and must be got approved from the Work - In - charge before starting the painting work.

Each step of painting work shall be in the supervision of person authorized by the Work - In - charge.

The surface of structure members shall first be cleaned with wire brush and emery paper.

Thereafter, the surface of member(s) shall be cleaned with cloth to remove the rust, dust or any other deposits on it.
(ix) Two coats of Aluminum paint shall be applied on all the members of the structure. Each coat shall be applied only after the previous coat has dried up.

(x) The painters working on the structures shall maintain a safe distance from the conductors / jumpers on the beams and nearby equipment so that they are protected from electric shock due to voltage induced in the conductors / jumpers.

(xi) All material, T&P and labour shall be arranged by the Contractor.

III) **PAINTING OF TRANSFORMERS AND EQUIPMENTS:**

i) Painting work is to be done on the transformers and equipments as intimated by the Work - In - charge.

ii) The Work - In - charge shall assess the requirement and arrange shutdown as and when required for the painting work.

iii) Before starting the painting work the Contractor shall ensure that the shutdown / PTW of the particular transformer/equipment on which the painting work is to be done, has been provided by the Work - In - charge.

All the material used in the painting work such as soda/caustic solution, Paints, wire brush, Paint Brush, Emery Paper, Cloth & Solvents shall be arranged by the Contractor.

iv) The paint used in painting work shall be of approved / recognized manufacturer such as Asian / Nerolac / Berger/ Johnson /Nicholson and must be got approved from the Work - In - charge before starting the painting work.

v) Each step of painting work shall be in the supervision of person authorized by the Work - In - charge.

vi) The surface of the transformer / equipment shall first be cleaned thoroughly with soda/caustic solution to clean the oily surface.

vii) The transformer / equipment shall then be washed with water.

viii) RVPN will attend the oil leakage in the transformer / equipment.

ix) The surface of transformer/equipment shall then be cleaned with emery paper.

x) Thereafter, the surface of transformer/equipment shall be cleaned with cloth to remove the rust, dust or any other deposits on it.

xi) Two coats of Smoke grey synthetic enamel paint shall be applied on all the surfaces of the transformer/equipment by the spray method. In case of radiators, some fins may have to be painted using brush. Each coat shall be applied only after the previous coat has dried up.

xii) In case of surface area of radiators, only those fins will be considered which are only feasible and approachable for painting by spray or by brush.

xiii) The painters working on the transformer/equipment shall maintain a safe distance from the conductors / jumpers on the beams and nearby equipments so that they are protected from electric shock due to voltage induced in the conductors / jumpers.

xiv) All material, T&P including spray painting machine and labour shall be arranged by the Contractor.
RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LTD

OFFICE OF THE SUPERINTENDING ENGINEER (T&C-JAIPUR CITY)
AJMER ROAD, JAIPUR – 302 021.

SECTION – III B

COMMERCIAL TERMS & CONDITIONS

1.0 SCOPE:
1.1 Please refer to Clause No. 1.1 of Section – III A of this specification.
1.2 This specification covers the Construction of 6 Nos. New 33 KV Bays at 132 kV GSS, Jawahar Nagar, Jaipur. The works shall be carried out as detailed in the Schedule – III (A) of Section – V.
1.3 The Contractor shall carry out all additions / alterations required to complete the Sub Station works for commissioning at the same rates as indicated in the schedules.
1.4 The Contractor shall carry out / take up the work of erection activities awarded to him on as is where is basis.

2.0 WAY LEAVE AND REMOVAL OF OBSTRUCTIONS:
2.1 The NIGAM will arrange for right of way and clearance from obstructions for entry into the land from outside. As such there is no likelihood of hindrances in carrying out the work by the Contractor.
2.2 The Contractor shall immediately notify obstructions or hindrance from local villagers or the local authorities in the execution of the work to the concerned Engineer – in – Charge but shall not deal the matter directly. The Engineer – in – Charge will arrange to remove the obstacles as soon as possible.

3.0 ACCESS TO LOCATIONS:
It will be the Contractor's sole responsibility to take the materials from the site store up to the location where it is to be installed/placed /erected. Any path way, temporary road, required will have to be provided by the Contractor at his cost. If for any reason the above is not feasible, the Contractor shall have to arrange transportation by head loads at his own cost. This is in connection with the transportation of material only.

4.0 DISTRIBUTION OF MATERIALS:
4.1 The Contractor has to take delivery of the equipments and other materials directly from the NIGAM's store at Sub Station site and handle them carefully and transport them to the location where these will be erected. He will be responsible for any damage to or loss of the equipments/ materials at any stage during transportation or erection. The materials that will be issued by the NIGAM will be on “as is where is” conditions at the Sub Station site stores of the purchaser. The materials shall normally be issued during working hours.
4.2 The equipments/materials for the work shall be issued from the site stores located within the Sub Station. The stubs/anchor bolts/parts of the structure required for grouting will be issued at one time for carrying out the grouting work without insisting for insurance. The remaining material (other than the stubs/anchor bolts/ parts of the structures required for grouting) shall be issued to the Contractor only after furnishing of valid insurance policy to the order placing authority and Indemnity Bond to the Work – In – Charge. The
insurance policy shall be accepted by order placing authority as per Clause 5.0 of Section II whereas Indemnity Bond shall be accepted by the Work – In – Charge. The provision of clause 1.10 “PRICES” of Section – I shall be applicable for transportation of material.

4.3 The material shall be issued to the Contractor based on the progress of the work and subject to acceptance of insurance policy and indemnity bond as per provisions of Clause 5.0 of Section – II.

4.4 All the material shall be thoroughly checked by the Contractor before lifting from NIGAM stores. Once the material is lifted, no complaint for quantity or / and quality will be entertained.

4.5 The empty drums of conductor, earth wire and control cables shall be returned by the Contractor on as is where basis is.

4.6 On completion of the work, all surplus materials including the excess bolts and nuts, spring washers, plain washers, D – shackles, step-bolts, etc. and stub/anchor bolt setting templates shall be returned by the Contractor at the site stores of the NIGAM.

4.7 All the surplus structure/structure material shall be returned to the site stores as per instructions of Engineer – in – Charge of the work within one month of completion of erection. This includes unloading of structure material and stacking it as per instructions of the Engineer – in – Charge.

5.0 METHOD OF MEASUREMENT:
(Refer Section III A for Scope of Work)

a) **EARTHING**
   
i) **Earth Mat:** The distance between the two points of the earth mat between which the M.S. Rod has been connected shall be measured for the purpose of payment. The length of M.S. Rod actually laid shall not be considered for measurement of this work. No payment will be made for the length of the rod which may extend outside the points connected. Also, no payment shall be made for the overlapping lengths of M.S. Rod in case of joints in the earth mat.
   
ii) **Earth Risers:** The length of the M.S. Flat laid between the earthed point of the equipment/structure and the earth mat where it is connected shall be measured for the purpose of payment. No payment shall be made for the overlapping lengths of M.S. Flat in case of joints in the risers between the structure/equipment and the earth mat.
   
iii) **Earth Electrodes:** The measurement shall be in terms of numbers of electrodes irrespective of the length of the electrodes.
   
iv) The actual length of M.S. Rod/M.S. Flat used shall not be measured for the purpose of payment, i.e., the overlapping length of M.S. Rod/Flat in case of joints shall not be considered while measuring the length in case of earth mat and earth risers.
   
v) However, the actual length of M.S. Rod/M.S. Flat laid, including the overlapping lengths and the lengths extending beyond the connecting points, shall be considered in the material at site Account submitted by the Contractor.
   
v) **Small extra lengths of M.S. Rod/M.S. Flat up to 100 mm extending beyond the connecting points need not be cut.**
vii) Wastage up to 1.0% of the M.S. Rod/M.S. Flat shall be permitted. However, the pieces of M.S. Rod/M.S. Flat left after the work is completed shall be deposited as far as possible.

b) **SUB STATION AND EQUIPMENT STRUCTURE ERECTION AND ASSEMBLY:**
No measurements are to be taken, but payments shall be made in respect of fully assembled structures (in terms of the unit in the Schedule – III (B), i.e., weight in M.T. as applicable) at the rates indicated in the work order and in accordance with the Technical Specifications in Section – III A. (Note: The unit weight of the Sub Station and equipment structure in sections III A are indicative only. The actual weight shall be taken as per approved BOM of the supplied structure. This may vary to any extent depending on the types of structures at the substation).

c) **STRINGING OF BUS BAR:**
The measurement of each bus section shall be on the basis of the section length measured between the center lines of the structures at both ends. The work of each section shall mean stringing of all three phases.

d) **STRINGING OF EARTH WIRE:**
The measurement shall be in terms of each earth wire strung between any two structures irrespective of the distance between the structures.

e) **JUMPERING:**
The measurement shall be in terms of each set of three jumpers of single/double conductors per phase connected between bus to equipment or equipment to equipment or between bus to bus irrespective of the length of the conductor used.

f) **EQUIPMENT ERECTION:**
The measurement of the works at clause 1.1A(h) to (t) and 1.1B(h) to (r) of Section III(A) shall be made only in terms of numbers of the items erected as per requirements of Section III A and relevant Schedule.

g) **CABLING:**
i) **Cable Laying:** The measurement of the length of the Power/Control cables laid shall be made.

ii) **Fixing in Cable Glands:** The measurement shall be in terms of each end of the cable laid. For clarity, the payment for two nos. shall be made for each cable laid and fixed at both ends.

iii) **Cable Termination:**
a) Control Cable: The measurement shall be in terms of number of cables of each size which have been terminated, which includes termination of all the wires in the control cable at both ends. If all the wires are not got terminated, then deduction shall be made at the rate specified in the relevant item of the schedule for each wire not terminated.

b) Power Cables: The measurement shall be in terms of the ends of the cables terminated which includes termination of all 4 wires at each end. To clarify, the payment for termination of each cable shall be for 2 sets of 4 wires each.

h) **PAINTING:**
The work shall be measured in terms of square meters of the surface area painted.

a) In case of structures, no actual measurement shall be made. The surface area shall be calculated on the basis of steel sections of the structure as per its drawing less 5% for the overlapping of members of structures.
b) In case of transformers and equipments, actual measurements shall be made. In case of transformer radiators, the surface area of only those fins will be considered which are only feasible and approachable for painting by spray or by brush.

### 6.0 INSPECTION BY NIGAM'S REPRESENTATIVE:

a) The Contractor shall check the verticality of the towers / structures in the presence of NIGAM's Engineer before tightening and punching of bolts and nuts. The structures erected should be truly vertical after erection and no straining will be permitted to bring them so. The maximum tolerance permissible is one mm per 360 mm of tower height.

### 7.0 ELECTRICITY RULES:

#### 7.1 All works shall be carried out in accordance with the revised and latest provisions under The Electricity Act, 2003 and Rules made there under.

### 8.0 ERECTION TOOLS:

#### 8.1

- a) All the erection tools required during construction of Sub Stations/bays shall be arranged by the Contractor at his own cost.
- b) The crane required for any activity during erection shall be arranged by Contractor at his own cost. The price quoted shall also include charges for crane.
- c) Templates for structures will however be supplied by the NIGAM which shall be returned by the Contractor in good condition on completion of the works.
- d) Compression machine, if required for stringing/jumpering works, shall be provided by RVPN on rent free basis.

#### 8.2

The Contractor only shall be completely responsible for any damage and or loss of erection tools.

### 9.0 WASTAGES:

#### 9.1

- a) The Contractor shall make every effort to minimize the breakages, losses and wastages of materials/equipments, etc. supplied “Free of Cost” by the NIGAM for construction.
- b) No damage/breakage/wastage shall be permitted except for the items mentioned at clause 9.2 below.

#### 9.2 The maximum ceiling for wastages permitted is as under:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Item</th>
<th>Percentage wastage permitted (Max.)</th>
<th>Compensation payable for excess wastage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conductor and earth wire</td>
<td>1.0 %</td>
<td>Double the issue rate</td>
</tr>
<tr>
<td>2.</td>
<td>Insulators</td>
<td>1.0 %</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Bolts &amp; nuts (no extra bolts &amp; nuts shall be supplied)</td>
<td>2.0 %</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Hardware &amp; accessories</td>
<td>1.0 %</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>M.S. Flat/M.S Rod</td>
<td>1.0 %</td>
<td></td>
</tr>
</tbody>
</table>

#### 9.3

The erection Contractor shall return to the NIGAM all the unused items. Conductor / earth wire length(s) less than 20 metres will be treated as wastage, but will be required to be returned as far as possible. Small extra lengths of M.S. Rod/M.S. Flat shall also be deposited as far as possible. However, the erection Contractor shall compensate the NIGAM at double the issue rate for the quantities exceeding permitted wastage and
for the material not returned by the Contractor. However, in case of theft of material, recovery shall be made at single issue rate provided FIR has been lodged timely by the Contractor and a copy of the same is submitted to the Work – in – Charge.

9.4 All the wastages are accountable except for item no. 1 of clause 9.2. The account of permissible wastages shall be maintained at site in the registers as prescribed by the Engineer – in – Charge of the work, which will be subjected to periodical checking by NIGAM's authorized representatives.

9.5 The account of wastages shall also be submitted with running accounts bills to the Engineer – in – Charge of the work. The copy of running account bill shall also be submitted to the concerned order placing authority.

10.0 PROGRESS REPORT:
10.1 Progress review meeting with the Contractor will be taken by the order placing authority as and when required. Minutes of such meeting shall be drawn and will include progress of works, site constraints, material constraints, delay on part of RVPN / Contractor, other bottlenecks, instructions given, decisions taken, agreed targets and views of both parties. Copy of these minutes shall be sent to the Contractor.

10.2 Deficiencies in the work shall be communicated in writing to the Contractor continuously and timely by all Inspecting Officers, and also taken up during progress review meetings.

10.3 Deficiencies which materially affect the safety and commercial use of the Sub Station/bay work will have to be attended by the Contractor before the Sub Station/bay is declared fit for charging or taking over.

11.0 QUANTITY OF WORK:
11.1 The quantities of various items of erection works indicated in the work orders placed against Labour Rate Contract shall be tentative / estimated. Final quantities shall be determined after completion of work. The Contractor has to carry out the work according to the final quantities as determined so as to complete the work for commissioning for which the rates of the BSR 2017 shall be valid..

12.0 QUALITY OF MATERIAL TO BE USED BY CONTRACTOR
The material used shall meet the following requirements:
   a) **Paint**: Asian / Nerolac / Berger / Jenson & Nicholson make
   b) **Cable Gland**: Heavy duty single compression brass gland SIBG type of Gripwel, Comet, Metalcraft, Cabend, Trinity Touch or HMI make
   c) **Thimbles**: Copper Terminal lugs of Dowell, Jainson, Elcon, Metalcraft, Cabend, Trinity Touch or Data make
   d) **Bitumen Impregnated tape**: Bengal Bitumen, SPT Ltd. or Arcus Ltd. make
   e) **Bitumen Compound**: Bengal Bitumen, SPT Ltd. or Arcus Ltd. make
   f) **Welding Electrodes**: ISI marked.

13.0 PENALTY FOR DELAY:
The Tenderer should note that the completion time allowed in the work order for carrying out the work shall be strictly observed. In case of failure to complete the contracted works within the stipulated completion period, the Contractor shall be liable to pay penalty as per Clause 7.0 “Delay in Completion” of Section – II.

14.0 IMPORTANT INSTRUCTIONS:
In case of any doubt in the interpretation of the terms and conditions, the decision of the concerning Chief Engineer (T&C) will be final and binding on the bidder and no dispute in this regard will be entertained.

15.0 SPECIAL INSTRUCTIONS:
   a) The Bidders shall specifically note that the NIGAM will not pay any extra amount towards any type of claim except for the description indicated in erection schedule.

   b) Quantities of works indicated in the work orders placed against Labour Rate Contract will be tentative / estimated and may vary according to requirement. For the items where quantity is one (1), the Contractor has to execute the work as per requirement.

16.0 SAFETY MEASURE & ACCIDENT:
The contractor shall follow a safe method of working so that there is no damage to Nigam’s material and also no injury to any of his worker. The contractor shall be fully responsible for safety of his workers & during the work if any person gets injured due to any accident, the compensation if any, will be paid by contractor. No payment will be paid by RVPN on this account. The contractor will give an under taking on non-judicial stamp paper worth Rs. 100/- to the effect that RVPN will not be responsible for any injury sustained by contractor’s worker due to an accident arising out of the above work and that contractor will bear entire cost of such injury or compensation if any to be paid to the workers. The cost of stamp / duty shall be borne by contractor.
RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LTD

OFFICE OF THE SUPERINTENDING ENGINEER (T&C-JAIPUR CITY)
AJMER ROAD, JAIPUR – 302 021.

SECTION – IV

SCHEDULES

1. Schedule – I : SCHEDULE OF QUANTITY & PRICES
2. Schedule – II : SCHEDULE OF UNIT RATES FOR ERECTION WORKS OF SUBSTATIONS.
# Schedule-I

## Construction of 06 Nos. New Bays at 132 KV GSS, Jawahar Nagar

<table>
<thead>
<tr>
<th>CODE NO</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>RATE(Rs) As per BSR 1.04.17</th>
<th>QTY.</th>
<th>AMOUNT in Rs</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A-1</strong></td>
<td>EARTH MESH WORK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Laying of Earth Mesh with 25mm/28 mm. dia M.S. Rod at depth of 0.8 mtr. From the top level of foundation, including excavation of trench of required depth and back filling of the same, transportation of M.S. Rod from site store to location, welding of M.S. Rod along the length, at crossing and with earth electrode as per drawing, application of bitumen impregnated tape on all the welded joints, for the type of soil prevalent at 0.8 mtr. Below the foundation (M.S. Rod of above sizes and M.S. Flat as required shall be made available by RVPN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) In case electricity is made by RVPN with out charges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Normal dry soil</td>
<td>Mtr.</td>
<td>24</td>
<td>140</td>
<td>3360</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) Hard soil/Murram/Black cotton soil</td>
<td>Mtr.</td>
<td>26</td>
<td>50</td>
<td>1300</td>
<td></td>
</tr>
<tr>
<td><strong>B-1</strong></td>
<td>Laying of Earth Riser of 50X10mm , size M.S. Flat at a depth of 0.8 mtr. From the top level of foundations, including excavation of trench of required depth and back filling of the same, transportation of M.S. Flat from site store to location, preparation of risers, bending as required, fixing on and welding/bolting of equipments/structures and peak of towers, laying of trench, welding to the earth mesh of M.S. Rod as per requirement, application of bitumen compound and covering with bitumen tape on all welded joints, painting on all the surface of the riser above ground level with red oxide and green enamel paint, for the soil prevalent at a depth of 0.8 mtr. From the top level of the foundation (M.S Rod of above sizes &amp; M.S. Flat of above size will be supplied by RVPN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) In case electricity is made by RVPN with out charges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Normal dry soil</td>
<td>Mtr.</td>
<td>27</td>
<td>400</td>
<td>10800</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) Hard soil/Murram/Black cotton soil</td>
<td>Mtr.</td>
<td>28</td>
<td>100</td>
<td>2800</td>
<td></td>
</tr>
<tr>
<td><strong>C-1</strong></td>
<td>Placing/driving of Earth Electrode of 25mm/28mm. dia. M.S. Rod of length 3.3 mtr. To a depth of approx. 3.8 mtr. From the top level of foundation, including excavation of pits as required and black filling of the same, transportation of M.S. Rod from site store to location, cutting of M.S. Rod to desired length, preparation of one end as spike if necessary, welding of earth electrode to earth mesh as per drawing. Application of bitumen compound and and covering with bitumen impregnated tape on all welded joints, for the type of soil prevalent at 3.8 tr. Below the foundation (M.S. Rod of above sizes and M.S. Flat as required shall be made available by RVPN)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) In case electricity is made by RVPN with out charges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Normal dry soil</td>
<td>Nos.</td>
<td>200</td>
<td>8</td>
<td>1600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ii) Hard soil/Murram/Black cotton soil</td>
<td>Nos.</td>
<td>333</td>
<td>5</td>
<td>1665</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>ERECTATION OF SUB-STATION STEEL STRUCTURES</strong> columns, Beams, Lighting Masts and equipment structures (excluding circuit breaker and capacitor bank) of all types including transportation of structure members, nut and bolts, washer etc. from site store to location, their assembly, placing on foundation, fixing of templates with foundation bolts as requirement, leveling and preparing for grouting as required but excluding grouting, erection after grouting and tightening and punching of nuts and bolts (Max height of structure up to 20.0 Mtr.)</td>
<td>MT</td>
<td>2321</td>
<td>2</td>
<td>4642</td>
<td></td>
</tr>
</tbody>
</table>

| 3 | **BUS-BAR WORK** |

A | STRINGING OF 220KV,132KV,33KV &11KV Bus Bar of ACSR & Tarantulla conductor, including transportation of conductor, disc insulator and tension hardware from site stores to location, laying and cutting required length of conductor, cleaning and assembly of disc insulator as required along with fitting of bolted type or compression type tension hardware as made available (compression machine shall be provided by RVPN on rent free basis), making up at one end, stringing of conductor between the beams with specified sag and tension also equalizing sag and fitting spacers and spacer T-clamps for twin conductor, for three phases of conductors in each bus section. |

\[ \text{iii) Double ACSR Zebra} \]

\[ \text{Secti} \text{n} \quad 1955 \quad 2 \quad 3910 \]

B | Jumpers of ACSR conductor (3 Nos. Y – Type ) between bus to equipment or between equipment to equipment, bus to bus including transportation of conductor, disc insulators and hardware from site store to location, cleaning and assembly of disc insulator as required along with fitting on suspension hardware and erection as required, cutting required length of conductor making connection, fixing of spacers and spacer T Clamps as required, tightening of clamps/connector, dressing etc for three phases. |

\[ \text{i) Single ACSR Zebra/ Panther conductor} \]

\[ \text{Set} \quad 333 \quad 55 \quad 18315 \]

\[ \text{ii) Double ACSR Zebra conductor} \]

\[ \text{Set} \quad 665 \quad 10 \quad 6650 \]

| 4 | **STRINGING OF EARTHWIRE** size 7/3.15 or 7/4 mm including transportation of earth wire, tension hardware etc from site store to locations, laying and cutting required length of earth wire fitting of bolted type hardware or compression type as made available (compression machine shall be provided by RVPN on rent free basis), making up at one end stringing of earth wire on structure peaks with specified sag and tension, jumpering and connecting earth bonds for single earth wire. |

\[ \text{Each} \quad 292 \quad 2 \quad 584 \]

| 5 | **ERECTION OF SUBSTATION EQUIPMENTS:** |

B | Erection of Current Transformers/ Potential Transformer/ CVT/ SR/RVT Neutral CT with clamps and connectors, on already erected steel structures including transportation from site store to location, fabrication of base frame, fixing of terminal connectors, tightening of nuts and bolts complete in all respect. |

\[ \text{iii) 33 KV CT/PT} \]

\[ \text{Nos.} \quad 532 \quad 27 \quad 14364 \]

C | Erection of Lightening Arrester on already erected steel structure including transportation of Lightening Arrester, clamps & connectors, surge counter etc. from site store to locations, fabrication of base frame fixing of terminal connectors, surge counter, tightening of nuts & bolts etc. complete in all respect. |

\[ \text{iii) 33 KV or 11 KV} \]

\[ \text{Nos.} \quad 317 \quad 24 \quad 7608 \]
**Erection of Isolator** on already erected steel structure including transportation of base frame PI’s, Mechanism box, clamps and connectors etc from site store to location, minor fabrication and fixing of terminal connectors etc adjustment/ alignment of isolator and fixing of earth blade if provided for their smooth operation and adjustment if required after jumpering.

<p>| | | | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>iii) 33 KV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Without Earth Blade</td>
<td>Nos.</td>
<td>916</td>
<td>18</td>
</tr>
<tr>
<td>b) With Single Earth Blade</td>
<td>Nos.</td>
<td>1364</td>
<td>7</td>
</tr>
</tbody>
</table>

**Erection of 33 kV Circuit Breaker** including transportation of equipment, structure members, nuts and bolts, clamps and connectors, accessories etc. from site store to location, assembly of support structure, their placing on foundation, leveling and preparing for grouting as required, but excluding grouting, assembly/ placing of support columns/ poles, mechanism box/ control cubicle, and other accessories as per manufacturer drawings, fitting of terminal connectors as required, but excluding commissioning of CB.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>i) 33KV CB (outdoor Type) VCB/ SF6</td>
<td>Nos.</td>
<td>7404</td>
<td>8</td>
</tr>
</tbody>
</table>

**Erection of 132 KV class EHV Transformer** (tank already placed on foundation with wheels), including transportation of accessories from site store to location, erection of HV, IV, LV & Neutral bushings, main & OLTC conservations, radiators, equalizing pipe line, marshalling kiosk, etc. as per manufacturer’s drawing, preparation of oil, oil filling, dehydration of transformer (filter machine, oil tank & operating staff shall be provided by RVPN), electrical wiring from individual equipment, e.g. Buchholz relay, MOLG, OSR, etc. to marshalling kiosk, etc. but excluding testing & commissioning of transformer.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>a) if electricity is available &amp; arranged by RVPN without charges.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Transformer received oil filled.(132/33 KV,20/25 MVA)</td>
<td>Nos.</td>
<td>42089</td>
<td>1</td>
</tr>
</tbody>
</table>

**Erection of C & R Panels** complete in all respect including transportation from site store to control room, placing on foundation/ cable trench as per layout, interconnection between C & R panels and with existing panels, fixing of side/ top covers and doors, earthing to existing earth strip in control room, connection of bus wiring to existing panels and between control and relay panels as required.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ii) Duplex Panel</td>
<td>Nos.</td>
<td>1265</td>
<td>1</td>
</tr>
<tr>
<td>iii) Simplex Panel,DC Panel,RTCC Panel,PLCC Panel etc</td>
<td>Nos.</td>
<td>632</td>
<td>4</td>
</tr>
</tbody>
</table>

**Erection of Marshalling Kiosk/ LMU/ line matching and distribution unit (LMDC) complete in all respect including transportation from site store to location, placing on foundation/ cable trench as per layout/ preparing for grouting of foundation bolts but excluding grouting etc.

<p>| | | | |</p>
<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ii) 33 KV or 11KV Marshalling Kiosk</td>
<td>Nos.</td>
<td>192</td>
<td>4</td>
</tr>
</tbody>
</table>

**Laying and Termination of Cables**

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Control Cables</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Laying of P.V.C. Insulated unarmored/ armored control cables of 1.1 KV grade with copper conductor in cable trench as per specification as required, including transportation of cable drum from site store to location, laying in cable trenches, placing in the cable racks/ cable trays/ cable batten and dressing, including repairing and fixing of trench covers as required, making necessary connections, testing, cable marking on both the termination ends, etc as required for all sizes from 2CX 2.5 mm² to 20C X 2.5 mm² and 4CX 4 mm² and 4C X 6 mm².**

<table>
<thead>
<tr>
<th>Description</th>
<th>Mtr.</th>
<th>Rate (Rs)</th>
<th>Subtotal (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Unarmored control cables</td>
<td>5</td>
<td>4500</td>
<td>22500</td>
</tr>
<tr>
<td>ii) Fixing of Control Cables in position with single compression nickel plated brass cable glands confirming to IS: 12943 and having three metal washers and rubber ring, including preparation of cable and drilling of corresponding holes in gland plates, etc as required and including cost of cable glands for each cable gland of size:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) 19 mm unarmoured control cable</td>
<td>44</td>
<td>130</td>
<td>5720</td>
</tr>
<tr>
<td>c) 25 mm unarmoured control cable</td>
<td>67</td>
<td>40</td>
<td>2680</td>
</tr>
<tr>
<td>iii) Termination of wires of Cables with copper terminal lugs (Pin or ring type of Dowells or equivalent make as approved by Engineer - In-Charge) duly crimped by crimping tools, including wire ends ready for crimping, ferruling and dressing of wires, etc as required, including cost of terminals ends for all wires, for each cable at both ends for cables of following sizes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) 3C x 2.5 mm²</td>
<td>32</td>
<td>14</td>
<td>448</td>
</tr>
<tr>
<td>e) 12C x 2.5 mm²</td>
<td>128</td>
<td>23</td>
<td>2944</td>
</tr>
<tr>
<td>In case all the wires of any cable are not terminated then a deduction @ 6.00 shall be made for each end of the wire not terminated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) 4C x 4 mm²</td>
<td>57</td>
<td>54</td>
<td>3078</td>
</tr>
<tr>
<td>In case all the wires of any cable are not terminated then a deduction @ 7.00 shall be made for each end of the wire not terminated.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DESTRINGING OF 220KV,132KV,33KV & 11KV BUS BAR OF ACSR & TARANTULA CONDUCTOR,** including transportation of conductor, disc insulator, clamp & connectors and tension hardware from site to storage location for all phases of conductors in each bus section.

<table>
<thead>
<tr>
<th>Description</th>
<th>Section</th>
<th>Rate (Rs)</th>
<th>Subtotal (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii) Single ACSR Zebra</td>
<td>814</td>
<td>2</td>
<td>1628</td>
</tr>
<tr>
<td>iii) Double ACSR Zebra</td>
<td>1173</td>
<td>1</td>
<td>1173</td>
</tr>
</tbody>
</table>

**Dismantling of Jumpers of ACSR Conductor (3 Nos. Y – Type )**

<table>
<thead>
<tr>
<th>Description</th>
<th>NOS.</th>
<th>Rate (Rs)</th>
<th>Subtotal (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Single ACSR Zebra/ Panther conductor</td>
<td>200</td>
<td>60</td>
<td>12000</td>
</tr>
</tbody>
</table>

**Dismantling of 132KV class EHV transformer** (tank already placed on foundation with wheels), including transportation of accessories from locations to site store, dismantling of HV, IV, LV & neutral bushing, main & OLTC conservator, radiators, equalizing pipe line, MK etc as per manufacture drawing.
### a) If electricity is available & arranged by RVPN without charges

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Nos.</th>
<th></th>
<th>Total (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Transformer received oil filled (132/11KV 10/12.5MVA Transformer)</td>
<td>25253</td>
<td>2</td>
<td>50506</td>
</tr>
<tr>
<td><strong>Dismantling of Current Transformers/ Potential Transformer/ CVT/ SR/ RVT Neutral CT</strong> with clamps and connectors, on already erected steel structures including transportation from location to site store complete in all respect.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) 33 KV or 11 KV CT/PT</td>
<td>319</td>
<td>31</td>
<td>9889</td>
</tr>
<tr>
<td><strong>Dismantling of 33 kV or 11KV Circuit Breaker,</strong> including transportation of equipment, structure members, nuts and bolts, clamps and connectors, accessories etc. from location to site store.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) 33KV or 11KV Outdoor type (VCB/SF6)</td>
<td>4442</td>
<td>11</td>
<td>48862</td>
</tr>
<tr>
<td><strong>Dismantling of Lightening arrester</strong> on already erected steel structure including transportation of lightening arrester, clamps &amp; connectors, surge counter, etc from location to site store complete in all respect.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) 33KV or 11KV</td>
<td>190</td>
<td>42</td>
<td>7980</td>
</tr>
<tr>
<td><strong>Dismantling of Isolator</strong> on already erected steel structure including transportation of base frame PI’s, Mechanism box, clamps and connectors etc from location to site store.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) 33 K &amp; 11KV</td>
<td>550</td>
<td>34</td>
<td>18700</td>
</tr>
<tr>
<td><strong>Dismantling of sub station steel structure</strong> columns, Beams, Lighting Masts and equipment structures (excluding circuit breaker and capacitor bank) of all types including transportation of structure members, nut and bolts, washer etc. from location to site store.</td>
<td>MT</td>
<td>0.5</td>
<td>696.5</td>
</tr>
<tr>
<td><strong>Dismantling of Post insulator</strong> on already erected structures including transportation of P.I’s, nuts &amp; bolts, clamp and connectors etc from location to site store.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) 33KV or 11KV</td>
<td>45</td>
<td>6</td>
<td>270</td>
</tr>
<tr>
<td><strong>Dismantling of Capacitor Bank,</strong> with Series Reactors &amp; Residual Voltage Transformers/Neutral Current Transformers, including transportation of equipments, structure members, nuts &amp;bolts, washers, clamps &amp; connectors etc. from location to site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) 33KV or 11KV</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dismantling of C &amp; R Panels</strong> complete in all respect including transportation from control room to site store,</td>
<td>Each</td>
<td>1</td>
<td>11080</td>
</tr>
<tr>
<td>ii) Duplex Panel</td>
<td>759</td>
<td>2</td>
<td>1518</td>
</tr>
<tr>
<td>iii) Simplex Panel, DC Panel, RTCC Panel, PLCC Panel etc</td>
<td>379</td>
<td>8</td>
<td>3032</td>
</tr>
<tr>
<td><strong>Removal of P.V.C. Insulated unarmored/ armored control cables</strong> of 1.1 KV grade with copper conductor in cable trench as per specification as required, including transportation of cable from location to site store to location, removing in cable trenches, including removing and fixing of trench covers as required for all sizes from 2CX 2.5 mm² to 20C X 2.5 mm² and 4CX 4 mm² and 4C X 6 mm²</td>
<td>Mtr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Unarmored control cables</td>
<td>3</td>
<td>2000</td>
<td>6000</td>
</tr>
<tr>
<td><strong>TOTAL(Rs)</strong></td>
<td></td>
<td></td>
<td>420221</td>
</tr>
</tbody>
</table>

Say Rs. Four Lakh Twenty Thousand Two Hundred Twenty One Only
1. We agree to execute the above work @ ............... % above / below (Exclusive GST) on RVPN-BSR-2017.

(Note- Please tick on above or below clearly)

2. The bidder shall quote the prices in all respect inclusive of all type of taxes etc.(except GST) till completion of the work.

3. Our quoted rates will also be applicable for the items included in Schedule-II.

Date:

Signature of authorized Representative of the Contractor with seal
## SCHEDULE OF RATES FOR ERRECTION OF UNIT QUANTITY ITEMS OF SUBSTATIONS
### ON LABOUR CONTRACT BASIS
### SECTION-IV
### SCHEDULE –II

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>RATE (Rupee)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EARTH MESH WORK</td>
<td></td>
<td>BSR-2017.</td>
</tr>
<tr>
<td>A-1</td>
<td>Laying of earth mesh with 25mm. / 28mm. dia. M.S. Rod at a depth of 0.80 metre from top level of foundations, including excavation of trench of required depth and backfilling of the same, transportation of M. S. Rods from site store to locations, welding of M. S. Rod to M. S. Rod along the length, at crossings and with earth electrodes as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints, for the type of soil prevalent at 0.80 metre below top level of foundations (M. S. Rod of above sizes &amp; M. S. Flat as required shall be made available by RVPN).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) In case electricity is made available by RVPN without charges.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
<td>24.00</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
<td>26.00</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
<td>35.00</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
<td>54.00</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
<td>60.00</td>
</tr>
<tr>
<td></td>
<td>(b) In case diesel generator is arranged by the Contractor at his own cost.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
<td>33.00</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
<td>35.00</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
<td>46.00</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
<td>65.00</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
<td>72.00</td>
</tr>
<tr>
<td>A-2</td>
<td>Laying of earth mesh with 40 mm. dia. M.S. Rod at a depth of 0.80 metre from top level of foundations, including excavation of trench of required depth and backfilling of the same, transportation of M. S. Rods from site store to locations, welding of M. S. Rod to M. S. Rod along the length, at crossings and with earth electrodes as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints, for the type of soil prevalent at 0.80 metre below top level of foundations (M. S. Rod of above sizes &amp; M. S. Flat as required shall be made available by RVPN).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) In case electricity is made available by RVPN without charges.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
<td>48.00</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
<td>48.00</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
<td>70.00</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
<td>85.00</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
<td>104.00</td>
</tr>
<tr>
<td></td>
<td>(b) In case diesel generator is arranged by the Contractor at his own cost.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
<td>63.00</td>
</tr>
<tr>
<td>Soil Type</td>
<td>Description</td>
<td>Soil Type</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
<td>63.00</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
<td>84.00</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
<td>101.00</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
<td>117.00</td>
</tr>
</tbody>
</table>

**B-1**

Laying of earthing risers of 50x6mm / 50x10mm / 50x12mm size M. S. Flat at a depth of 0.80 metre from top level of foundations, including excavation of trench of required depth and backfilling of the same, transportation of M. S. Flat from site store to locations, preparation of risers, bending as per requirement (after heating if necessary), fixing on and welding / bolting to equipment / structure and peaks of structures, laying in the trench, welding to the earth mesh of M. S. Rod as per drawing, including welding of extra length of M. S. Flat if required, application of bitumen compound and covering with bitumen impregnated tape on all welded joints, painting of all surfaces of risers above ground level with red oxide and green paint, for the type of soil prevalent at 0.80 metre below top level of foundations (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

(a) In case electricity is made available by RVPN without charges.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Description</th>
<th>Length (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
</tr>
</tbody>
</table>

(b) In case diesel generator is arranged by the Contractor at his own cost.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Description</th>
<th>Length (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
</tr>
</tbody>
</table>

**B-2**

Laying of earthing risers of 75 x 12mm size M. S. Flat at a depth of 0.80 metre from top level of foundations, including excavation of trench of required depth and backfilling of the same, transportation of M. S. Flat from site store to locations, preparation of risers, bending as per requirement (after heating if necessary), fixing on and welding / bolting to equipment / structure and peaks of structures, laying in the trench, welding to the earth mesh of M. S. Rod as per drawing, including welding of extra length of M. S. Flat if required, application of bitumen compound and covering with bitumen impregnated tape on all welded joints, painting of all surfaces of risers above ground level with red oxide and green paint, for the type of soil prevalent at 0.80 metre below top level of foundations (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

(a) In case electricity is made available by RVPN without charges.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Description</th>
<th>Length (Meters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>i)</td>
<td>Normal dry soil</td>
<td>Metres</td>
</tr>
<tr>
<td>ii)</td>
<td>Hard soil / Murram / Black cotton soil</td>
<td>Metres</td>
</tr>
<tr>
<td>iii)</td>
<td>Soft rock</td>
<td>Metres</td>
</tr>
<tr>
<td>iv)</td>
<td>Hard rock (with blasting)</td>
<td>Metres</td>
</tr>
<tr>
<td>v)</td>
<td>Hard rock (blasting prohibited)</td>
<td>Metres</td>
</tr>
</tbody>
</table>
(b) In case diesel generator is arranged by the Contractor at his own cost.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Measurement</th>
<th>Metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Normal dry soil</td>
<td></td>
<td>67.00</td>
</tr>
<tr>
<td>ii) Hard soil / Murram / Black cotton soil</td>
<td></td>
<td>67.00</td>
</tr>
<tr>
<td>iii) Soft rock</td>
<td></td>
<td>88.00</td>
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<tr>
<td>iv) Hard rock (with blasting)</td>
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<td>104.00</td>
</tr>
<tr>
<td>v) Hard rock (blasting prohibited)</td>
<td></td>
<td>120.00</td>
</tr>
</tbody>
</table>

C-1 Placing / Driving of earth electrode of 25 / 28mm dia. M. S. Rod of length 3.30 meters (approx.) to a depth of 3.80 meters from the top level of foundations, including excavation of pit as required and back filling of the same, transportation of M. S. Rod from site store to locations, cutting of M. S. Rod to desired length, preparation of one end as spike if necessary, welding of earth electrode to earth mesh of M. S. Rod as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints, for the type of soil prevalent at 3.80 metres below top level of foundations (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Number</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) In case electricity is made available by RVPN without charges.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Normal dry soil</td>
<td></td>
<td>200.00</td>
</tr>
<tr>
<td>ii) Hard soil / Murram / Black cotton soil</td>
<td></td>
<td>333.00</td>
</tr>
<tr>
<td>iii) Soft rock</td>
<td></td>
<td>532.00</td>
</tr>
<tr>
<td>iv) Hard rock (with blasting)</td>
<td></td>
<td>932.00</td>
</tr>
<tr>
<td>v) Hard rock (blasting prohibited)</td>
<td></td>
<td>1057.00</td>
</tr>
</tbody>
</table>

(b) In case diesel generator is arranged by the Contractor at his own cost.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Number</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Normal dry soil</td>
<td></td>
<td>283.00</td>
</tr>
<tr>
<td>ii) Hard soil / Murram / Black cotton soil</td>
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<td>iii) Soft rock</td>
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<td>616.00</td>
</tr>
<tr>
<td>iv) Hard rock (with blasting)</td>
<td></td>
<td>1016.00</td>
</tr>
<tr>
<td>v) Hard rock (blasting prohibited)</td>
<td></td>
<td>1139.00</td>
</tr>
</tbody>
</table>

C.2 Placing / Driving of earth electrode of 40 mm dia. M. S. Rod of length 3.30 meters (approx.) to a depth of 3.80 meters from the top level of foundations, including excavation of pit as required and back filling of the same, transportation of M. S. Rod from site store to locations, cutting of M. S. Rod to desired length, preparation of one end as spike if necessary, welding of earth electrode to earth mesh of M. S. Rod as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints, for the type of soil prevalent at 3.80 metres below top level of foundations (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Number</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) In case electricity is made available by RVPN without charges.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Normal dry soil</td>
<td></td>
<td>328.00</td>
</tr>
<tr>
<td>ii) Hard soil / Murram / Black cotton soil</td>
<td></td>
<td>505.00</td>
</tr>
<tr>
<td>iii) Soft rock</td>
<td></td>
<td>933.00</td>
</tr>
<tr>
<td>iv) Hard rock (with blasting)</td>
<td></td>
<td>1246.00</td>
</tr>
<tr>
<td>v) Hard rock (blasting prohibited)</td>
<td></td>
<td>1593.00</td>
</tr>
</tbody>
</table>

(b) In case diesel generator is arranged by the Contractor at his own cost.

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Number</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Normal dry soil</td>
<td></td>
<td>440.00</td>
</tr>
<tr>
<td>ii) Hard soil / Murram / Black cotton soil</td>
<td>Nos.</td>
<td>615.00</td>
</tr>
<tr>
<td>iii) Soft rock</td>
<td>Nos.</td>
<td>1042.00</td>
</tr>
<tr>
<td>iv) Hard rock (with blasting)</td>
<td>Nos.</td>
<td>1356.00</td>
</tr>
<tr>
<td>v) Hard rock (blasting prohibited)</td>
<td>Nos.</td>
<td>1704.00</td>
</tr>
</tbody>
</table>

D.1

(i) **Placing of earth electrode of 25 / 28mm dia. M. S. Rod of length 7.50 meters** (approx.) to a depth of 8.00 meters from the top level of foundations, including drilling of 200 mm dia. earth pit having a throughout bore of 200 mm dia to a depth of 8.00 metres from the top level of the foundations, in all types of rocks by DTH system and overburden, including back filling of pit with Bentonite slurry (with cost of Bentonite slurry), including its preparation, transportation of M. S. Rod and Bentonite from site store to location, cutting of M. S. Rod to desired length, welding of earth electrode to earth mesh of M. S. Rod as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

(a) In case electricity is made available by RVPN without charges. Nos. 11230.00
(b) In case diesel generator is arranged by the Contractor at his own cost. Nos. 11312.00

D.2

(ii) **Placing of earth electrode of 40 mm dia. M. S. Rod of length 7.50 meters** (approx.) to a depth of 8.00 meters from the top level of foundations, including drilling of 200 mm dia. earth pit having a throughout bore of 200 mm dia to a depth of 8.00 metres from the top level of the foundations, in all types of rocks by DTH system and overburden, including back filling of pit with Bentonite slurry (with cost of Bentonite slurry), including its preparation, transportation of M. S. Rod and Bentonite from site store to location, cutting of M. S. Rod to desired length, welding of earth electrode to earth mesh of M. S. Rod as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

(a) In case electricity is made available by RVPN without charges. Nos. 11230.00
(b) In case diesel generator is arranged by the Contractor at his own cost. Nos. 11312.00

E.1

(ii) **Placing of earth electrode of 25 / 28mm dia. M. S. Rod of length 7.50 meters** (approx.) to a depth of 8.00 meters from the top level of foundations in already bored hole, including back filling of pit with Bentonite slurry (with cost of Bentonite slurry), including its preparation, transportation of M. S. Rod and Bentonite from site store to location, cutting of M. S. Rod to desired length, welding of earth electrode to earth mesh of M. S. Rod as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

(a) In case electricity is made available by RVPN without charges. Nos. 1323.00
(b) In case diesel generator is arranged by the Contractor at his own cost. Nos. 1405.00
E.2  (ii) **Placing of earth electrode** of 40 mm dia. M. S. Rod of length 7.50 meters (approx.) to a depth of 8.00 meters from the top level of foundations in already bored hole, including back filling of pit with Bentonite slurry (with cost of Bentonite slurry), including its preparation, transportation of M. S. Rod and Bentonite from site store to location, cutting of M. S. Rod to desired length, welding of earth electrode to earth mesh of M. S. Rod as per drawing, application of bitumen compound and covering with bitumen impregnated tape on all welded joints (M. S. Rod of above sizes & M. S. Flat as required shall be made available by RVPN).

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) In case electricity is made available by RVPN without charges.</td>
<td>1414.00</td>
</tr>
<tr>
<td>(b) In case diesel generator is arranged by the Contractor at his own cost.</td>
<td>1527.00</td>
</tr>
</tbody>
</table>

2  **ERECTION OF SUB-STATION STEEL STRUCTURES** columns, beams, lighting mast and equipment structures (excluding Circuit Breakers and Capacitor Banks) of all types including transportation of structure members, nuts & bolts, washers, etc. from site store to locations, their assembly, placing on foundation, fixing of template, with foundation bolts as required, levelling and preparing for grouting as required, but excluding grouting, erection after grouting and tightening & punching of nuts & bolts. (Maximum height of structures up to 20 meters)

<table>
<thead>
<tr>
<th>Description</th>
<th>M. T.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2321.00</td>
</tr>
</tbody>
</table>

3  **BUS-BAR WORK**

A.  **STRINGING of 220 KV, 132 KV, 33 KV & 11KV Bus Bar of ACSR & Tarantulla conductor**, including transportation of conductor, disc insulators and tension hardware from site store to location, laying and cutting required length of conductor, cleaning and assembly of disc insulators as required along with fitting of bolted type or compression type tension hardware as made available (compression machine shall be provided by RVPN on rent free basis), making up at one end, stringing of conductors between the beams with specified sag and tension, also equalizing sag and fitting spacers and spacer T-clamps for twin conductor, for three phases of conductors in each bus-section.

<table>
<thead>
<tr>
<th>Description</th>
<th>Section</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Single ACSR Panther</td>
<td></td>
<td>1165.00</td>
</tr>
<tr>
<td>ii) Single ACSR Zebra</td>
<td></td>
<td>1356.00</td>
</tr>
<tr>
<td>iii) Double ACSR Zebra</td>
<td></td>
<td>1955.00</td>
</tr>
<tr>
<td>iv) Single Tarantulla</td>
<td></td>
<td>1219.00</td>
</tr>
<tr>
<td>v) Double Tarantulla</td>
<td></td>
<td>1758.00</td>
</tr>
</tbody>
</table>

B.  **JUMPERS of ACSR conductor (3 nos. Y- type)** between bus to equipment, or between equipment to equipment or between bus to bus, including transportation of conductor, disc insulators and hardware from site stores to locations, cleaning and assembly of disc insulators as required along with fitting of suspension hardware and erection as required, cutting required length of conductor, making connections, fixing of spacers & spacer T-clamps as required, tightening of clamps / connectors, dressing, etc., for three phases.

<table>
<thead>
<tr>
<th>Description</th>
<th>Section</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Single ACSR Zebra / Panther conductor</td>
<td>Set</td>
<td>250.00</td>
</tr>
<tr>
<td>ii) Double ACSR Zebra conductor</td>
<td>Set</td>
<td>500.00</td>
</tr>
<tr>
<td>iii) Single Tarantulla</td>
<td>Set</td>
<td>360.00</td>
</tr>
<tr>
<td>iv) Double Tarantulla</td>
<td>Set</td>
<td>719.00</td>
</tr>
</tbody>
</table>
### STRINGING of Earth wire (size 7 / 3.15 mm or 7 / 4.00 mm), including transportation of earthwire, tension hardwares, etc., from site store to locations, laying and cutting required length of earthwire, fitting of bolted type or compression type hardware as made available (compression machine shall be provided by RVPN on rent free basis), making up at one end, stringing of earthwire between structure peaks with specified sag and tension, jumpering and connecting earth bonds, for single earthwire.

| Each | 292.00 |

### ERECTION OF SUB-STATION EQUIPMENTS

#### A. i) Erection of 33/0.4 KV or 11/0.4 KV Station transformer up to 500 KVA on existing masonry platform including transportation of transformer & accessories from site store to location, erection of Horn Gap fuse set, jumpering from isolator to Horn Gap to transformer.

| Each | 3967.00 |

#### ii) Filtration of the transformer, if required (Additional cost)

| Each | 1323.00 |

#### B. Erection of Current Transformer / Potential Transformer / Capacitive voltage Transformer / Series Reactor / Residual Voltage Transformer / Neutral Current Transformer with clamps & connectors, on already erected steel structure including transportation from site store to locations, fabrication of base frame, fixing of terminal connectors, tightening of nuts & bolts etc., complete in all respects.

| 220 KV CT / PT / CVT | Nos. | 2529.00 |
| 132 KV CT / PT / CVT | Nos. | 1415.00 |
| 33 KV or 11 KV CT / PT | Nos. | 532.00 |
| 33 KV or 11 KV SR / RVT / NCT | Nos. | 1016.00 |

#### C. Erection of Lightening Arrestor on already erected steel structure including transportation of Lightening Arrestor, clamps & connectors, surge counter, etc. from site store to locations, fabrication of base frame, fixing of terminal connectors, surge counter, tightening of nuts & bolts etc., complete in all respect.

| 220 KV | Nos. | 1996.00 |
| 132 KV | Nos. | 1422.00 |
| 33 KV or 11 KV | Nos. | 317.00 |

#### D. Erection of Isolators on already erected steel structure including transportation of base frame, P. I.’s, contacts, mechanism box, clamps & connectors, etc. from site store to locations, minor fabrication as required, and fixing of terminal connectors, etc., adjustment/ alignment of isolator and its earth blade, if provided, for their smooth operation and final adjustment if required after jumpering.

| 220 KV | Nos. | 4400.00 |
| 132 KV | Nos. | 4899.00 |
| 33 KV or 11 KV | Nos. | 5557.00 |
| 33 KV or 11 KV | Nos. | 4899.00 |

a) Without Earth Blade

<p>| 220 KV | Nos. | 2596.00 |
| 132 KV | Nos. | 3045.00 |
| 33 KV or 11 KV | Nos. | 3045.00 |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Without Earth Blade</td>
<td>Nos.</td>
<td>916.00</td>
</tr>
<tr>
<td>b) With Single Earth Blade</td>
<td>Nos.</td>
<td>1364.00</td>
</tr>
<tr>
<td>E.</td>
<td>Erection of Wave trap on already erected structure beam, including transportation of wave trap, disc insulators, hardware, clamps and connectors, etc. from site store to locations, cleaning &amp; assembly of disc insulators along with fitting of suspension arrangement and erection, fixing of terminal connectors, etc.</td>
<td></td>
</tr>
<tr>
<td>i) 220 KV</td>
<td>Nos.</td>
<td>807.00</td>
</tr>
<tr>
<td>ii) 132 KV</td>
<td>Nos.</td>
<td>599.00</td>
</tr>
<tr>
<td>F.</td>
<td>Erection of 2x33 KV or 2x11 KV Capacitor Bank, with Series Reactors &amp; Residual Voltage Transformers / Neutral Current Transformers, including transportation of equipments, structure members, nuts &amp; bolts, washers, clamps &amp; connectors etc. from site store to location, assembly of structure, their placing on foundation, leveling and preparing for grouting as required, but excluding grouting, assembly of capacitor bank cells on frames as required &amp; their connections as per manufacturer’s drawings, fixing of terminal connectors, etc.</td>
<td>Each 18466.00</td>
</tr>
<tr>
<td>G.</td>
<td>Erection of 220 KV or 132 KV Circuit Breakers, including transportation of equipment, structure members, nuts &amp; bolts, clamps &amp; connectors, accessories etc. from site store to location, assembly of support structure, their placing on foundation, levelling and preparing for grouting as required, but excluding grouting, assembly / placing of support columns / poles, mechanism box / control cubicle, and other accessories as per manufacturer’s drawings, fitting of SF 6 gas pipeline, fabrication of air / oil pipeline as required, electrical wiring from pole to control cubicle, fixing of terminal connectors as required, but excluding commissioning of CB, for all types of operating mechanism, as required.</td>
<td></td>
</tr>
<tr>
<td>i) 220 KV</td>
<td>Nos.</td>
<td>19216.00</td>
</tr>
<tr>
<td>ii) 132 KV</td>
<td>Nos.</td>
<td>15223.00</td>
</tr>
<tr>
<td>H.</td>
<td>Erection of 33 KV or 11 KV Circuit Breakers including transportation of equipment, structure members, nuts &amp; bolts, clamps &amp; connectors, etc. from site store to location, assembly of support structure, their placing on foundation, levelling and preparing for grouting as required, but excluding grouting, assembly / placing of poles, mechanism box, etc. on support structure as per manufacturer’s drawings, fitting of terminal connectors, etc. but excluding commissioning of CB.</td>
<td></td>
</tr>
<tr>
<td>i) 33 KV or 11KV Outdoor Type ( VCB / SF 6 )</td>
<td>Nos.</td>
<td>7404.00</td>
</tr>
<tr>
<td>ii) 11 KV Kiosk ( VCB / SF 6 / MOCB )</td>
<td>Nos.</td>
<td>2620.00</td>
</tr>
<tr>
<td>I.</td>
<td>Erection of Post Insulators on already erected structures including transportation of P. I. ‘s, nuts &amp; bolts, clamps &amp; connectors, etc. from site store to locations, fabrication of base frame &amp; assembly if required, fixing of clamps, etc.</td>
<td></td>
</tr>
<tr>
<td>i) 220 KV</td>
<td>Nos.</td>
<td>883.00</td>
</tr>
<tr>
<td>ii) 132 KV</td>
<td>Nos.</td>
<td>665.00</td>
</tr>
<tr>
<td>iii) 33 KV or 11 KV</td>
<td>Nos.</td>
<td>75.00</td>
</tr>
</tbody>
</table>
J. Erection of 132 KV Class EHV Transformer (tank already placed on foundation with wheels), including transportation of accessories from site store to locations, erection of HV, IV, LV & Neutral bushings, main & OLTC conservators, radiators, equalizing pipe line, marshalling kiosk, etc. as per manufacturer’s drawing, preparation of oil, oil filling, dehydration of transformer (filter machine, oil tank & operating staff shall be provided by RVPN), electrical wiring from individual equipment, e.g., Buchholz relay, MOLG, OSR, etc. to marshalling kiosk, etc., but excluding testing & commissioning of transformer.

a) If electricity is available & arranged by RVPN without charges.

<table>
<thead>
<tr>
<th>Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformers received oil filled</td>
<td>42089.00</td>
</tr>
<tr>
<td>Transformers received gas filled</td>
<td>52736.00</td>
</tr>
</tbody>
</table>

b) If electricity is not available & the Contractor is required to arrange diesel generator of appropriate capacity.

<table>
<thead>
<tr>
<th>Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transformers received oil filled</td>
<td>174345.00</td>
</tr>
<tr>
<td>Transformers received gas filled</td>
<td>317248.00</td>
</tr>
</tbody>
</table>

K. Erection of 220 KV Class EHV Transformer (Gas filled tank already placed on foundation with wheels), including transportation of accessories from site store to locations, erection of HV, IV, LV & Neutral bushings, erection of cooler bank with associated pipe line, radiators, fans, pump, main & OLTC conservators, equalizing pipe line, marshalling kiosk, etc. as per manufacturer’s drawing, preparation of oil, oil filling, dehydration of transformer along with cooler bank & diverter switch (filter machine, oil tank & operating staff shall be provided by RVPN), electrical wiring from individual equipment, e.g., Buchholz relay, MOLG, OSR, Fans, Pumps, Bushing CT’s etc. to marshalling kiosk, etc., but excluding testing & commissioning of transformer.

a) If electricity is available & arranged by RVPN without charges.

<table>
<thead>
<tr>
<th>Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>128596.00</td>
</tr>
</tbody>
</table>

b) If electricity is not available & the Contractor is required to arrange diesel generator of appropriate capacity.

<table>
<thead>
<tr>
<th>Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>525363.00</td>
</tr>
</tbody>
</table>

6 Erection of Control & Relay Panels complete in all respects including transportation from site store to control room, placing on foundation / cable trench as per layout, interconnection between Control & Relay panels and with existing panels, fixing of side / top covers and doors, earthing to existing earth strip in control room, connection of bus wiring to existing panel and between control and relay panel, as required.

<table>
<thead>
<tr>
<th>Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 x 2 Duplex Panel</td>
<td>2521.00</td>
</tr>
<tr>
<td>Duplex Panel</td>
<td>1265.00</td>
</tr>
<tr>
<td>Simplex Panel, DC Panel, RTCC Panel, PLCC Panel, etc.</td>
<td>632.00</td>
</tr>
<tr>
<td>LT Panel</td>
<td>1739.00</td>
</tr>
</tbody>
</table>

7 Erection of Marshalling Kiosk / Line Matching Unit (LMU) / Line Matching & Distribution Unit (LMDU) complete in all respect including transportation from site store to location, placing on foundation / cable trench as per layout, preparing for grouting of foundation bolts but excluding grouting, etc.

<table>
<thead>
<tr>
<th>Description</th>
<th>Nos.</th>
</tr>
</thead>
<tbody>
<tr>
<td>220 KV or 132 KV Marshalling Kiosk</td>
<td>374.00</td>
</tr>
<tr>
<td>33 KV or 11 KV Marshalling Kiosk</td>
<td>192.00</td>
</tr>
</tbody>
</table>
### 8 Erection of Battery Charger

<table>
<thead>
<tr>
<th>Description</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erection of Battery Charger complete in all respect including transportation</td>
<td></td>
</tr>
<tr>
<td>from site store to location, placing on foundation / cable trench as per</td>
<td></td>
</tr>
<tr>
<td>layout, etc.</td>
<td></td>
</tr>
<tr>
<td>i) 220 Volt DC, 400 AH</td>
<td>1265.00</td>
</tr>
<tr>
<td>ii) 110 Volt DC, 200 AH</td>
<td>1265.00</td>
</tr>
<tr>
<td>iii) 48 Volt DC, 600 / 400 / 200 AH</td>
<td>1265.00</td>
</tr>
</tbody>
</table>

### 9 BATTERY SET

#### A. Assembly, erection and commissioning of Lead Acid Battery Set

**Assembly, erection and commissioning of Lead Acid Battery Set including transportation of cells, battery stand, electrolyte, nuts & bolts and accessories from site store to battery room, assembly of wooden stand, placing the cells on stand, making their interconnection, filling of electrolyte, giving two cycle of charge and discharge after initial charging as per procedure recommended by battery manufacturer.**

- **a) If electricity is available & arranged by RVPN without charges.**
  - i) 220 Volt DC, 400 AH Nos. 26285.00
  - ii) 110 Volt DC, 200 AH Nos. 24621.00
  - iii) 48 Volt DC, 600 / 400 / 200 AH Nos. 22875.00
  - iv) Additional cycle of discharge & charge, if required. Each 4576.00

- **b) If electricity is not available & the Contractor is required to arrange diesel generator of appropriate capacity.**
  - i) 220 Volt DC, 400 AH Nos. 91083.00
  - ii) 110 Volt DC, 200 AH Nos. 68125.00
  - iii) 48 Volt DC, 600 / 400 / 200 AH Nos. 46581.00
  - iv) Additional cycle of charge & discharge, if required. Each 9150.00

#### B. Assembly, erection and commissioning of Maintenance Free VRLA type Battery Set

**Assembly, erection and commissioning of Maintenance Free VRLA type Battery Set including transportation of cells, battery stand, nuts & bolts, etc. from site store to battery room, assembly of stand, placing the cells on stand, making their interconnection, initial charging, discharging and final charging as per procedure recommended by battery manufacturer.**

- **a) If electricity is available & arranged by RVPN without charges.**
  - i) 220 Volt DC, 400 AH Nos. 9774.00
  - ii) 110 Volt DC, 200 AH Nos. 8027.00
  - iii) 48 Volt DC, 600 / 400 / 200 AH Nos. 6613.00
  - iv) Additional cycle of charge & discharge, if required. Each 4576.00

- **b) If electricity is not available & the Contractor is required to arrange diesel generator of appropriate capacity.**
  - i) 220 Volt DC, 400 AH Nos. 14182.00
  - ii) 110 Volt DC, 200 AH Nos. 10439.00
  - iii) 48 Volt DC, 600 / 400 / 200 AH Nos. 9024.00
  - iv) Additional cycle of charge & discharge, if required.
### LAYING AND TERMINATION OF CABLES

**A. Control Cables**

i) Laying of P. V. C. insulated unarmoured / armoured control cables of 1.1 KV grade with copper conductor in cable trenches as per specification as required, including transportation of cable drums from site store to locations, laying in cable trenches, cutting to required length, placing them on cable racks / cable trays / cable batten & dressing, including removing and re-fixing trench covers as required, making necessary connections, testing, cable marking on both the terminating ends, etc., as required for all sizes from 2c x 2.5 sq. mm. to 20c x 2.5 sq. mm., 4c x 4 sq. mm. and 4c x 6 sq. mm.

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Unarmoured control cable.</td>
<td>Metres</td>
<td>5.00</td>
</tr>
<tr>
<td>b) Armoured control cable.</td>
<td>Metres</td>
<td>6.00</td>
</tr>
</tbody>
</table>

ii) Fixing of control cables in position with single compression nickel plated brass cable glands confirming to IS: 12943 & having three metal washers and one rubber ring, including preparation of cable and drilling of corresponding holes in gland plates, etc. as required, & including cost of cable glands, for each cable gland of size.

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 19 mm unarmoured control cable</td>
<td>Nos.</td>
<td>44.00</td>
</tr>
<tr>
<td>b) 19 mm armoured control cable</td>
<td>Nos.</td>
<td>49.00</td>
</tr>
<tr>
<td>c) 25 mm unarmoured control cable</td>
<td>Nos.</td>
<td>67.00</td>
</tr>
<tr>
<td>d) 25 mm armoured control cable</td>
<td>Nos.</td>
<td>73.00</td>
</tr>
<tr>
<td>e) 32 mm unarmoured control cable</td>
<td>Nos.</td>
<td>96.00</td>
</tr>
<tr>
<td>f) 32 mm armoured control cable</td>
<td>Nos.</td>
<td>106.00</td>
</tr>
</tbody>
</table>

iii) Termination of wires of cables with copper conductor using copper terminal ends (pin or ring type as required of Dowell’s or equivalent make as approved by the Engineer – In – Charge) duly crimped with crimping tool, including making wire ends ready for crimping, ferruling & dressing of wires, etc., as required, including cost of terminal ends for all wires, for each cable at both ends for cables of the following sizes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 2c x 2.5 sq. mm.</td>
<td>Each</td>
<td>21.00</td>
</tr>
<tr>
<td>b) 3c x 2.5 sq. mm.</td>
<td>Each</td>
<td>32.00</td>
</tr>
<tr>
<td>c) 4c x 2.5 sq. mm.</td>
<td>Each</td>
<td>43.00</td>
</tr>
<tr>
<td>d) 6c x 2.5 sq. mm.</td>
<td>Each</td>
<td>64.00</td>
</tr>
<tr>
<td>e) 10c x 2.5 sq. mm.</td>
<td>Each</td>
<td>106.00</td>
</tr>
<tr>
<td>f) 12c x 2.5 sq. mm.</td>
<td>Each</td>
<td>128.00</td>
</tr>
<tr>
<td>g) 16c x 2.5 sq. mm.</td>
<td>Each</td>
<td>169.00</td>
</tr>
<tr>
<td>h) 18c x 2.5 sq. mm.</td>
<td>Each</td>
<td>191.00</td>
</tr>
</tbody>
</table>

In case all the wires of any cable are not got terminated, then a deduction at the rate of Rs. 4.00 shall be made for each end of the wires not terminated.

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) 4c x 4.0 sq. mm.</td>
<td>Each</td>
<td>57.00</td>
</tr>
<tr>
<td>j) 6c x 4.0 sq. mm.</td>
<td>Each</td>
<td>85.00</td>
</tr>
<tr>
<td>k) 4c x 6.0 sq. mm.</td>
<td>Each</td>
<td>57.00</td>
</tr>
</tbody>
</table>
In case all the wires of any cable are not got terminated, then a deduction at the rate of Rs. 5.00 shall be made for each end of the wires not terminated.

### B. L.T. Power Cables

i) Laying of P. V. C. insulated and P. V. C. sheathed armoured / unarmoured L. T. power cable of 1.1 kV grade with aluminium conductor as per IS: 1255 in ground / cable trench / wall / surface including transportation of cable drums from site store to locations and excavation of 30 cm.* 75 cm. size trenches, providing 25 mm thick under layer of sand & 2nd class brick covering & refilling earth in remaining portion, fixing as per approved / available spacing by means of M. S. U clamps, etc, as per specification as required, including making necessary connections & testing, etc., as required, of the following sizes.

<table>
<thead>
<tr>
<th>Size</th>
<th>Metres</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ½ core x 70 sq. mm.</td>
<td>44.00</td>
<td>85.00</td>
</tr>
<tr>
<td>3 ½ core x 120 sq. mm</td>
<td>44.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 185 sq. mm</td>
<td>53.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 300 sq. mm</td>
<td>53.00</td>
<td></td>
</tr>
</tbody>
</table>

ii) Fixing of power cables in position with single compression, heavy duty nickel plated brass cable glands as per IS: 12943 & having three metal washers and one rubber ring, including preparation of cable and drilling of corresponding holes in gland plate, etc., including cost of cable gland if required, for each end of cable of size.

<table>
<thead>
<tr>
<th>Size</th>
<th>Nos.</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>38 mm. for 3 ½ core x 70 sq. mm. cable with material</td>
<td>116.00</td>
<td></td>
</tr>
<tr>
<td>38 mm. for 3 ½ core x 70 sq. mm. cable without material</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>50 mm. for 3 ½ core x 120 sq. mm. cable with material</td>
<td>169.00</td>
<td></td>
</tr>
<tr>
<td>50 mm. for 3 ½ core x 120 sq. mm. cable without material</td>
<td>22.00</td>
<td></td>
</tr>
<tr>
<td>57 mm. for 3 ½ core x 185 sq. mm. cable with material</td>
<td>241.00</td>
<td></td>
</tr>
<tr>
<td>57 mm. for 3 ½ core x 185 sq. mm. cable without material</td>
<td>37.00</td>
<td></td>
</tr>
<tr>
<td>75 / 76 mm. for 3 ½ core x 300 sq. mm. cable with material</td>
<td>442.00</td>
<td></td>
</tr>
<tr>
<td>75 / 76 mm. for 3 ½ core x 300 sq. mm. cable without material</td>
<td>124.00</td>
<td></td>
</tr>
</tbody>
</table>

iii) Termination of wires of cables with aluminium conductors using ISI marked tubular aluminium terminal ends as per IS: 8309 duly crimped with crimping tool, including making cable ends ready for crimping and providing insulation tape with colour code, dressing of wires, etc., including cost of terminal ends if required, for each end of cable (4 nos. per end) for the following size of cables.

<table>
<thead>
<tr>
<th>Size</th>
<th>Set</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 ½ core x 70 sq. mm. cable with material</td>
<td>233.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 70 sq. mm. cable without material</td>
<td>147.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 120 sq. mm. cable with material</td>
<td>330.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 120 sq. mm. cable without material</td>
<td>198.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 185 sq. mm. cable with material</td>
<td>495.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 185 sq. mm. cable without material</td>
<td>305.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 300 sq. mm. cable with material</td>
<td>820.00</td>
<td></td>
</tr>
<tr>
<td>3 ½ core x 300 sq. mm. cable without material</td>
<td>384.00</td>
<td></td>
</tr>
</tbody>
</table>

### 11 PAINTING OF SUB-STATION EQUIPMENTS AND STEEL STRUCTURES
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Cost (Sq. Mtr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td><strong>Aluminium painting of new steel structures</strong> at the GSS including paint and painting brush, emery paper, cloth &amp; solvent, etc. The surface shall be first rubbed free of dust or any other deposits on erected M. S. steel structures &amp; beams. One coat of red oxide paint shall be applied after carrying out cleaning and allowed to dry. Thereafter two coats of Aluminium paint shall be applied. Each subsequent coat shall be applied only after the previous coat has dried. The paint used shall be out of the following recognized manufacturers only, namely, Asian / Nerolac / Berger / Johnson Nicholson / Dulux.</td>
<td>35.00</td>
</tr>
<tr>
<td>B.</td>
<td><strong>Aluminium painting of old painted steel structures</strong> at the GSS including paint and painting brush, emery paper, cloth &amp; solvent, etc. The surface shall be first rubbed free of dust or any other deposits on erected M.S. steel structures &amp; beams. Two coats of Aluminium paint shall be applied. Each subsequent coat shall be applied only after previous coat has dried. The paint used shall be out of the following recognized manufacturers, namely, Asian / Nerolac / Berger / Johnson Nicholson / Dulux.</td>
<td>26.00</td>
</tr>
<tr>
<td>C.</td>
<td><strong>Enamel painting on power transformers and other associated equipments</strong> using spray painting set, including supply of paint, emery paper, cloth &amp; solvent etc. at GSS by cleaning surfaces thoroughly with soda / caustic solution to clean oily surfaces &amp; thereafter washing with water. Thereafter two coats of smoke grey synthetic enamel paint shall be applied by spray method. Each coat shall be applied only after the previous coat has dried up. The paint used shall be out of the following recognized manufacturers namely, Asian / Nerolac / Berger / Johnson Nicholson / Dulux. In case of surface area of radiators, the fins will only be considered which are only feasible and approachable for painting by spray or by brush.</td>
<td>31.00</td>
</tr>
</tbody>
</table>
RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LTD

OFFICE OF THE SUPERINTENDING ENGINEER (T&C-JAIPUR CITY)
AJMER ROAD, JAIPUR – 302 021.

SECTION – V

SCHEDULES

1. Schedule – I : Schedule of past experience of the bidder in respect of EHV lines or at EHV GSS.

2. Schedule – II : Schedule for Departure from specification.

SECTION-V
SCHEDULE –I

SCHEDULE OF PAST EXPERIENCE OF THE BIDDER IN RESPECT OF EHV GSS

1. Details of orders obtained/executed

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of order placing authority</th>
<th>Order No. &amp; Date</th>
<th>Name of work</th>
<th>Value of Work Order</th>
<th>Date of commencement of the work</th>
<th>Date of completion of work</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

2. In support of above & of meeting the other qualifying requirements, copies of the Work Orders and satisfactory completion reports from the user or Order Placing Authority duly attested are enclosed.

Encl: As above

(Signature)
Name & Designation
With Seal of the firm.
DEPARTURE FROM SPECIFICATION

The tendered shall state under this schedule the departure from the purchaser’s specification in respect of both technical and commercial terms & conditions:-

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Main Deviations from Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Technical Deviations:</td>
</tr>
<tr>
<td>2.</td>
<td>Commercial Deviations:</td>
</tr>
</tbody>
</table>

Certified that we agree to all Technical Specification and Commercial Terms and conditions as laid down in “General Conditions of Contract” except for the deviations to the extent indicated above.

(Signature)
Name & Designation
with Seal of the firm
### SECTION-V

### SCHEDULE-III

Schedule of completion of construction of 06 Nos. New 33 KV Bays at 132 KV GSS, Jawahar Nagar, Jaipur on (labour contract basis).

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of the work</th>
<th>Period of completion</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>construction of 06 Nos. New 33 KV Bays at 132 KV GSS, Jawahar Nagar, Jaipur</td>
<td>4 months</td>
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</tbody>
</table>

(Signature)

Name & Designation

With seal of the firm
With reference to your invitation to the bid against Specification **NO.RVPN/SE/T&C/JPR-City/BN------** we agree to execute the work on Labour contract Basis.

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<tr>
<th>S.No.</th>
<th>Name of work</th>
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1. The percentage variation below / above for the cost of construction of line indicated in price schedule shall also be applicable in case of unit rate items detailed in Schedule-II (For the same work/project).

2. Any increase / decrease in the quantity of individual items mentioned in the price schedule shall be finalized on basis of the actual. The cost of that item shall be increased / decreased in proportion to the % variation.

3. The offer is valid for a period of 90 days after the date of opening of Bid.

5. We confirm that we agree to all the terms and conditions as well as the technical stipulations of your Specification **No.RVPN/SE/T&C/JPR-City/BN-------** and there are no deviations other than as specified in the Schedule of deviations.

Yours faithfully,

(Signature)
Name & Designation with seal of the firm.
CONTRACT AGREEMENT

This Agreement is made at Jaipur this day ……………………….. between the ………………… RRVPNL, Jaipur (herein after called ‘NIGAM’ which expression shall, where the context so admits include its successors and permitted assignees) and M/s. …………………………, (herein after called ‘The Contractor’ which expression shall, where the context so admits include their heirs, executors, administrators and legal representative as well as successors and permitted assignees) are hereby held and firmly bind to the Rajasthan Rajya Vidyut Prasaran Nigam Ltd. to execute the work of: ……………………… to be executed as per rate, terms and conditions of …………………………………………………., awarded by the Nigam as per details given below:

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<tbody>
<tr>
<td>1.</td>
<td>Name of work</td>
</tr>
<tr>
<td></td>
<td>Name of order placing authority/purchaser</td>
</tr>
<tr>
<td>2.</td>
<td>Name of contractor</td>
</tr>
<tr>
<td>3.</td>
<td>Estimated cost</td>
</tr>
<tr>
<td>4.</td>
<td>Earnest Money deposited.</td>
</tr>
<tr>
<td>5.</td>
<td>Security Deposit</td>
</tr>
<tr>
<td>6.</td>
<td>Tentative date of completion</td>
</tr>
<tr>
<td>7.</td>
<td>Work order No. &amp; date</td>
</tr>
</tbody>
</table>

I/ we hereby assure and abide to fulfill all the conditions of the work order referred to above. I/we declare that I/we have read thoroughly and carefully all the terms & conditions, clauses of the work order/Bid specifications (Section- I to IV) and I/we hereby accept & abide with the terms and conditions of the said work order/Bid specifications for execution of the said work. I/we declare that, I/We will be fully responsible for safety of Nigam’s material issued to us for earthing works as well as safety of our workers and confirm that, if any person get injured due to any accident during execution of work, the compensation if any, will be paid by me/us (contractor) and RVPN shall not be responsible in any circumstances.

Signed and delivered by,
Signature of contractor……………………….

Witness:
Signature
Address………………………….

Notary attested:

Accepted on behalf of RVPN.

Superintending Engineer (T&C-City)
RVPN, JAIPUR.
INDEMNITY BOND

Know all men by these presents that we ……………………………………………….(herein after called ‘The Contractor’ which expression shall, where the context so admits include their, heirs, executors, administrators and legal representative as well as successors and permitted assignees) are hereby held and firmly bind to the Rajasthan Rajya Vidyut Prasaran Nigam Ltd. (herein after called ‘NIGAM’ which expression shall, where the context so admits include its successors and permitted assignees) to refund the full amount of owner supplied material made available by the Nigam under the terms and conditions of work order No. …………………………………….. for the work of…………………………………………………… If any loss, damage or deterioration of whatsoever nature occurs to such material which is held by us at our site stores at works site, in trust for and on behalf of the Nigam and or if any of such material or fabricated articles made there from are in inspection by any officer authorized by the Nigam in this behalf are found to be defective and rejected by such officer. We, hereby further bind ourselves that the amount of such refund may be deducted by the Nigam from any sum, which at any time thereafter may become due to us under said work order or any other contract entered into by us with the Nigam.

We bind ourselves firmly by these presents dated ………………………….. and whereas the contractor do hereby agree to be responsible for the safe custody and protection of the said material against all risks (excluding war risks) and against loss, damage and deterioration of whatsoever nature in respect of the said material while it remains in the custody and possession of the sub-contractor / contractor.

AND WHEREAS the said material shall at all-time remains open for inspection by any officer authorized by the Nigam. Now the conditions of the above written bond are such that:

1. The said contractor shall refund the full amount against the material as has been supplied by the Nigam to them in respect of which loss, damage or deterioration of whatsoever nature, except due to circumstances arising out of war has occurred.

2. The contractor shall keep the said material open at any time for inspection by the officers authorized by the Nigam till the said material is utilized by the contractor on the said works and balance / surplus material is deposited with In-charge of the works. If the material account is settled than the above written bond shall be void and of no effects, otherwise the same shall be and remain in full force.

IN WITNESS WHEREOF we the said have hereto signed at Jaipur in the presence of: -

Authorized signatory

Witness:

Sign____________________________
Name____________________________
Address__________________________

Notary attested:
APPENDIX

- **Annexure – A: Compliance with The Code of Integrity and No Conflict of Interest**

Any person participating in a procurement process shall –

(a) not offer any bribe, reward or gift or any material benefit either directly or indirectly in exchange for an unfair advantage in procurement process or to otherwise influence the procurement process;

(b) not misrepresent or omit that misleads or attempts to mislead so as to obtain a financial or other benefit or avoid an obligation;

(c) not indulge in any collusion, Bid rigging or anti – competitive behavior to impair the transparency, fairness and progress of the procurement process;

(d) not misuse any information shared between the procuring Entity and the Bidders with an intent to gain unfair advantage in the procurement process;

(e) not indulge in any coercion including impairing or harming or threatening to do the same, directly or indirectly, to any party or to its property to influence the procurement process;

(f) not obstruct any investigation or audit of a procurement process;

(g) disclose conflict of interest, if any; and

(h) disclose any previous transgressions with any Entity in India or any other country during the last three years or any debarment by any other procuring entity.

**Conflict of Interest:-**

The Bidder participating in a bidding process must not have a conflict of interest.

A conflict of interest is considered to be a situation in which a party has interests that could improperly influence that party’s performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations.

i. A Bidder may be considered to be in conflict of interest with one or more parties in abiding process if, including but not limited to:

   a. have controlling partners/shareholders in common; or
b. receive or have received any direct or indirect subsidy from any of them; or

c. have the same legal representative for purposes of the Bid; or

d. have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bid of another Bidder, or influence the decisions of the Procuring Entity regarding the bidding process; or

e. the Bidder participates in more than one Bid in a bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all Bids in which the Bidders is involved. However, this does not limit the inclusion of the same subcontractor, not otherwise participating as a Bidder, in more than one Bid; or

f. the Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the Goods, Works or Services that are the subject of the Bid; or

g. Bidder or any of its affiliates has been hired (or is proposed to be hired) by the procurement Entity as engineer-in-charge/consultant for the contract.
• Annexure –B: Declaration by the Bidder regarding Qualifications

Declaration by the Bidder

In relation to my/our Bid submitted to...............................................for Contract of.......................................in response to their Notice Inviting Bid No.....................Dated.........................I/we hereby declare under Section 7 of Rajasthan Transparency in Public Procurement Act, 2012 that:

1. I/we possess the necessary professional, technical, financial and managerial resources and competence required by the Bidding Document issued by the Procuring Entity;

2. I/we have fulfilled my/our obligation to pay such of the taxes payable to the union and the State Government or any local authority as specified in the Bidding Document;

3. I/we are not insolvent, in receivership, bankrupt or being wound up, not have my/our affairs administered by a court or a judicial officer, not have my/our business activities suspended and not the subject of the legal proceedings for any of the foregoing reasons;

4. I/we do not have, and our directors and officers not have, been convicted of any criminal offence related to my/our professional conduct or the making of false statements or misrepresentations as to my/our qualifications to enter into procurement contract within a period of three years preceding the commencement of this procurement process, or not have been otherwise disqualified pursuant to debarment proceedings;

5. I/we do not have a conflict of interest as specified in the Act, Rules and the Bidding Document, which materially affects fair competition;

Date:                                                                              Signature of bidder

Place                                                                                Designation:

Name:

Address:
Annexure –C: Grievance Redressal during Procurement process

The designation and address of the First Appellate Authority is as nominated vide order No.RVPN/AAO/F&R/F.98/D.53 dated 30.06.2016.

(1) **Filling an Appeal**

If any Bidder or prospective bidder is aggrieved that any decision, action or omission of the Procuring entity is in contravention to the provisions of the Act or the Rules or the Guidelines issued there under, he may file an appeal to First Appellate Authority, as specified in the Bidding Document within a period of ten days from the date of such decision or action, omissions, as the case may be, clearly giving the specific ground or grounds on which he feels aggrieved:

Provide that after the declaration of a Bidder as successful the appeal may be filed only by a Bidder who has participated in procurement proceedings:

Provided further that in case a Procuring Entity evaluates the Technical Bids before the opening of the Financial Bids, an appeal related to the matter of financial Bids may be filed only by a Bidder whose Technical Bid is found to be acceptable.

(2) The officer to whom an appeal is filled under para (1) shall deal with the appeal as expeditiously as possible and shall endeavour to dispose it of within thirty days from the date of appeal.

(3) If the officer designated under para (1) fails to dispose of the appeal filed within the period specified in para (2), or if the Bidder or prospective bidder or the procuring Entity is aggrieved by the order passed by the First Appellate Authority, the Bidder or prospective bidder or procuring Entity, as the case may be, may file a second appeal to Second Appellate Authority specified in the Bidding Document in this behalf within fifteen days from the expiry of the period specified in para (2) or of the date of receipt of the order passed by the First Appellate Authority, as the case may be.

(4) **Appeal not to lie in certain cases**

No appeal shall lie against any decision of the Procuring Entity relating to the following matters, namely:-

(a) determination of need of procurement;
(b) provisions limiting participation of Bidders in the Bid process;
(c) the decision of whether or not to enter into negotiations;
(d) cancellation of procurement process;
(e) applicability of the provisions of confidentiality.

(5) **Form of Appeal**
(a) An appeal under para (1) or (3) above shall be in the annexed form along with as many copies as there are respondents in the appeal.

(b) Every appeal shall be accompanied by an order appealed against, if any, affidavit verifying the facts stated in the appeal and proof of payment of fee.

(c) Every appeal may be presented to First Appellate Authority or Second Appellate Authority, as the case may be, in person or through registered post or authorized representative.

(6) **Fee of filing Appeal**
(a) Fee of first appeal shall be rupees two thousand five hundred and for second appeal shall be rupees ten thousand, which shall be non-refundable.

(b) The fee shall be paid in the form of bank demand draft or banker’s cheque of the Scheduled Bank in India payable in the name of Appellate Authority concerned.

(7) **Procedure for disposal of Appeal**
(a) The First Appellate Authority or Second Appellate Authority, as the case may be, upon filing of appeal, shall issue notice accompanied by copy of appeal, affidavit and documents, if any, to the respondents and fix date of hearing.

(b) On the date fixed for hearing, the First Appellate Authority or Second Appellate Authority, as the case may be, shall,-

(i) hear all the parties to appeal present before him; and

(ii) peruse or inspect documents, relevant records or copies thereof relating to the matter.

(c) After hearing the parties, perusal or inspection of documents and relevant records or copies thereof relating to the matter, the Appellate Authority concerned shall pass an order in writing and provide the copy of order to the parties to appeal free of cost.

(d) The order passed under sub-clause(c) above shall also be placed on the State Public Procurement Portal.

Annexure –D

FORM No. 1

[See rule 83]

Memorandum of Appeal under the Rajasthan Transparency in
Public Procurement Act, 2012.

Appeal No ………of ……………
Before the ………………………… (First / Second Appellate Authority)
1. Particulars of appellant:
(i) Name of the appellant:
(ii) Official address, if any:
(iii) Residential address:
2. Name and address of the respondent(s):
(i)
(ii)
(iii)
3. Number and date of the order appealed against and name and designation of the officer / authority who passed the order (enclose copy), or a statement of a decision, action or omission of the procuring entity in contravention to the provisions of the Act by which the appellant is aggrieved:
4. If the Appellant proposes to be represented by a representative, the name and postal address of the representative:
5. Number of affidavits and documents enclosed with the appeal:
6. Grounds of appeal:
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........................................................................................................................................................................
........................................................................................................................................................................ (Supported by an affidavit)
7. Prayer:
........................................................................................................................................................................
........................................................................................................................................................................
........................................................................................................................................................................
Place ........................................
Date ........................................
Appellant's Signature
APPENDIX-II

Format of Affidavit for MSME UNIT.

(On non-judicial Stamp Paper of Rajasthan State of appropriate value attested by Notary Public/ First Class Magistrate)

I, S/o Aged Year residing at Proprietor/Partner/Director of M/s. do hereby solemnly affirm and declare that:

(a) My/Our above noted enterprise M/s. has been issued Acknowledgement of Entrepreneurial Memorandum Part-II by the District Industries Center,

. The acknowledgement No. is dated and has been issued for manufacture of following items:

(i)
(ii)
(iii)
(iv)

- My/our above noted acknowledgement of Entrepreneurial Memorandum Part-II has not been cancelled or withdrawn by the Industries Department and that the enterprise is regularly manufacturing the above Items.

- My/our enterprise is having all the requisite plant and machinery and is fully equipped to manufacture the above noted items.

(d) The Present status of the firm is as per acknowledgement of Entrepreneurial Memorandum Part-II issued on date by the District Industries Center, .

Place

Signature of Proprietor/Director

Authorized Signatory with Stamp and date

VERIFICATION

I, S/o Aged Year residing at Proprietor/Partner/Director of M/s. verify and confirm that the
at (a), (b), (c) & (d) above are true and correct to the best of my knowledge and nothing has been concealed therein. So, help me God.

DEPONENT

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After evaluation of the Cover-I Bid, only the qualified bidders whose cover-I bids have been found Techno-Commercial responsive & acceptable will be considered eligible for opening of Cover-II i.e. Price schedule/BOQ on a specified date which shall be intimated later on.

Nigam shall evaluate successful service provider (whose qualifying requirement has been found responsive and acceptable) on the lowest cost to Nigam basis. However Nigam have right to assess the service provider’s capabilities in the overall interest of Nigam. Nigam’s decision in this regard will be final and binding.