



SOUTH CENTRAL RAILWAY

Gati Shakti Unit

TENDER BOOKLET

NAME OF THE WORK

- 1) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Parli vaijnath/Kurduwadi main line for OHE arrangements.**
2) Proposed New Bypass Line at Parli Vaijanath station for connecting Parli vaijnath- Latur Road & Parlivaijnath - Parbhani Main lines for OHE arrangements.

Tender No.C/E /29/GSU/ELEC/03/2026-27
etenderNo.CE- 29-GSU-ELEC-03-2026-27

THE TENDERER SHOULD SIGN (AUTHORISED SIGNATORY ONLY) ON
EACH PAGE OF THE TENDER DOCUMENTS WITH THEIR OFFICE
SEAL/STAMP

WHILE SUBMITTING OFFER

THE OFFER SHALL BE VALID FOR A PERIOD OF
60 DAYS FROM THE DATE OF OPENING OF THE TENDER

THE TENDERER SHALL CAREFULLY STUDY THE TENDER BOOKLET
BEFORE QUOTING HIS OFFER

Issued by
Deputy Chief Electrical Engineer (Gati Shakti)
Secunderabad
Telangana

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CHECK LIST OF DOUCMENTS TO BE SUBMITTED ALONG WITH TENDERS.

(Tenders are requested to give certificates and or put (Tick) mark wherever applicable).

1	Tenderer details	
1.1	Name of the tenderer	
1.2	<p>i. In case of Proprietary Firm: The Tenderer shall submit documents as mentioned in Clause 15 a (iv) of IR GCC APRIL 2022.</p> <p>ii. In case of Partnership Firm: The Tenderer shall submit documents as mentioned in Clause 15 (c) of IR GCC APRIL 2022.</p> <p>iii. In case of JV: The Tenderer shall submit documents as mentioned in Clause 15 (d) and Clause 17 of the Tender Form (Second sheet) of IRSGCC, April-2022 (JV applicable for tenders where the advertised tender value of Rs.10.0 crores and above).</p> <p>iv. In case of Company: The Tenderer shall submit documents as mentioned in Clause 15 (e) of IR GCC APRIL 2022..</p> <p>v. In case of LLP (Limited Liability Partnership): The Tenderer shall submit documents as mentioned in Clause 15 (f) of IR GCC APRIL 2022.</p> <p>vi. Registered Society & Registered Trust: The Tenderer shall submit documents as mentioned in Clause 15 (g) of IR GCC APRIL 2022.</p>	
2	Annexure-I (Tender form First Sheet& second sheet)	
3	Amount towards BID SECURITY Paid	
4	Engineering organization in Annexure “A”	
5	List of plants and machinery in Annexure “B”	
6	List of works completed in Annexure ‘C’	
7	List of works on hand in Annexure “D”	
8	Experience certificate (for works costing above Rs.50 lakhs)	
9	NEFT MANDATE FORM	
10	Registration number of CGST/SGST/IGST/UTGST	
11	Annexure-V& V(A)	
12	Declaration regarding non-blacklisting as per IR GCC APRIL 2022. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract April 2022”.	
13	Registration number of CGST/SGST/IGST/UTGST	
14	Any other information / certificates required as per Tender documents	
15	Total number of annexure submitted (Number of pages)	

Address:

Phone No:

Signature of Tenderer / Contractor

Computerising Primary Information on Input Tax Credits

- A.** Modification in IPAS : As per Draft GST Rules, Tax Invoices, which the supplier/vendor will prefer to the railway, should contain following fields:
- a. Name, address and GST Identification Number (GSTIN) of the supplier of each state,
 - b. Consecutive serial number of the Invoices with a continuity check (This will be a proof for claiming tax credits),
 - c. Date of issues of the invoices,
 - d. Name, address and GSTIN or UIN, if registered, of the recipient (IR),
 - e. Name, address of the recipient and the address of the delivery,
 - f. HSN code (for goods) or Accounting code of service,
 - g. Description of goods or services along with Contract Reference No. and/ or Bill No.,
 - h. Quantity and unit,
 - i. Total value of supply of goods and services/ or services,
 - j. Taxable value of supply of goods and/ or services taking into account discount or abatement, if any,
 - k. Rate of tax (Central GST, State GST, Inter GST, Union Territory GST or cess).
 - l. Amount of tax charged in respect of taxable goods or services (CGST, SGST, IGST, UTGST or cess).
 - m. Place of supply along with the name of state (in case of a supply in the course of inter-state trade or commerce),
 - n. Whether the tax is payable on reverse on charge basis? This field must separately be identified as the recipient of services/ Goods supplied is liable to pay taxes with out adjustments. Credit can be claimed later on.
 - o. Signature or digital signature of the supplier or his authorizes representative.

SOUTH CENTRAL RAILWAY
ELECTRICAL DEPARTMENT
Gati Shakti Unit

Deputy Chief Electrical Engineer –Gati Shakti - Secunderabad acting for and on behalf of The President of India invites E-Tenders against Tender No. **C/E/29/GSU/ELEC/03/2026-27 (etender No. CE-29-GSU-ELEC-03-2026-27)** Closing Date/Time as given in IREPS web site. Bidders will be able to submit their original/revised bids up to closing date and time only. Manual offers are not allowed against this tender, and any such manual offer received shall be ignored. Contractors are allowed to make payments against this tender towards Bid security (EMD) only through payment modes available ON IREPS portal like Net banking, Debit card, Credit card etc. or through Bank Guarantee. Manual payments through Demand draft, Banker cheque, Deposit receipts, FDR etc. are not allowed.

1. NIT HEADER

Contract Type	Works		
Name of Work	1) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Parli vaijnath/Kurduwadi main line for OHE arrangements. 2) Proposed New Bypass Line at Parli Vaijanath station for connecting Parli vaijnath- Latur Road & Parli vaijnath - Parbhani Main lines for OHE arrangements..		
Tender Type	Open	Bidding System	Single Packet System
Tender Closing Date Time	As given in IREPS web site	Date Time Of Uploading Tender	
Pre-Bid Required	No	Pre-Bid Query Date Time	Not Applicable
Advertised Value (Rs.)	8,67,03,005.80/-	Tendering Section	ELECTRICAL/GS
Bidding Style	Single Rate for each shedule	Bidding Unit	
Earnest Money (Rs.)	As given in IREPS web site	Validity of Offer (Days)	60 days
Tender Doc. Cost (Rs.)	Nil	Period of Completion	270 DAYS
Bidding Start Date	As given in the web site	Are joint venture (JV) firms allowed to Bid	No

2. SCHEDULES

Sl.No.	Amount	Amount in words	Bidding Unit
SCH-1 PS1-SCHEDULE-A1: OHE& PSI items	1,24,98,493.50	(Rupees one cores twenty four lakhs ninty eight four hundred ninety three and fifty paisa only)	Above/ Below/At Par
SCH-2 PS1-SCHEDULE-A2: foundation items	81,06,561.00	(Rupees eighty one lakhs six thousand five hundred sixty one only)	Above/ Below/At Par
SCH-3 PS1-SCHEDULE-B1: STEEL items	1,24,18,694.00	(Rupees one cores twenty four lakhs eighteen thousand six hundred ninety four only)	Above/ Below/At Par
SCH-4 PS1-SCHEDULE-B2: COPPER items	12,77,280.00	(Rupees twelve lakhs seventy seven thousand two hundred eighty only)	Above/ Below/At Par
SCH-5 PS1-SCHEDULE-B3 : INSULATOR items	19,30,080.00	(Rupees nineteen lakhs thirty thousand eighty only)	Above/ Below/At Par
SCH-6 PS1-SCHEDULE-B4 : General Supply	23,59,511.00	(Rupees twenty three lakhs fifty nine thousand five hundred eleven only)	Above/ Below/At Par
SCH-7 PS1-SCHEDULE-C : General items.	1,06,093.00	(Rupees one lakhs six thousand ninety three only)	Above/ Below/At Par
SCH-8 PS1-SCHEDULE- D- 2*25 kv items	2,46,186.00	(Rupees two lakhs fourty six thousand one hundred eighty six and fourty eight paisa only)	Above/ Below/At Par
SCH-9 PS1-SCHEDULE-E: Other items NON SOR	83,31,595.00	(Rupees Eighty Three lakhs Thirty One thousand Five hundred ninety Five only)	Above/ Below/At Par
SCH-10 PS-2 SCHEDULE-A1: OHE& PSI items	1,36,42,216.20	(Rupees One crore Thirty six lakhs fourty two thousand two hundred Sixteen and Twenty paisa only)	Above/ Below/At Par
SCH-11 PS-2 SCHEDULE-A2: foundation items	49,57,556.00	(Rupees Forty Nine lakhs Fifty Seven thousand five hundred Fifty Six only)	Above/ Below/At Par
SCH-12 PS-2-SCHEDULE-B1: STEEL items	1,28,60,864.00	(Rupees One Crore twenty Eight lakhs Sixty thousand Eight hundred Sixty Four only)	Above/ Below/At Par
SCH-13 PS-2-SCHEDULE-B2: COPPER items	22,04,050.00	(Rupees Twenty two lakhs four thousand Fifty only)	Above/ Below/At Par
SCH-14 PS-2-SCHEDULE-B3 : INSULATOR items	19,39,301.00	(Rupees Nineteen lakhs Thirty Nine thousand Three hundred One only)	Above/ Below/At Par
SCH-15 PS-2-SCHEDULE-B4 : General Supply	17,36,264.00	(Rupees Seventeen lakhs Thirty Six thousand two hundred sixty Four only)	Above/ Below/At Par
SCH-16 PS-2-SCHEDULE-C : General items.	39,700.00	(Rupees Thirty Nine Thousand Seven Hundred only)	Above/ Below/At Par
SCH-17 PS-2-SCHEDULE-E: Other items NON SOR	20,48,561.00	(Rupees Twenty lakhs Forty Eight thousand Five hundred sixty One only)	Above/ Below/At Par

3. COMPLIANCE

Undertakings

S.No.	Description	Confirmation Required	Remarks Allowed	Documents Uploading
1	I / We have visited the works site and I / We am / are aware of the site conditions.	No	No	Not Allowed
1.1	The tenderer shall go through the tender document attached before submitting his/their offer. No objections will be entertained after opening of the tender.	No	No	Not Allowed

Custom:

S. No.	Description	Confirmation Required	Remarks Allowed	Documents Uploading
1	Declaration regarding non-blacklisting as per IR GCC APRIL 2022. (included in Annex V)	Yes	No	Allowed (Mandatory)
2	Annexure-V & V(A) (Both formats for certificate to be submitted / uploaded by tenderer along with the tender documents) IR GCC APRIL 2022 Note: annexure VA is not required in case of Proprietor firm.	Yes	No	Allowed (Mandatory)
3	Attested copy of Experience Certificate in Annexure E	Yes	No	Allowed (Mandatory)
4	Annexure -VIB (For works costing above Rs.50 lakhs): Attested copy of certificate showing contractual amount received during the last three financial years and current financial year	Yes	No	Allowed (Mandatory)
5	Any other information / Certificates required as per Tender document for Partnership deed, Article of association, MOU, Proprietary firm, Power of Attorney (backed by resolution) etc. as per IR GCC APRIL 2022	Yes	No	Allowed (Mandatory)
6	Engineering Organization in Annexure- A	Yes	No	Allowed (Optional)
7	List of plants and machinery in Annexure- B	Yes	No	Allowed (Optional)
8	List of works completed in Annexure -C	Yes	No	Allowed (Optional)
9	List of works on hand with tenderer in Annexure- D	Yes	No	Allowed (Optional)

10	NEFT Mandate Form	Yes	No	Allowed (Optional)
11	Check List of Documents to be Submitted along with Tender	Yes	No	Allowed (Optional)

Note: Mandatory documents should be submitted along with the Tender, failing which the tender will be rejected.

4. Documents attached with tender:

S. No.	Document Name	Document Description
1	Tender form, Tender details, offer letter, GCC & Terms & Conditions including special conditions of contract.pdf	Particulars of BID SECURITY, PG & SD, Penalty clauses, Guarantee clause etc.
2	Schedule of Rates & Quantities.pdf	Work schedules
3	Explanatory Notes.pdf	Detailed description of work item wise as per schedule
4	Annexures.pdf	Annexure
5	Specifications	Specifications
6	Tender Document. pdf	Total Tender Document comprising all the above including specifications etc

Signed By: Y. SRITEJA
Designation: Dy.CEE/GS/SC

SOUTH CENTRAL RAILWAY

TENDER FORM (First Sheet)

Tender No. **C/E /29/GSU/ELEC/03-2026-27**(etenderNo.**CE-29-GSU-ELEC-03-2026-27**)

Name of the work:

1) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Parli vaijnath/Kurduwadi main line for OHE arrangements.2) Proposed New Bypass Line at Parli Vaijanath station for connecting Parli vaijnath- Latur Road & Parli vaijnath - Parbhani Main lines for OHE arrangements.

To

The President of India

Acting through the South-Central Railway

1. I/We _____ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this offer open for acceptance for a period of _____ days from the date fixed for closing of the tender and in default thereof, I/We will be liable for forfeiture of my/our “Bid Security”. I/We offer to do the work for _____ Railway, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within _____ months from the date of issue of letter of acceptance of the tender.

2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions/Specifications, Standard Schedule of Rates (SSOR) with all correction slips up-to-date for the present contract.

3. A Bid Security of ₹ _____ has already been deposited online/ submitted as Bank Guarantee bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:

- (a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;
- (b) I/We do not execute the contract documents within seven days after receipt of notice issued by the Railway that such documents are ready; and
- (c) I/We do not commence the work within fifteen days after receipt of orders to that effect.

4. (a) I/We am/are a Startup firm registered by Department of Industrial Policy and Promotion (DIPP) and my registration number is valid upto (Copy enclosed) and hence exempted from submission of Bid Security.

5. We are a Labour Cooperative Society and our Registration No. is withand hence required to deposit only 50% of Bid Security.

6. Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.

Signature of Witnesses:

(1) _____

(2) _____

Signature of Tenderer(s)

Date _____

Address of the Tenderer(s)

TENDER FORM (Second Sheet)

1. Instructions to Tenderers and Conditions of Tender: The following documents form part of Tender / Contract:

(a) Tender Forms – First Sheet and Second Sheet

(b) Special Conditions/Specifications (enclosed)

(c) Bill(s) of quantities (enclosed)

(d) Standard General Conditions of Contract and Standard Specifications (Works and Materials) of Indian Railways as amended/corrected upto latest correction slips, copies of which can be seen in the office of _____ or obtained from the office of the Chief Engineer, _____ Railway on payment of prescribed charges.

(e) Standard Schedule of Rates (SSOR) as amended / corrected upto latest correction slips, copies of which can be seen in the office of _____ or obtained from the office of the Chief Engineer, _____ Railway on payment of prescribed charges.

(f) All general and detailed drawings pertaining to this work which will be issued by the Engineer or his representatives (from time to time) with all changes and modifications.

2. Drawings for the Work: The Drawing for the work can be seen in the office of the Dy.CEE/GS/SC at any time during the office hours. The drawings are only for the guidance of Tenderer(s). Detailed working drawings (if required) based generally on the drawing mentioned above, will be given by the Engineer or his representative from time to time.

3. The Tenderer(s) shall quote his / their rates as a percentage above or below the Standard Schedule of Rates (SSOR) of _____ Railway as applicable to _____ Division except where he/they are required to quote item rates and must tender for all the items shown in the Bill(s) of Quantities attached. The quantities shown in the attached Bill(s) of Quantities are given as a guide and are approximate only and are subject to variation according to the needs of the Railway. The Railway does not guarantee work under each item of the Bill(s) of Quantities. The tenderer(s) shall quote rates / rebates only at specified place in Tender Form supplied by Railway. Any revision of rates / rebates submitted (quoted) through a separate letter whether enclosed with the bid (Tender Form) or submitted separately or mentioned elsewhere in the document other than specified place shall be summarily ignored and will not be considered.

4. Tenders containing erasures and / or alterations of tender documents are liable to be rejected. Any correction made by tender(s) in his/their entries must be attested by him / them.

5. The works are required to be completed within a period of _____ months from the date of issue of acceptance letter.

6. Bid Security:

(a) Subject to exemptions provided under para 5(1) (a) of Part-1 (ITT) of General Conditions of contract, April 2022, the tender must be accompanied by a Bid Security as mentioned in tender documents, failing which the tender shall be summarily rejected.

(b) The Tenderer(s) shall keep the offer open for a minimum period of 60 days (in case of two packet system of tendering 90days) from the date of closing of the Tender. It is understood that the tender documents have been issued to the Tenderer(s) and the Tenderer(s), is / are permitted to tender in consideration of the stipulation on his / their part that after submitting his / their tender subject to the period being extended further, if required by mutual agreement from time to time, he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to _____ Railway. Should the tenderer fail to observe or

comply with the foregoing stipulation, the amount deposited or Bank guarantee bond submitted as Bid Security for the due performance of the above stipulation, shall be forfeited to the Railway.

- (c) If his tender is accepted,
- (i) the Bid Security mentioned in sub para(a) above deposited in cash through e-payment gateway will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract;
 - (ii) the Bid Security mentioned in sub para(a) above submitted as Bank guarantee bond, will be encashed as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract.

The Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation to the Bid Security that may happen thereto while in their possession, nor be liable to pay interest thereon.

- (d) In case Contractor submits the Term Deposit Receipt/Bank Guarantee Bond towards either the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security so retained as per sub para(c) above, to the Contractor.

- (e) In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:

(i) A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal (IREPS) while applying to the tender.

(ii) The original Bank Guarantee should be delivered in person to the OS/GS/SC within 5 working days before closing date for submission of bids.(i.e, excluding the last date of submission of bids)

(iii) Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal(IREPS) and/or non submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.

(iv) The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.

(v) The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected.

(vi) The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification "Bid for the 1) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Parli vajinath/Kurduwadi main line for OHE arrangements.2) Proposed New Bypass Line at Parli Vajinath station for connecting Parli vajinath- Latur Road & Parli vajinath - Parbhani Main lines for OHE arrangements. and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.

(vii) The envelope shall be addressed to the officer and address as mentioned in the tender document.

(viii) If the envelope is not sealed and marked as instructed above, the Railway assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

7. Care in Submission of Tenders: The tenderers shall submit a copy of certificate stating that all their statements/documents submitted alongwith bid are true and factual. Standard format of certificate to be submitted by the bidder is enclosed as Annexure-V. In addition to Annexure-V, In case of other than Company/Proprietary firm, Annexure- V(A) shall also be submitted by the each member of a Partnership firm/ Joint Venture (JV)/ Hindu Undivided Family (HUF)/ Limited Liability Partnership (LLP) etc. as the case may be. Non submission of above certificate by the bidder shall result in **summarily** rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self attested/digitally signed by which they/he is qualifying the Qualifying Criteria mentioned in the Tender Document.

8. Rights of the Railway to deal with Tender: The authority for the acceptance of the tender will rest with the Railway. It shall not be obligatory on the said authority to accept the lowest tender or any other tender, and tenderer(s) shall neither demand any explanation for the cause of rejection of his/ their tender nor the Railway to assign reasons for declining to consider or reject any particular tender or tenders.

9. If the tenderer(s) deliberately gives / give wrong information in his / their tender or creates / create circumstances for the acceptance of his / their tender, the Railway reserves the right to reject such tender at any stage.

10. If any partner(s) of a partnership firm expires after the submission of its tender or after the acceptance of its tender, the Railway shall deem such tender as cancelled/contract as terminated under clause 61 of the Standard General Conditions of Contract, unless the firm retains its character as per partnership agreement. If a sole proprietor expires after the submission of tender or after the acceptance of tender, the Railway shall deem such tender as cancelled / contract as terminated under clause 61 of the Standard General Conditions of Contract.

11.0 Eligibility Criteria :

11.1 The tenderer should have valid Electrical Contractors License Grade "A" / 33kV or above issued by Govt. Electrical License Board (OR) the site Supervisor should possess necessary "A" Grade / 33kV or above License issued by a Government Licensing Authority to carryout works of appropriate voltage. The license should have been issued on a date prior to date of tender opening. A copy of valid license shall be submitted with the offer. Offer without valid license shall be summarily rejected.

11.2 Technical and Financial credentials are required for tenders having advertised value above Rs 50 lakhs.

11.3(i) Technical Eligibility Criteria: (a) The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

(i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or

(ii) Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or

(iii) One similar work costing not less than the amount equal to 60% of advertised value of the tender.

Note: Similar nature of works means As per CEDE/SCR/SC's letter No.E.252/Tr.D/Policy/VII dated 04.09.2025 which is enclosed in Documents attached with tender documents.

Definition of Similar nature of work for tender: As the tender cost is above Rs.50.0 lakhs, eligibility criteria defining the similar nature of work arises as "Erection, testing and commissioning of 25 kV Overhead Electric Equipment in Railways.

(OR)

Construction and commissioning of transmission line of 66kV or above voltage of requisite value as per the technical eligibility criteria. In addition tenderer shall also have experience of having

energized 25 kV OHE work of at least 10 TKM or 20% of TKM involved in instant tender whichever is higher from single completed or ongoing work either as separate additional work or as a part of transmission line work produced to satisfy technical eligibility criteria.

(OR)

Provision or modification to sub-stations/switching stations/switch gear equipment, control and protection equipment, reactors, power factor correction equipment, transformers or any other power equipment in 25 kV Railway Substations/Switching stations or any work pertaining to 66kV and above Electrical sub-station of any PSU/Govt. agencies. In addition, tenderer shall also have experience of having energized 25 kV OHE work of at least 10 TKM or 20 % of TKM involved in instant tender whichever is higher from single completed or ongoing work either as separate additional work or as a part of above Substations/Switching stations work produced to satisfy technical eligibility criteria.”

(b) (1) In case of tenders for composite works (e.g. works involving more than one distinct component, such as Civil Engineering works, S&T works, Electrical works, OHE works etc. and in the case of major bridges – substructure, superstructure etc.), tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:

(i) Three similar works each costing not less than the amount equal to 30% of advertised value of each component of tender, or

(ii) Two similar works each costing not less than the amount equal to 40% of advertised value of each component of tender, or

(iii) One similar work each costing not less than the amount equal to 60% of advertised value of each component of tender.

Note for b(1): Separate completed works of minimum required values shall also be considered for fulfillment of technical eligibility criteria for different components.

(b)(2) In such cases, what constitutes a component in a composite work shall be clearly pre-defined with estimated tender cost of it, as part of the tender documents without any ambiguity.

(b) (3) To evaluate the technical eligibility of tenderer, only components of work as stipulated in tender documents for evaluation of technical eligibility, shall be considered. The scope of work covered in other remaining components shall be either executed by tenderer himself if he has work experience as mentioned in clause 7 of the Standard General Conditions of Contractor through subcontractor fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract or jointly i.e., partly himself and remaining through subcontractor, with prior approval of Chief Engineer in writing.

However, if required in tender documents by way of Special Conditions, a formal agreement duly notarized, legally enforceable in the court of law, shall be executed by the main contractor with the subcontractor for the component(s) of work proposed to be executed by the subcontractor(s), and shall be submitted along with the offer for considering subletting of that scope of work towards fulfilment of technical eligibility. Such subcontractor must fulfill technical eligibility criteria as follows:

The subcontractor shall have successfully completed at least one work similar to work proposed

for subcontract, costing not less than 35% value of work to be subletted, in last 5 years, ending last day of month previous to the one in which tender is invited through a works contract.

Note: for subletting of work costing up to Rs 50 lakhs, no previous work experience of subcontractor shall be asked for by the Railway.

In case after award of contract or during execution of work it becomes necessary for contractor to change subcontractor, the same shall be done with subcontractor(s) fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract, with prior approval of Chief Engineer in writing.

Note for Item 11.3(ii): Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organization, work experience certificate issued by Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/registered at least 5 years prior to the date of closing of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates. In case of non submission of such certificates, tender will be summarily rejected.

In case tenderer submits work experience certificate issued by public listed company, the tenderer shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.

(a) For Works without composite components

The technical eligibility for the work as per para 10.1 above, shall be satisfied by either the 'JV in its own name & style' or 'Lead member of the JV'.

Each other (non-lead) member(s) of JV, who is/ are not satisfying the technical eligibility for the work as per para 10.1 above, shall have technical capacity of minimum 10% of the cost of work i.e., each non-lead member of JV member must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum off 10% of advertised value of the tender.

(b) For works with composite components The technical eligibility for major component of work as per para 10.1 above, shall be satisfied by either the 'JV in its own name & style' or 'Lead member of the JV' and technical eligibility for other component(s) of work as per para 10.1 above, shall be satisfied by either the 'JV in its own name & style' or 'any member of the JV'. Each other(non-lead) member(s)of JV, who is/are not satisfying the technical eligibility for any component of the work as per-par 10.1 above, shall have technical capacity of minimum 10% of the cost of any component of work mentioned in technical eligibility criteria. i.e., each other (non-lead) member of must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum- of 10% of cost of any component of work mentioned in technical eligibility criteria.

Note for Para 17.15.1:

a) The major component of the work for this purpose shall be the component of work having

highest value. In cases where value of two or more component of work is same, any one work can be classified as Major component of work.

b) Value of a completed work done by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above-mentioned technical eligibility criteria in the tender under consideration.

11.4. Financial Eligibility Criteria: The tenderer must have minimum average annual contractual turnover of V/N or V whichever is less; where

V= Advertised value of the tender in crores of Rupees

N= Number of years prescribed for completion of work for which bids have been invited.

The average annual contractual turnover shall be calculated as an average of 'total contractual payments' in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.

The tenderers shall submit requisite information as per Annexure-VIB, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet

11.5. Bid Capacity: The tender/technical bid will be evaluated based on bid capacity formula detailed as Annexure-VI of GCC April 2022.

11.6 Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under:

The conversion rate of US Dollars into Rupees shall be the daily representative exchange rates published by the Reserve Bank of India or entity authorized by RBI to do so for the relevant date or immediately previous date for which rates have been published. Where, relevant date shall be as on the last day of month previous to the one in which tender is invited. In case of any other currency, the same shall first be converted to US Dollars as on the last day of month previous to the one in which tender is invited, and the amount so derived in US Dollars shall be converted into Rupees at the aforesaid rate. The conversion rate of such currencies shall be the daily representative exchange rates published by the International Monetary Fund for the relevant date or immediately previous date for which rates have been published.

[Explanation for Para 10 of the Tender Form (Second Sheet) including Para 10.1 to 10.5 - Eligibility Criteria:

1. Substantially Completed Work means an ongoing work in which payment equal to or more than 90% of the present contract value (excluding the payment made for adjustment of Price variation (PVC), if any) has been made to the contractor in that ongoing contract and no proceedings of termination of contract on Contractor's default has been initiated. The credential certificate in this regard should have been issued not prior to 60 days of date of invitation of present tender.
2. In case a work is started prior to 07 (seven) years, ending last day of month previous to the one in which tender is invited, but completed in last 07 (seven) years, ending last day of month previous to the one in which tender is invited, the completed work shall be considered for fulfillment of credentials.
3. If a work is physically completed and completion certificate to this extent is issued by the concerned organization but final bill is pending, such work shall be considered for fulfillment

of credentials

4. In case of completed work, the value of final bill (gross amount) including the PVC amount (if paid) shall be considered as the completion cost of work. In case final bill is pending, only the total gross amount already paid including the PVC amount (if paid) shall be considered as the completion cost of work.

In case of substantially completed work, the total gross amount already paid including the PVC amount (if paid), as mentioned in the certificate, shall be considered as the cost of substantially completed work.

5. If a bidder has successfully completed a work as subcontractor and the work experience certificate has been issued for such work to the subcontractor by a Govt. Organization or public listed company as defined in Note for Item 10.1 Para 10 of the Tender Form (Second Sheet), the same shall be considered for the purpose of fulfillment of credentials.
6. In case a work is considered similar in nature for fulfillment of technical credentials, the overall cost including the PVC amount (if paid) of that completed work or substantially completed work, shall be considered and no separate evaluation for each component of that work shall be made to decide eligibility.
7. In case of newly formed partnership firm, the credentials of individual partners from previous propriety firm(s) or dissolved previous partnership firm(s) or split previous partnership firm(s), shall be considered only to the extent of their share in previous entity on the date of dissolution / split and their share in newly formed partnership firm. For example, a partner A had 30% share in previous entity and his share in present partnership firm is 20%. In the present tender under consideration, t
8. he credentials of partner A will be considered to the extent of $0.3 \times 0.2 \times \text{value of the work done in the previous entity}$. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.
9. In case of existing partnership firm, if any one or more partners quit the partnership firm, the credentials of remaining partnership firm shall be re-worked out i.e., the quitting partner(s) shall take away his credentials to the extent of his share on the date of quitting the partnership firm(e.g. in a partnership firm of partners A, B & C having share 30%, 30% & 40% respectively and credentials of Rs 10 crore; in case partner C quits the firm, the credentials of this partnership firm shall remain as Rs 6 crore). For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deed(s), dissolution deed(s) and proof of surrender of PAN No.(s) in case of dissolution of partnership firm(s) etc.
10. In case of existing partnership firm if any new partner(s) joins the firm without any modification in the name and PAN/TAN no. of the firm, the credentials of partnership firm shall get enhanced to the extent of credentials of newly added partner(s) on the same principles as mentioned in item 6 above. For this purpose, the tenderer shall submit along with his bid all the relevant documents which include copy of previous partnership deeds, dissolution/splitting deeds and proof of surrender of PAN No.(s) in case of dissolution of partnership firm etc.
11. Any partner in a partnership firm cannot use or claim his credentials in any other firm without leaving the partnership firm i.e., In a partnership firm of A&B partners, A or B partner cannot use credentials of partnership firm of A&B partners in any other partnership firm or propriety firm without leaving partnership firm of A&B partners.

12. In case a partner in a partnership firm is replaced due to succession as per succession law, the proportion of credentials of the previous partner will be passed on to the successor.
13. If the percentage share among partners of a partnership firm is changed, but the partners remain the same, the credentials of the firm before such modification in the share will continue to be considered for the firm as it is without any change in their value. Further, in case a partner of partnership firm retires without taking away any credentials from the firm, the credentials of partnership firm shall remain the same as it is without any change in their value.
14. In a partnership firm “AB” of A&B partners, in case A also works as propriety firm “P” or partner in some other partnership firm “AX”, credentials of A in propriety firm “P” or in other partnership firm “AX” earned after the date of becoming a partner of the firm AB shall not be added in partnership firm AB.
15. In case a tenderer is LLP, the credentials of tenderer shall be worked out on above lines similar to a partnership firm.
16. In case company A is merged with company B, then company B would get the credentials of company A also.

12. Tenderer Credentials:

Documents testifying tenderer previous experience and financial status should be produced alongwith the tender.

Tenderer(s) who is / are not borne on the approved list of the Contractors of _____ Railway shall submit alongwith his / their tender:

- (i) Certificates and testimonials regarding contracting experience for the type of job for which tender is invited with list of works carried out in the past.
- (ii) Audited Balance Sheet duly certified by the Chartered Accountant regarding contractual payments received in the past.
- (iii) The list of personnel / organization on hand and proposed to be engaged for the tendered work. Similarly list of Plant & Machinery available on hand and proposed to be inducted and hired for the tendered work.
- (iv) A copy of certificate stating that they are not liable to be disqualified and all their statements/documents submitted alongwith bid are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V. In addition to Annexure-V, in case of other than Company/Proprietary firm, Annexure- V(A) shall also be submitted by the each member of a Partnership firm/ joint Venture (JV)/ Hindu Undivided Family (HUF)/ Limited Liability Partnership (LLP) etc. as the case may be. Non submission of a copy of certificate by the bidder shall result in summarily rejection of his/their bid. It shall be mandatorily incumbent upon the tenderer to identify, state and submit the supporting documents duly self attested/ digitally signed by which they/he are/is qualifying the Qualifying Criteria mentioned in the Tender Document.
- (v) The Railway reserves the right to verify all statements, information and documents submitted by the bidder in his tender offer, and the bidder shall, when so required by the Railway, make available all such information, evidence and documents as may be necessary for such verification. Any such verification or lack of such verification, by the Railway shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any

rights of the Railway there under.

- (vi) (a) In case of any information submitted by tenderer is found to be false, forged or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Bid Security besides banning of business for a period of upto five years.
- (b) In case of any information submitted by tenderer is found to be false, forged or incorrect after the award of contract, the contract shall be terminated. Bid Security, Performance Guarantee and Security Deposit available with the railway shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and agency shall be banned for doing business for a period of upto five years.

13. Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.

14. Execution of Contract Documents: The successful Tenderer(s) shall be required to execute an agreement with the President of India acting through the _____, _____ Railway for carrying out the work according to the Standard General Conditions of Contract, Special Conditions / Specifications annexed to the tender and Standard Specifications (Works and Materials) of Railway as amended/corrected upto latest correction slips, mentioned in tender form (First Sheet).

15.0 DOCUMENTS TO BE SUBMITTED ALONG WITH TENDER

(i) The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Joint Venture (JV) / Registered Society / Registered Trust / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern, and copy of PAN Card along with their tender. Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be.

(ii) Following documents shall be submitted by the tenderer:

(a) Sole Proprietorship Firm:

All documents in terms of Para 10 of the Tender Form (Second Sheet) of GCC April 2022

(b) HUF:

- (i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.
- (ii) All other documents in terms of Para 10 of the Tender Form (Second Sheet) above. Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V(A).

(c) Partnership Firm:

All documents mentioned in para No.18 of IR GCC April 2022 of Tender form (second sheet). Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V (A).

(d) Joint Venture (JV): All documents as mentioned in para No.17 of IR GCC April 2022 of

Tender form (second sheet).Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V (A).

(e) **Company registered under Companies Act2013:**

- (i) The copies of **MOA (Memorandum of Association) / AOA (Articles of Association)** of the company
- (ii) A copy of Certificate of Incorporation
- (iii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.
All other documents in terms Para 10 of the Tender Form (Second Sheet) above.

(f) **LLP (Limited Liability Partnership):**

- (i) A copy of LLP Agreement
- (ii) A copy of Certificate of Incorporation
- (iii) A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf of the LLP and create liability against the LLP.
- (iv) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.
All other documents in terms of Para 10 of the Tender Form (Second Sheet).Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V (A).

(g) **Registered Society & Registered Trust:**

- (i) A copy of Certificate of Registration
- (ii) A copy of Memorandum of Association of Society/Trust Deed
- (iii) A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust.
- (iv) A copy of Rules & Regulations of the Society
All other documents in terms of Para 10 of the Tender Form (Second Sheet) above.Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V (A).

(iii) If it is NOT mentioned in the submitted tender that tender is being submitted on behalf of a Sole Proprietorship firm / Partnership firm / Joint Venture / Registered Company etc., then the tender shall be treated as having been submitted by the individual who has signed the tender.

(iv) After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society / HUF/LLP etc. shall be neither asked nor considered, if submitted. Further, no suo moto cognizance of any document available in public domain (i.e., on internet etc.) or in Railway's record/office files etc. will be taken for consideration of the tender, if no such mention is available in tender offer submitted.

(v) A tender from JV shall be considered only where permissible as per the tender conditions.

(vi) The Railway will not be bound by any change of power of attorney or in the composition of the firm made subsequent to the submission of tender. Railway may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be

chargeable to the Contractor.

16.0 The tenderer whether sole proprietor / a company or a partnership firm / joint venture (JV) / registered society / registered trust / HUF / LLP etc if they want to act through agent or individual partner(s), should submit along with the tender, a copy of power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, specifically authorizing him/them to sign the tender, submit the tender and further to deal with the Tender/ Contract up to the stage of signing the agreement except in case where such specific person is authorized for above purposes through a provision made in the partnership deed / Memorandum of Understanding / Article of Association /Board resolution, failing which tender shall be summarily rejected.

A separate power of attorney duly stamped and authenticated by a Notary Public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person, shall be submitted after award of work, specifically authorizing him/them to deal with all other contractual activities subsequent to signing of agreement, if required

Note: A Power of Attorney executed and issued overseas, the document will also have to be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney is being issued. However, the powers of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalized by the Indian Embassy if it carries a conforming Apostille certificate.

17. Employment/Partnership etc. of Retired Railway Employees:

Details given in para No16 of IR GCC April 2022 of Tender form (second sheet):

18.0 Participation of Partnership Firms in works tenders:

18.1 The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act. Partnership firms shall fulfill other conditions as per Para No.18.2 to 18.11 of IR GCC April 2022 of Tender form (second sheet)

GENERAL CONDITIONS OF CONTRACT

- 1.0 **“Indian Railways Standards General Conditions of Contract, April ‘2022”** governing the performance of the works covered by this Tender “Standard General Conditions of Contract” in use in General in the South Central Railway” as amended time to time. A copy of the booklet incorporating the above General Conditions of the Contract uploaded separately.
- 2.0 In submitting this letter it would be deemed that the Tenderer has kept himself fully informed of the provisions of the Indian Railways Standards General Conditions of Contract, April – 2022 including all corrections and amendments issued up to the date of Tender Notice.
- 3.0 Any changes in the GCC issued by Rly. Board from time to time will applicable during the currency of contract

NOTE:-

- 1) The contract shall be governed by IRS conditions as applicable. All the terms and conditions in the tender are also equally applicable.

Terms & Conditions

1.0 GENERAL:

- i Name of the work: 1) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Parli vaijnath/Kurduwadi main line for OHE arrangements.2) Proposed New Bypass Line at Parli Vaijanath station for connecting Parli vaijnath- Latur Road & Parli vaijnath - Parbhani Main lines for OHE arrangements.
- ii The Tenderer is hereby advised to thoroughly go through the Tender Booklet and may also ascertain the nature & quantum of work involved and the prevailing working conditions before submission of his offer.
- Iii The submission of the tender will be deemed to imply that this memorandum and all documents enclosed have been studied and understood and that the Tenderer is aware of the full scope of the work to be done besides terms and conditions.
- iv In all matters of dispute, the decision of the Deputy Chief Electrical Engineer (Gati Shakti), Secunderabad Division, S.C.Railway, Secunderabad shall be final.
- V Tender should be submitted for the entire work.
- Vi It shall not be obligatory on the said authority to accept the lowest tender and no tenderer / tenderers shall demand any explanation for the cause of rejection of his / their tender. Further it shall not be obligatory on the said authority to award contract to a single tenderer for the entire work. The said work may be bifurcated and awarded to more than one tenderer in the interest of the Railways.
- vii If the tenderer expires after the submission of his tender or after the acceptance of his tender, the Railway shall deem such tender as cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender, the Railway shall deem such tender as cancelled, unless the firm retains its charter.
- viii The authority for acceptance of the Tender will rest with the Dy.CEE/GS/SC, South Central Railway, Secunderabad who does not bind himself to accept the lowest or any other tender nor does he undertake to assign reasons for declining to consider any particular tender or tenders. **Railway has the right to summarily reject the offer, which does not fulfill the Eligibility criteria as per the tender conditions.**
- ix Should the Railway decide to negotiate with a view to bring down the rates, the tenderer called for negotiations should furnish the following form of declaration before commencement of the negotiations.

2.0 TENDER ON WEB SITE:

Tender conditions / other particulars are available in the Tender Documents on IREPS website at “ireps.gov.in” which can be downloaded, can be participated and can view any modifications if any.

3.0 VALIDITY OF OFFER:

The offer of the Tender shall be valid for a minimum period of **60 days** from the date of tender opening

4.0 TENDER VALUE :

Tender value is ₹8,67,03,005.8/-(Rupees Eight crores Sixty Seven lakhs three thousand and five and Eighty paisa Only). The rates quoted by the tenderer should be firm and no variation/conditions shall be accepted. The offer shall be filled up on line in the SCHEDULE OF RATES & QUANTITY of tender booklet with percentage at par / below / above as indicated therein.

The tenderers shall be required to submit scanned copy through on line, the relevant documents failing which, their offer will be liable to be rejected.

5.0 OFFICER INCHARGE :

Deputy Chief Electrical Engineer – Gati Shakti - Secunderabad
Assistant Divisional Electrical Engineer -Maint-Secunderabad/or any other officer assigned by
DY.CEE/GS/SC

5.1 NOMINATED SUPERVISORS :

Junior Engineer/Senior Section Engineer - Gati Shakti –Secunderabad

6.0 DURATION OF THE CONTRACT PERIOD:

- (i) The contract shall be in force for a period of **270 days** from the date of issue of letter of acceptance.
- (ii) If during the course of contract, the administration feels that it is not necessary to continue the contract due to administrative reasons, the contract stands foreclosed with immediate effect without assigning any reasons.

7.0 SECURITY DEPOSIT:

(1) Security Deposit: The Security Deposit shall be 5% of the contract value. The Bid Security submitted by the Contractor with his tender will be retained/encashed by the Railways as part of security for the due and faithful fulfillment of the contract by the Contractor. Provided further that, if Contractor submits the Cash or Term Deposit Receipt issued from a Scheduled commercial bank of India or irrevocable Bank Guarantee Bond from a Scheduled commercial bank of India, either towards the Full Security Depositor the Part Security Deposit equal to or more than Bid Security, the Railway shall return the Bid Security, to the Contractor.

Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled commercial bank of India or irrevocable Bank Guarantee bond issued from Scheduled commercial bank of India, or may be recovered at the rate of 6% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the

Railway may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.

The Irrevocable Bank Guarantee submitted towards Security deposit shall be initially valid up to the stipulated date of Maintenance period plus 60 days and shall be extended from time to time, depending upon extension of contract granted in terms of Clause 17A and 17B of the Standard General Conditions of Contract.

Note: Security Deposit deposited in cash by the Contractor or recovered from the running bills of a Contractor or submitted by contractor as Term Deposit Receipt(s) can be refunded/returned to the contractor, in lieu of irrevocable Bank Guarantee bond issued from scheduled commercial bank of India, to be submitted by him, for an amount equal to or more than the already available Security Deposit, provided however that, in a contract of value less than Rs. 50 Crore, such refund/ return of the already available Security Deposit is permitted up to two times and in a contract of value equal to or more than Rs. 50 Crore, such refund / return of the already available Security Deposit is permitted up to three times.

7 (2) (i) Refund of Security Deposit: Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor along with or after, the following:

- (a) Final Payment of the Contract as per clause 51.(1) of IRSGCC April 2022 **and**
- (b) Execution of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor **and**
- (c) Maintenance Certificate issued, on expiry of the maintenance period as per clause 50.(1) of IRSGCC April 2022, in case applicable.

7. (2) (ii) Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause 62 (1) of these conditions, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 62 (1) of IRSGCC April 2022, the Security Deposit shall not be forfeited.

7.(3) No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 16.(4)(b) of this clause will be payable with interest accrued thereon.

8.0 PERFORMANCE GUARANTEE:

The procedure for obtaining Performance Guarantee is outlined below

- (a) The successful bidder shall have to submit a Performance Guarantee (PG) within 21 (Twenty one) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 21 (Twenty one) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 12% per annum shall be charged for the delay beyond 21(Twenty one) days, i.e. from 22nd day after the date of issue of LOA. Further, if the 60th day happens to be a declared holiday in the concerned office of the Railway, submission of PG can be accepted on the next working day.

In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit Bid Security and other dues

payable against that contract. In case a tenderer has not submitted Bid Security on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.

The failed Contractor shall be debarred from participating in re-tender for that work.

- (b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% (Subject to revision from time to time) of the contract value:
 - (i) A deposit of Cash;
 - (ii) Irrevocable Bank Guarantee;
 - (iii) Government Securities including State Loan Bonds at 5% below the market value;
 - (iv) Deposit Receipts, Pay Orders, Demand Drafts and Guarantee Bonds. These forms of Performance Guarantee could be either of the State Bank of India or of any of the Nationalized Banks;
 - (v) Guarantee Bonds executed or Deposits Receipts tendered by all Scheduled Banks;
 - (vi) Deposit in the Post Office Saving Bank;
 - (vii) Deposit in the National Savings Certificates;
 - (viii) Twelve years National Defence Certificates;
 - (ix) Ten years Defence Deposits;
 - (x) National Defence Bonds and
 - (xi) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of FA&CAO (free from any encumbrance) may be accepted.
- (c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.
- (d) The value of PG to be submitted by the Contractor will not change for variation upto 25% (either increase or decrease). In case during the course of execution, value of the contract increases by more than 25% of the original contract value, an additional Performance Guarantee amounting to 5% (five percent) for the excess value over the original contract value shall be deposited by the Contractor. On the other hand, if the value of contract decreases by more than 25% of the original contract value, Performance Guarantee amounting to 5% (five percent) of the decrease in the contract value shall be returned to the Contractor. The PG amount in excess of required PG for decreased contract value, available with Railways, shall be returned to Contractor as per his request duly safeguarding the interest of railways
- (e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.
- (f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed in addition to forfeiture of Security Deposit available with railway.

- (g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:
- (i) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.
 - (ii) Failure by the Contractor to pay President of India any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
 - (iii) The Contract being determined or rescinded under clause 62 of the GCC

9.0 Force Majeure Clause: If at any time, during the continuance of this contract, the performance in whole or in part by either party of any obligation under this contract shall be prevented or delayed by reason of any war, hostility, acts of public enemy, civil commotion, sabotage, serious loss or damage by fire, explosions, epidemics/pandemics, strikes, lockouts or acts of God (hereinafter, referred to events) provided, notice of the happening of any such event is given by either party to the other within 30 days from the date of occurrence thereof, neither party shall by reason of such event, be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non-performance or delay in performance, and works under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Engineer as to whether the works have been so resumed or not shall be final and conclusive, PROVIDED FURTHER that if the performance in whole or in part of any obligation under this contract is prevented or delayed by reason of any such event for a period exceeding 120 days, either party may at its option terminate the contract by giving notice to the other party.

9-A Extension of Time in Contracts: Subject to any requirement in the contract as to completion of any portion or portions of the works before completion of the whole, the Contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date. Details of extension due to different the clauses are mentioned in item No.17(A)(i) (ii), (iii) & 17B of Part II of IR GCC April 2022 with amendments if any.

9-C-Commencement of Works: The Contractor shall commence the works within 15 days after the receipt by him of an order in writing to this effect from the Engineer and shall proceed with the same with due expedition and without delay

10A. Deployment of Qualified Engineers at Work Sites by the Contractor:

10. A.1 The Contractor shall also employ qualified Graduate Engineer(s) or equivalent, or qualified Diploma Engineer(s), as prescribed in the tender documents.

10A.2 In case the Contractor fails to employ the Engineer, as aforesaid in Para 10.A.1, he shall be liable to pay liquidated damages at the rates, as prescribed in the tender documents.

10A.3 No. of qualified Engineers required to be deployed by the Contractor for various activities

contained in the works contract shall be specified in the tender documents as 'Special Condition of Contract'.

11.(1) Workmanship and Testing: The whole of the works and/or supply of materials specified and provided in the contract or that may be necessary to be done in order to form and complete any part thereof shall be executed in the best and most substantial workman like manner with materials of the best and most approved quality of their respective kinds, agreeable to the particulars contained in or implied by the specifications and as referred to in and represented by the drawings or in such other additional particulars, instructions and drawings given during the carrying on of the works and to the entire satisfaction of the Engineer according to the instructions and directions which the Contractors may from time to time receive from the Engineer. The materials may be subjected to tests by means of such machines, instruments and appliances as the Engineer may direct and wholly at the expense of the Contractor.

11.(2) Removal of Improper Work and Materials: The Engineer or the Engineer's Representative shall be entitled to order from time to time:

(a) The removal from the site, within the time specified in the order, of any materials which in his opinion are not in accordance with the specifications or drawings.

(b) The substitution of proper and suitable materials, and

(c) the removal and proper re-execution, notwithstanding any previous tests thereof or on account payments therefore, of any work which in respect of materials or workmanship is not in his opinion in accordance with the specifications and in case of default on the part of the Contractor in carrying out such order, the Railway shall be entitled to rescind the contract under Clause 62 of these conditions.

(d) The provision of Construction and Demolition Waste Management Rule 2016 issued by Ministry of Environment Forest and Climate Change dated 29.03.2016 and published in the Gazette of India, Part – II, Section -3, Sub-section (ii) are binding upon the Contractor. Contractor shall implement these provisions at worksites, for which no extra payment will be payable.

12.0 AGREEMENT:

The successful tenderer have to execute an agreement with the Railways for executing the work as Tendered and accepted by Railways within stipulated time from the date of issue of letter of acceptance, failure to do so may constitute a breach of the agreement effected by the acceptance of the tender in which case, the earnest money accompanying the tender may be forfeited by the Railways as liquidated damages for such default. In the event as "Tenderer whose tender is accepted & refuse to execute the contract documents within the stipulated period, the Railway may deter that the tenderer has abandoned the contract and upon his Acceptance has to forfeit the earnest money as liquidated damages for such default. Performance guarantee should also be submitted within this time limit and valid till the expiry of maintenance period.

The Tenderer should sign one copy of the General conditions of contract (form enclosed) as a token of acceptance at the time of executing the agreement.

13.0 Bid Security: Details furnished in para 5 of Part I of IR GCC April 2022.

14.0 **FAILURE TO PERFORM:**

If the Contractor fails in the performance of the contract, South Central Railway may without prejudice to his other rights, cancel the contract or a portion thereof and Railway shall be entitled to forfeit PG, BID SECURITY & SD as per the provision of GCC.

- A. The rates quoted in “schedule of rates and quantities” shall be inclusive of ED & other applicable taxes etc., The Railway will also recover other applicable taxes viz., IT, education cess, building cess etc., for all the payments being made.
- B. All the Bidders/Tenderers should ensure that they are GST compliant and their quoted tax structure / rates are as per GST law.

C. CARE IN SUBMISSION OF TENDER (RB Ir No 2017/CE-I/CT/4/GST dt 23/06/17 or latest)

- (a) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works, are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in the Indian Railways Standard General conditions of Contract Nov18. For the completion of works to the entire satisfaction of the Engineer.
- (b) Tenderers will examine the provisions of the Central Goods and Services Tax Act, 2017 (CGST)/ Integrated Goods and Services Tax Act, 2017 (IGST)/ Union Territory Goods and Services Tax Act, 2017/respective state's State Goods and Services Tax Act (SGST) also as notified by Central/State Govt and as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax credit (ITC) like to be availed by them is duly considered while quoting rates.
- (c) The successful tenderers who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to Railway immediately after the award of contract without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.
- (d) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/SGST Act, the Railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.

15.0 **EMPLOYMENT OF ENGINEERING GRADUATE/DIPLOMA HOLDERS**

The Contractor is required to employ the Engineers / Diploma holders as indicated below:

Contract Value	No. of Engineer/Diploma holders to be employed	Duration
Between 25.0 lakhs to 2.0 crores	One qualified Diploma holder Engineer	Duration of the contract
2.0 crores and above	One qualified graduate Engineer	Duration of the contract

16.0 Variations in extent of contract, Powers of Modification to Contract, Claims, Measurements & certificates :

As per details furnished from Para 41 to 45 of part II of IRS GCC-April'2022)

17.0 PAYMENT TERMS :

- i. On completion of each item of work or part of any item in Schedule on agreed items, the Contractor shall be due for payments to the extent of 100% of the prices for supply and erection included in schedule. Payment will be made based on Schedule rates for the various items of Schedule items, loaded with the percentage quoted by the contractor for schedule items.

The payment will be arranged to the contractor on submission of bills.

In respect of the above claim, the following documentation is to be invariably adhered to

- a. Work done statement shall be prepared by the contractor and submitted to the nominated Railway supervisor for completed portion of work for which the payment is claimed duly signed by the contractor as well as nominated Railway supervisor.
 - b. Based on the work done statement, measurements will be recorded in the Measurement Book (MB) by the Nominated Railway supervisor.
- ii. Certified that the 20% check conducted against the work undertaken and found satisfactory (this should be done by the concerned ADEE/DEE.)

18.0 PAYING AUTHORITY:

The paying authority for this contract is PFA/C/SC/SCR.

- 19.0** The Tender should comply with latest Labour commissioner rules issued from Time to Time.

LABOUR

54. Wages to Labour: The Contractor shall be responsible to ensure compliance with the provision of the Minimum Wages Act, 1948 (hereinafter referred to as the "said Act") and the Rules made thereunder in respect of any employees directly or through petty Contractors or sub-contractors employed by him for the purpose of carrying out this contract. If, in compliance with the terms of the contract, the Contractor supplied any labour to be used wholly or partly under the direct orders and control of the Railways whether in connection with any work being executed by the Contractor or otherwise for the purpose of the Railway such labour shall, for the purpose of this Clause, still be deemed to be persons employed by the Contractor. GCC April 2022 87 If any moneys shall, as a result of any claim or application made under the said Act be directed to be paid by the Railway, such money shall be deemed to be moneys payable to the Railway by the Contractor and on failure by the Contractor to repay the Railway any moneys paid by it as aforesaid within seven days after the same shall have been demanded, the Railways shall be entitled to recover the same from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

54-A. Apprentices Act: The Contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act, 1961 and the Rules and Orders issued thereunder from time to time in respect of apprentices directly or through petty Contractors or sub-contractors employed by him for the purpose of carrying out the Contract. If the Contractor directly or through petty Contractors or sub-contractors fails to do so, his failure will be a breach of the contract and the

Railway may, in its discretion, rescind the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

55. Provisions of Payments of Wages Act: The Contractor shall comply with the provisions of the Payment of Wages Act, 1936 and the rules made thereunder in respect of all employees employed by him either directly or through petty Contractors or sub-contractors in the works. If in compliance with the terms of the contract, the Contractor directly or through petty Contractors or sub-contractors shall supply any labour to be used wholly or partly under the direct orders and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer, such labour shall nevertheless be deemed to comprise persons employed by the Contractor and any moneys which may be ordered to be paid by the Engineer shall be deemed to be moneys payable by the Engineer on behalf of the Contractor and the Engineer may on failure of the Contractor to repay such money to the Railways deduct the same from any moneys due to the Contractor in terms of the contract. The Railway shall be entitled to recover the same from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India all moneys paid or payable by the Railway by way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of the Engineer upon any question arising out of the effect or force of this Clause shall be final and binding upon the Contractor.

55-A. Provisions of Contract Labour (Regulation and Abolition) Act, 1970:

55-A.(1) The Contractor shall comply with the provision of the contract labour (Regulation and Abolition) Act, 1970 and the Contract labour (Regulation and Abolition) Central Rules 1971 as modified from time to time, wherever applicable and shall also indemnify the Railway from and against any claims under the aforesaid Act and the Rules.

55-A.(2) The Contractor shall obtain a valid license under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid license until the completion of the work. Any failure to fulfill the requirement shall attract the penal provision of the Act.

55-A.(3) The Contractor shall pay to the labour employed by him directly or through subcontractors the wages as per provision of the aforesaid Act and the Rules wherever applicable. The GCC April 2022 88 Contractor shall notwithstanding the provisions of the contract to the contrary, cause to be paid the wages to labour, indirectly engaged on the works including any engaged by sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

55-A.(4) In respect of all labour directly or indirectly employed in the work for performance of the Contractor's part of the contract, the Contractor shall comply with or cause to be complied with the provisions of the aforesaid Act and Rules wherever applicable.

55-A.(5) In every case in which, by virtue of the provisions of the aforesaid Act or the rules, the Railway is obliged to pay any amount of wages to a workman employed by the Contractor or his subcontractor in execution of the work or to incur any expenditure on account of the contingent, liability of the Railway due to the Contractor's failure to fulfill his statutory obligations under the aforesaid Act or the rules, the Railway will recover from the Contractor, the amount of wages so paid or the amount of expenditure so incurred and without prejudice to the rights of the Railway under the Section 20, Sub-Section (2) and Section 2, Sub-Section (4) of the aforesaid Act, the Railway shall be at liberty to recover such amount or part thereof from Contractor's bills/Security

Deposit or any other dues of Contractor with the Government of India. The Railway shall not be bound to contest any claim made against it under Sub-Section (1) of Section 20 and Sub-Section (4) of Section 21 of the aforesaid Act except on the written request of the Contractor and upon his giving to the Railway full security for all costs for which the Railway might become liable in contesting such claim. The decision of the Chief Engineer regarding the amount actually recoverable from the Contractor as stated above shall be final and binding on the Contractor.

55-B. Provisions of Employees Provident Fund and Miscellaneous Provisions Act, 1952: The Contractor shall comply with the provisions of Para 30 & 36-B of the Employees Provident Fund Scheme, 1952; Para 3 & 4 of Employees' Pension Scheme, 1995; and Para 7 & 8 of Employees Deposit Linked Insurance Scheme, 1976; as modified from time to time through enactment of "Employees Provident Fund & Miscellaneous Provisions Act, 1952", wherever applicable and shall also indemnify the Railway from and against any claims under the aforesaid Act and the Rules.

55-C (i) Contractor is to abide by the provisions of various labour laws in terms of above clause 54, 55, 55-A and 55-B of the Standard General Conditions of Contract. In order to ensure the same, an application has been developed and hosted on website 'www.shramikkalyan.indianrailways.gov.in'. Contractor shall register his firm/company etc. and upload requisite details of labour and their payment in this portal. These details shall be available in public domain. The registration/ updation in Portal shall be done as under:

(a) Contractor shall apply for onetime registration of his company/firm etc. in the Shramikkalyan portal with requisite details subsequent to issue of Letter of Acceptance. Engineer shall approve the contractor's registration in the portal within 7 days of receipt of such request.

(b) Contractor once approved by any Engineer, can create password with login ID (PAN No.) for subsequent use of portal for all Letter of Acceptances (LoAs) issued in his favour.

(c) The contractor once registered on the portal, shall provide details of his Letter of Acceptances (LoAs) / Contract Agreements on shramikkalyan portal within 15 days of issue GCC April 2022 89 of any LoA for approval of concerned Engineer. Engineer shall update (if required) and approve the details of LoA filled by contractor within 7 days of receipt of such request.

(d) After approval of LoA by Engineer, contractor shall fill the salient details of contract labours engaged in the contract and ensure updating of each wage payment to them on shramikkalyan portal on monthly basis.

(e) It shall be mandatory upon the contractor to ensure correct and prompt uploading of all salient details of engaged contractual labour & payments made thereof after each wage period.

(ii) While processing payment of any 'On Account Bill' or 'Final Bill' or release of 'Advances' or 'Performance Guarantee / Security Deposit', contractor shall submit a certificate to the Engineer or Engineer's representatives that "I have uploaded the correct details of contract labours engaged in connection with this contract and payments made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' till ____Month, ____Year."

55-D. Provisions of "The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996" and "The Building and Other Construction Workers' Welfare Cess Act, 1996": The tenderers, for carrying out any construction work, shall get themselves registered with the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and Rules made thereto by the concerned State Govt., and submit Certificate of Registration issued by Registering Officer of the concerned State Govt. (Labour Dept.). The Cess shall be deducted from contractor's bills as per provisions of the Act.

56. Reporting of Accidents: The Contractor shall be responsible for the safety of all employees

directly or through petty Contractors or sub-contractor employed by him on the works and shall report serious accidents to any of them however and wherever occurring on the works to the Engineer or the Engineers Representative and shall make every arrangement to render all possible assistance.

57. Provision of Workmen's Compensation Act: In every case in which by virtue of the provisions of Section 12 Sub-Section (1) of the Workmen's Compensation Act 1923, Railway is obliged to pay compensation to a workman directly or through petty Contractor or sub-contractor employed by the Contractor in executing the work, Railway will recover from the Contractor the amount of the compensation so paid, and, without prejudice to the rights of Railway under Section 12 Sub-section (2) of the said Act, Railway shall be at liberty to recover such amount or any part thereof from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India. Railway shall not be bound to contest any claim made against it under Section 12 Sub-Section (1) of the said Act except on the written request of the Contractor and upon his giving to Railway full security for all costs for which Railway might become liable in consequence of contesting such claim.

57-A. Provision of Mines Act: The Contractor shall observe and perform all the provisions of the Mines Act, 1952 or any statutory modifications or re-enactment thereof for the time being in force GCC April 2022 90 and any rules and regulations made thereunder in respect of all the persons directly or through the petty Contractors or sub-contractors employed by him under this contract and shall indemnify the Railway from and against any claims under the Mines Act, or the rules and regulations framed thereunder, by or on behalf of any persons employed by him or otherwise.

58. Railway not to Provide Quarters for Contractors: No quarters shall normally be provided by the Railway for the accommodation of the Contractor or any of his staff employed on the work. In exceptional cases where accommodation is provided to the Contractor at the Railway's discretion, recoveries shall be made at such rates as may be fixed by the Railway for the full rent of the buildings and equipments therein as well as charges for electric current, water supply and conservancy.

59.(1) Labour Camps: The Contractor shall at his own expense make adequate arrangements for the housing, supply of drinking water and provision of latrines and urinals for his staff and workmen, directly or through the petty Contractors or sub-contractors and for temporary creche (Bal-Mandir) where 50 or more women are employed at a time. Suitable sites on Railway land, if available, may be allotted to the Contractor for the erection of labour camps, either free of charge or on such terms and conditions that may be prescribed by the Railway. All camp sites shall be maintained in clean and sanitary conditions by the Contractor at his own cost.

59.(2) Compliance to Rules for Employment of Labour: The Contractor(s) shall conform to all laws, bye-laws rules and regulations for the time being in force pertaining to the employment of local or imported labour and shall take all necessary precautions to ensure and preserve the health and safety of all staff employed directly or through petty contractors or sub-contractors on the works.

59.(3) Preservation of Peace: The Contractor shall take requisite precautions and use his best endeavours to

(i) Prevent any riotous or unlawful behaviour by or amongst his workmen and other employed directly or through the petty Contractors or sub-contractors on the works and for the preservation of peace and protection of the inhabitants and

(ii) Security of property in the neighbourhood of the works. In the event of the Railway requiring the maintenance of a Special Police Force at or in the vicinity of the site during the tenure of works, the expenses thereof shall be borne by the Contractor and if paid by the Railway shall be recoverable from the Contractor.

59.(4) Sanitary Arrangements: The Contractor shall obey all sanitary rules and carry out all sanitary measures that may from time to time be prescribed by the Railway Medical Authority and permit inspection of all sanitary arrangements at all times by the Engineer, the Engineer's Representative or the Medical Staff of the Railway. Should the Contractor fail to make the adequate sanitary arrangements, these will be provided by the Railway and the cost thereof recovered from the Contractor.

59.(5) Outbreak of Infectious Disease: The Contractor shall remove from his camp such labour and their families as refuse protective inoculation and vaccination when called upon to do so by the Engineer or the Engineer's Representative on the advice of the Railway Medical Authority. Should cholera, plague, or other infectious disease break out, the Contractor shall burn the huts, beddings, GCC April 2022 91 clothes and other belongings of or used by the infected parties and promptly erect new huts on healthy sites as required by the Engineer, failing which within the time specified in the Engineer's requisition, the work may be done by the Railway and the cost thereof recovered from the Contractor.

59.(6) Treatment of Contractor's Staff in Railway Hospitals: The Contractor and his staff, other than labourers and their families requiring medical aid from the railway hospital and dispensaries will be treated as private patients and charged accordingly. The Contractors' labourers and their Families will be granted free treatment in railway hospitals and dispensaries where no other hospitals or dispensaries are available provided the Contractor pays the cost of medicines, dressing and diet money according to the normal scale and additional charges for special examinations such as pathological and bacteriological examination, X-Ray, etc. and for surgical operation.

59. (7) Medical Facilities at Site: The Contractor shall provide medical facilities at the site as may be prescribed by the Engineer on the advice of the Railway Medical Authority in relation to the strength of the Contractor's resident staff and workmen.

59. (8) Use of Intoxicants: The sale of ardent spirits or other intoxicating beverages upon the work or in any of the buildings, encampments or tenements owned, occupied by or within the control of the Contractor or any of his employees shall be forbidden and the Contractor shall exercise his influence and authority to the utmost extent to secure strict compliance with this condition.

59.(9) Restrictions on the Employment of Retired Engineers of Railway Services Within One Year of their Retirement: The Contractor shall not, if he is a retired Government Engineer of Gazetted rank, himself engage in or employ or associate a retired Government Engineer of Gazetted rank, who has not completed one year from the date of retirement, in connection with this contract in any manner whatsoever without obtaining prior permission of the President and if the Contractor is found to have contravened this provision it will constitute a breach of contract and administration will be entitled to terminate the contract and forfeit his Performance Guarantee as well as Security Deposit.

60.(1) Non-Employment of Labourers below the age of 15: The Contractor shall not employ children below the age of 15 as labourers directly or through petty Contractors or sub-contractors for the execution of work.

60.(2) Medical Certificate of Fitness for Labour: It is agreed that the Contractor shall not employ a person above 15 and below 19 years of age for the purpose of execution of work under the contract unless a medical certificate of fitness in the prescribed form (Proforma at Annexure-VIII) granted to him by a certifying surgeon certifying that he is fit to work as an adult, is obtained and kept in the custody of the Contractor or a person nominated by him in this behalf and the person carries with him, while at work; a token giving a reference to such certificate. It is further agreed that the responsibility for having the adolescent examined medically at the time of appointment or periodically till he attains the age of 19 years shall devolve entirely on the Contractor and all the expenses to be incurred on this account shall be borne by him and no fee shall be charged from the adolescent or his parent for such medical examination.

60.(3) Period of Validity of Medical Fitness Certificate: A certificate of fitness granted or renewed for the above said purposes shall be valid only for a period of one year at a time. The GCC April 2022 92 certifying surgeon shall revoke a certificate granted or renewed if in his opinion the holder of it, is no longer fit for work in the capacity stated therein. Where a certifying surgeon refuses to grant or renew a certificate or revoke a certificate, he shall, if so required by the person concerned, state his reasons in writing for doing so.

60.(4) Medical Re-Examination of Labourer: Where any official appointed in this behalf by the Ministry of Labour is of the opinion that any person employed in connection with the execution of any work under this contract in the age group 15 to 19 years is without a certificate of fitness or is having a certificate of fitness but no longer fit to work in the capacity stated in the certificate, he may serve on the Contractor, or on the person nominated by him in this regard, a notice requiring that such persons shall be examined by a certifying surgeon and such person shall not if the concerned official so directs, be employed or permitted to do any work under this contract unless he has been medically examined and certified that he is fit to work in the capacity stated in the certificate.

20.0 ACCIDENTS:

The tenderer shall indemnify and keep the Purchaser / Consignee indemnified and harmless against all actions, suits, claims, demands, costs, charges or expenses arising in connection with any death or injury sustained by any person or persons within the Railway premises and any loss or damage to Railway property sustained due to the acts or omission of the tenderer's his agents or his staff during the execution of this contract irrespective of whether such liability arises under the Workman's Compensation act, or Fatal Accident Act or Factory Act or Payment of Wages Act or any other statute in force for the time being.

SAFETY MEASURES:

The tenderer shall take all precautionary measures in order to ensure the protection of his own personnel moving or working on the Railway premises, but shall then confirm to the rules and regulations of the Railway. All safety equipment to be made available to his personnel during execution of work in the Railway premises.

The tenderer should abide by all Railway regulations in force from time to time and ensure that the same are followed by his representatives, agents or subcontractor or workmen

The tenderer should ensure that unauthorized, careless or inadvertent operation of installed equipment which may result in accident to staff and / or damage to equipment does not occur.

If at any time the works to be carried out directly concern the safety of trains, the tenderer's staff must comply fully with Railway regulations given to him by the authorized Railway staff. The tenderer's employees and workers may for no reason operate an installation concerning train safety or train movement. They shall notify the authorized representative of the purchaser/ consignee who will take all necessary steps in this regard.

22.0 DETERMINATION OF CONTRACT :

61.(1) Right of Railway to Determine the Contract: The Railway shall be entitled to determine and terminate the contract at any time should, in the Railway's opinion, the cessation of work becomes necessary owing to paucity of funds or from any other cause whatever, in which case the value of approved materials at site and of work done to date by the Contractor will be paid for in full at the rate specified in the contract. Notice in writing from the Railway of such determination and the reasons therefor shall be conclusive evidence thereof.

61.(2) Payment on Determination of Contract: Should the contract be determined under sub clause (1) of this clause and the Contractor claims payment for expenditure incurred by him in the expectation of completing the whole of the work, the Railways shall admit and consider such claims as are deemed reasonable and are supported by vouchers to the satisfaction of the Engineer. The Railway's decision on the necessity and propriety of such expenditure shall be final and conclusive.

61.(3) The Contractor shall have no claim to any payment of compensation or otherwise, howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of determination of contract.

62.(1) Determination of Contract owing to Default of Contractor:

If the Contractor should:

- (i) Becomes bankrupt or insolvent, or GCC April 2022 93
- (ii) Make an arrangement for assignment in favour of his creditors, or agree to carry out the contract under a Committee of Inspection of his creditors, or
- (iii) Being a Company or Corporation, go into liquidation (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or
- (iv) Have an execution levied on his goods or property on the works, or
- (iv) Assign the contract or any part thereof otherwise than as provided in Clause 7 of

these Conditions, or

(vi) Abandon the contract, or

(vii) Persistently disregard the instructions of the Engineer, or contravene any provision of the contract, or

(viii) Fail to adhere to the agreed programme of work by a margin of 10% of the stipulated period, or

(ix) Fail to Execute the contract documents in terms of Para 8 of the Instructions to Tenderers.

(x) Fail to submit the documents pertaining to identity of JV and PAN in terms of Para 17.11 of Tender Form (Second Sheet) of Annexure I available in the Instructions to Tenderers.

(xi) Fail to remove materials from the site or to pull down and replace work after receiving from the Engineer notice to the effect that the said materials or works have been condemned or rejected under Clause 25 and 27 of these Conditions, or

(xii) Fail to take steps to employ competent or additional staff and labour as required under Clause 26 of these Conditions, or

(xiii) Fail to afford the Engineer or Engineer's representative proper facilities for inspecting the works or any part thereof as required under Clause 28 of these Conditions, or

(xiv) Promise, offer or give any bribe, commission, gift or advantage either himself or through his partner, agent or servant to any officer or employee of the Railway or to any person on his or on their behalf in relation to the execution of this or any other contract with this Railway.

(xv) Fail to adhere to the provisions of Para 16 of Tender Form (Second Sheet) of Annexure I of the Instructions to Tenderers, or provision Clause 59(9) of these Conditions.

(xvi) Submits copy of fake documents / certificates in support of credentials, submitted by the tenderer

Then and in any of the said Clause, the Engineer on behalf of the Railway may serve the Contractor with a notice (Proforma at Annexure-IX) in writing to that effect and if the Contractor does not within seven days after the delivery to him of such notice proceed to make good his default in so far as the same is capable of being made good and carry on the work or comply with such directions as aforesaid of the entire satisfaction of the Engineer, the Railway shall be entitled after giving 48 hours' notice (Proforma at Annexure-X or XII, as the case may be) in writing under the hand of the Engineer to rescind the contract as a whole or in part or parts (as may be specified in such notice) and after expiry of 48 hours' notice, a final termination notice (Proforma at Annexure-XI or XIII, as the case may be) should be issued.

Note: Engineer at his discretion may resort to the part termination of contract with notices (Proforma at Annexure- IX, XII and XIII), only in cases where progress of work is more than or equal to 80% of the original scope of work. GCC April 2022 94

62.(2) Right of Railway after Rescission of Contract owing to Default of Contractor: In the event of any or several of the courses, referred to in Sub-Clause (1) of this Clause, being adopted:

(a) The Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and Contractor shall not be entitled to recover or be paid any sum for any work thereto for actually performed under the contract unless and until the Engineer shall have certified the performance of such work and the value payable in respect thereof and the Contractor shall only be entitled to be paid the value so certified.

(b) In the contract which has been rescinded as a whole, the Security Deposit already with railways under the contract shall be encashed/ forfeited and the Performance Guarantee already submitted for the contract shall be encashed. The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then

every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.

Further the authorized representative of failed Contractor cannot be accepted as authorized representative in new contract.

(c) In the contract rescinded in part or parts,

(i) The full Performance Guarantee available for the contract shall be recovered. No additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract. The contract value of part terminated contract stands reduced to the balance value of work under the contract.

(ii) The Security Deposit of part terminated contract shall be dealt as per clause 16(2) of these Conditions.

(iii) The defaulting Contractor shall not be issued any completion certificate for the contract.

(iv) The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.

(v) Further the authorized representative of failed Contractor will not be accepted as authorized representative in new contract.

(d) The Engineer or the Engineer's Representative shall be entitled to take possession of any materials, tools, implements, machinery and buildings on the works or on the property on which these are being or ought to have been executed, and to retain and employ the same in the further execution of the works or any part thereof until the completion of the works without the Contractor being entitled to any compensation for the use and employment thereof or for wear and tear or destruction thereof. GCC April 2022 95

(e) The Engineer shall as soon as may be practicable after removal of the Contractor fix and determine ex-parte or by or after reference to the parties or after such investigation or enquiries as he may consider fit to make or institute and shall certify what amount (if any) had at the time of rescission of the contract been reasonably earned by or would reasonably accrue to the Contractor in respect of the work then actually done by him under the contract and what was the value of any unused, or partially used materials, any constructional plant and any temporary works upon the site. The legitimate amount due to the Contractor after making necessary deductions and certified by the Engineer should be released expeditiously.

23.0 SETTLEMENT OF DISPUTES – INDIAN RAILWAY ARBITRATION AND CONCILIATION RULES 63.

Conciliation of Disputes:

- (i) This clause is applicable in the tender having advertised value less than or equal to Rs 50 Crore.
- (ii) All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the "Chief Engineer" or "Divisional Railway Manager" through "Notice of Dispute" provided that no such notice shall be served later than 30 days after the date of issue of Completion Certificate by the Engineer. Chief Engineer or Divisional Railway Manager shall, within 30 days after receipt of the Contractor's "Notice of Dispute", notify the name of conciliator(s) to the Contractor.
- (iii) The Conciliator(s) shall assist the parties to reach an amicable settlement in an

- independent and impartial manner within the terms of contract.
- (iv) If the parties reach agreement on a settlement of the dispute, they shall draw up and sign a written settlement agreement duly signed by Engineer In-charge, Contractor and conciliator(s). When the parties sign the settlement agreement, it shall be final and binding on the parties.
 - (v) The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.
 - (vi) The conciliation proceedings shall be terminated as per Section 76 of 'The Arbitration and Conciliation Act, 1996.

63.1 Matters Finally Determined by the Railway: All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the GM and the GM shall, within 120 days after receipt of the Contractor's representation, make and notify decisions on all matters referred to by the Contractor in writing provided that matters for which provision has been made in Clauses 7(j), 8, 18, 22(5), 39.1, 39.2, 40A, 43(2), 45(i)(a), 55, 55-A(5), 57, 57A, 61(1), 61(2), 62(1), 63(iv) and 63.2.11 of the Standard General Conditions of Contract or in any Clause (stated as excepted matter) of the Special Conditions of the Contract, shall be deemed as 'excepted matters' (matters not arbitrable) and GCC April 2022 96 decisions of the Railway authority, thereon shall be final and binding on the Contractor; provided further that 'excepted matters' shall stand specifically excluded from the purview of the Dispute Adjudication Board (DAB) and Arbitration.

63.2 Dispute Adjudication Board (DAB): This clause is applicable in the tender having advertised value more than Rs 50 Crore.

63.2.1 Any dispute/s if not settled with the Engineer, shall be referred to DAB. The DAB shall consist of a panel of three Retired Railway Officers, retired not below senior administrative grade (SAG). The DAB shall be formed within 90 days of signing of Contract Agreement. For this purpose, a panel of DAB members shall be maintained in the General Manager's office. The complete panel, which shall not be less than five members, shall be sent by Chief Engineer to the Contractor to nominate one member of the DAB from the panel as Contractor's nominee within two weeks of receipt of the panel. On receipt of Contractor's nominee, the Chief Engineer shall nominate one member from the same panel as Railway nominee for the DAB. Both above nominees shall jointly select presiding member of the DAB from the same panel.

63.2.2 The appointment of DAB shall be effectuated by way of a tri-partite agreement among the Railway, Contractor and the respective DAB members. The terms of the remuneration of each member shall be as fixed by Ministry of Railways from time to time. Each party shall be responsible for paying one-half of this remuneration.

63.2.3 If one or more of the members appointed refuses to act as DAB member, or is unable or unwilling to perform his functions as DAB member for any reason whatsoever or dies or in the opinion of the Chief Engineer fails to act without undue delay, the parties shall terminate the mandate of such DAB member and thereupon new DAB member shall be appointed in the same

manner, as the outgoing DAB member had been appointed.

63.2.4 The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Railway or the Contractor acting alone. Unless otherwise agreed by both the Parties, the appointment of the DAB (including each member) shall expire upon expiry of this Contract Agreement.

63.2.5 Before start of DAB proceedings, each DAB member shall give the following certificate to the Railway and the Contractor: "I have no any past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind. Further, I have no any past or present relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality."

63.2.6 DAB proceedings shall be conducted as decided by the DAB. The DAB shall give its decision within 90 days of a Dispute referred to it by any of the Parties, duly recording the reasons before arriving at the decision. The DAB shall decide the issue within terms and conditions of the contract. This time limit shall be extendable subject to the Parties mutual agreement. GCC April 2022 97

63.2.7 The DAB decision shall not be binding on both the Parties. In case any party is not satisfied by the decision of DAB, then the aggrieved party may approach Arbitral Tribunal for arbitration proceedings.

63.2.8 No dispute shall be referred to Arbitral Tribunal unless the same has been referred to DAB for adjudication. However, in case DAB is not formed due to any reason, the disputes can be directly referred to Arbitral Tribunal to adjudicate the dispute.

63.2.9 In the specific cases of any misconduct by any of the members of the DAB, the parties shall have the right to specifically bring it to the notice of the DAB such conduct, through a statement filed with necessary documents in proof of such misconduct and the DAB, after taking NOTICE of such conduct initiate the replacement of the member concerned, in the same manner the member to be replaced was appointed.

63.2.10 Once the decision is given by DAB, DAB cannot review the decision at its own or on the request of one party, unless both parties agree for review of decision by DAB.

63.2.11 In case DAB decision is not challenged by either party within 180 days of receipt of decision of DAB, the decision shall be considered as final and parties would be barred for referring the same to Arbitral Tribunal for adjudication.

63.2.12 The obligation of the Railway and the Contractor shall not be altered by reasons of issue being or under reference to DAB.

63.2.13 The DAB shall conduct the proceedings at any convenient venue which shall be decided by DAB in consultations with parties.

63.2.14 It is a term of this contract that the Parties shall not approach any Court of Law for

settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through DAB and Arbitral Tribunal.

JURISDICTION OF THE COURTS:

24.0 The courts of the place where the contract has been entered by South Central Railway i.e. courts of Hyderabad / Secunderabad shall alone have the Jurisdiction to decide any dispute arising out of or in the respect of the contract.

25.0 **Assignment or Subletting of Contract:** The Contractor shall not assign or sublet the contract or any part thereof or allow any person to become interested therein in any manner whatsoever without the special permission in writing of the Chief Engineer, save as provided below. Any breach of this condition shall entitle the Railway to rescind the contract under Clause 62 of these Conditions and also render the Contractor liable for payment to the Railway in respect of any loss or damage arising or ensuing from such cancellation; provided always that execution of the details of the work by petty Contractor under the direct and personal supervision of the Contractor or his agent shall not be deemed to be sub-letting under this clause. In case Contractor intends to subcontract part of work, he shall submit a proposal in writing seeking permission of Chief Engineer for the same. While submitting the proposal to railway, Contractor shall ensure the following: (a) (i) Total value of work to be assigned to sub-contractor(s) shall not be more than 50% of total contract value. (ii) The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract in last 5 years, ending date of submission of proposal by Contractor to Railway, costing not less than 35% value of work to be subletted, through a works contract. For fulfillment of above, Work Experience Certificate issued by a Govt. Department/Organisation shall be considered. Further, Work Experience Certificate issued by a Public listed company shall be considered provided the company is having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, registered at least 5 years back from the date of GCC April 2022 45 submission of proposal by Contractor to Railway and work experience certificate issued by a person authorised by the Public Listed Company to issue such certificates. Note: for subletting of work costing up to Rs 50 lakh no previous work experience shall be asked for by the Railway. In case contractor submits subcontractor's work experience certificate issued by public listed company, the contractor shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate. (iii) There is no banning of business with the sub-contractor in force over IR. (b) The Contractor shall provide to the Engineer a copy of the agreement to be entered into by Contractor with subcontractor. No subcontractor shall be permitted without a formal agreement between Contractor and subcontractor. This agreement shall clearly define the scope of work to be carried out by subcontractor and the terms of payment in clear & unambiguous manner. (c) On receipt of approval from Chief Engineer, Contractor shall enter into a formal agreement legally enforceable in Court of Law with subcontractor and submit a copy of the same to the Engineer. (d) The Contractor shall intimate to the Engineer not less than 7 days in advance, the intended date of commencement of subcontractor's work. (e) Once having entered into above arrangement, Contractor shall discontinue such arrangement, if he intends to do so at his own or on the instructions of Railway, with prior intimation to Chief Engineer. (f) The Contractor shall indemnify railway against any claim of subcontractor. (g) The Contractor shall release payment to the Sub-contractor(s) promptly

and shall Endeavour to resolve all issues amicably and speedily with the Sub-contractor(s), so that the execution of work is not affected in any manner whatsoever. (h) In addition to issuance of work experience certificate to Contractor, the Engineer, when, based on documents, is satisfied that subcontracted work has been carried out by subcontractor, shall issue work experience certificate to the subcontractor also for the portion of work subcontracted and successfully completed by the sub-contractor. Note: Work Experience Certificate to the subcontractor shall be issued only when the contractor's work is complete and contractor is entitled for the issuance of Work Experience Certificate. However, in the same contract, when the Chief Engineer, based on documents, is satisfied that the subcontractor has successfully carried out subletted work; without issuance of work experience certificate to subcontractor at this stage, the Chief Engineer can, only once, consider the successfully completed subletted work for the fulfilment of eligibility for further subletting of work to the subcontractor in the same contract. When the contractor's work is complete and contractor is entitled for the issuance of work experience certificate, the subcontractor shall be issued one Work Experience Certificate for the total scope of work executed by the subcontractor in the contract. GCC April 2022 46 (i) The responsibility of successful completion of work by subcontractor shall lie with Contractor. Subcontracting will in no way relieve the Contractor to execute the work as per terms of the Contract. (j) Further, in case Engineer is of the view that subcontractor's performance is not satisfactory, he may instruct the Contractor to remove the subcontractor from the work and Contractor has to comply with the above instructions with due promptness. Contractor shall intimate the actual date of discontinuation of subcontract to Engineer. No claim of Contractor whatsoever on this account shall be entertained by the Railway and this shall be deemed as 'excepted matter' (matter not arbitrable). (k) The permitted subcontracting of work by the Contractor shall not establish any contractual relationship between the sub-contractor and the Railway and shall not relieve the Contractor of any responsibility under the Contract.

26.0 OWNERSHIP OF REJECTED / OLD COMPONENTS :

The owner ship of the released materials shall be sole ownership of Railway administration.

27.1 SCOPE:

This chapter deals with prices to be paid for supply and/or erection of various items of works or for supplies and other amounts payable in accordance with accepted schedules of prices and rates and terms and conditions of payment mentioned herein.

This is a works contract. The total prices for the completed items of work are the actual prices for the completed items of work are the actual prices payable to the contractors as per the terms and conditions of contract.

27.2 SCHEDULE OF PRICESFOR TRD ARRANGEMENTS:

- 27.2.1 Prices for the items covered in schedule of prices are based on "Schedule of Rates (SOR) & NON SOR " specified as Schedule "1 TO 17 " items. The tenderers have to quote a percentage below/at par/above the prices of each schedule separately.
- 27.2.2 All prices shall be valid irrespective of minor variations in basic quantities and use of alternative types approved by the purchaser. Minor changes in basic designs shall not affect unit prices as long as such changes are mutually agreed to by purchaser and the contractor. The contractor shall carefully note the items of materials, equipments, fittings and components which will be supplied by Railways.

27.2.3 The prices shall include provision for wastage in transit and erection. The prices shall include all incidental charges for transport, loading, un-loading and handling of materials. The prices shall include insurance premia under the emergency risks, all taxes, duties, levies etc.

27.3 QUANTITIES:

It is considered that the items of work included in schedule may not cover all works involved in putting the installation into commission. Additional items of work which are considered necessary and unit prices of such items if any shall be quoted separately and brought out clearly in a separate letter.

27.4 EXPLANATORY NOTES:

Explanatory Notes for various items of work included in Schedule of Prices are given separately.

27.5 NEW ITEMS OF WORK:

If during the execution of the work, the contractor is called upon to carry out any new item of work not included in schedule, the contractor shall execute such works at such prices as may be mutually agreed with the purchaser before commencement.

27.6 PAYMENTS AND RECOVERIES:

The rates to be paid for erection of various items of works shall be in accordance with the accepted schedule of rates as governed by the terms and conditions as mentioned herein.

The total rates for the completed items of work are the actual rates payable to the contractors. The rates in schedule shall include provision of loss and wastage in transit and erection. The rate shall include all incidental charges for transport, loading, unloading and handling of materials. The rate shall include all taxes. No adjustment of unit rates and rates of fittings, materials, equipment or components on account of price fluctuation will be permitted. If during the execution of the work, any new items of work are carried out, not included in schedule, the rates for such items as per accepted schedule should be taken into consideration.

Subject to any deduction or recoveries, which the purchaser may be entitled to make under the contract, the contractor shall unless otherwise agreed to, be entitled to get the following payments subject to conditions stipulated in subsequent paragraph.

PENALTIES :

1. In case the contractor fails to employ the Qualified Engineer (Employment of Engineering Graduate / Diploma holder) the penalties will be levied for each month or part thereof for the default period, as per the following.

Contract Value	No. of Engineer/Diploma holders to be employed	Penalties
Between 25.0 lakhs to 2.0 crores	One qualified Diploma holder Engineer	Rs.25,000/-
2.0 crores and above	One qualified graduate Engineer	Rs.40,000/-

2. Any other delay in execution of work on the part of contract, suitable penalty will be imposed as decided by Dy CEE/GS/SC.

INSURANCE :

The Contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the Contractor or the Purchaser at common law or under any statute in respect of accidents to persons

who shall be employed by the Contractor in or about the site of work or the Contractor's offices for the purpose of carrying out the works on the site.

27.7 ON ACCOUNT PAYMENTS FOR TRD ARRANGEMENTS:

- a) 80% payment will be made on supply portion of materials against all schedule items.
- b) Balance 20% will be released after erection of each schedule item or if the item is taken over as supply item by Railways.

27.8 PROGRESS PAYMENTS FOR TRD ARRANGEMENTS:

- a) 100% payment will be made for each schedule items after supply and erection of the items.

27.9 INVOICING PROCEDURE:

27.9.1 The contractor shall submit the following documentation supply portion of materials for obtaining Schedule "1,3,4,5,6,7&8," payments.

- a) Supplier's challans/invoices.
- b) Certificate of receipt of materials at consignee depot/s duly accepted by the purchaser's engineers.
- c) Inspection certificate granted by the purchaser's representative i.e. RITES/RDSO/Consignee and submission of quality assurance documents i.e., manufactures routine test reports, warranty certificate, etc in 3 copies.
- d) Insurance of materials

27.9.2 All invoices shall be submitted with original supporting documents or certified copies of supporting documents.

27.9.3 Quantities and measurement of works completed shall be approved by the field supervisor, prior to the submission of quantity schedule to Dy.CEE office. After approval of quantity schedule, invoice/bill to be submitted by contractor after measurements are accepted by contractors in measurement book.

27.9.4 INDEMNITY BOND:

Schedule '1 to 17' items for which ON Account payment is received by the contractor, such materials shall be issued to contractor only after submission Indemnity Bond of value such items.

27.9.5 For material under schedule '1 to 17' items, the following documents shall be submitted

- a) Supplierschallans/invoices.
- b) Inspection certificate granted by the Purchaser's representative (RITES/RDSO/CONSIGNEE).
- c) Final measurements shall not be recorded unless above documents are submitted.

27.9.6 Final bill shall be passed after submission of 'Reconciliation of materials' statement and there are no short fall of materials to be handed over to Railways.

27.10 Variation in quantities during the execution of works contracts:

- c) In the event of any of the provisions of the contract requiring to be modified after the contract documents have been signed, the modifications shall be made in writing and signed by the Railway and the contractor, and no work shall proceed under such modifications until this has been done. Any verbal or written arrangement abandoning, modifying, extending, reducing or supplementing the contract or any of the terms of thereof shall be deemed conditional and shall not be binding on the Railway unless and until the same is incorporated in a formal instrument and signed by the Railway and the contractor and till then the Railway shall have the right to repudiate such arrangement.

- d) Power of modification to contract: The engineer on behalf of the Railway shall be entitled by order in writing to enlarge or extend, diminish or reduce the works or make any alterations in their designs, character, position, site, quantities, dimensions or in the method of their execution or in the combination and use of materials for the execution thereof or to order any additional works to be done or any works not to be done and the contractor will not be entitled to any compensation for any increase/reduction in the quantities of work but will be paid for actual amount of work done and for approved material supplied against the specific order.
- e) The procedure as detailed below shall be adopted for dealing with variation in quantities during execution of works contracts:-
- f) The procedure as detailed below shall be adopted for dealing with variation in quantities during execution of works contracts:-
- g) Individual NS items in contracts shall be operated with variation of plus or minus 25% and payment would be made as per the agreement rate. For this no finance concurrence would be required.
- h) In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered as unavoidable, the same shall be got executed by floating a fresh tender. If floating a fresh tender is considered not practicable, quantity of that item may be operated in excess of 125% of agreement quantity (100% i.e the original quantity + 25% i.e., quantity over and above the original quantity) subject to the following conditions:
 - i) Since there is an in-built rate reduction clause of 2% & 4% for variation between 125% & 140% & between 140% and 150% respectively on the accepted rates it will only require the prior approval of an officer not below the rank of SAG without finance concurrence subject to other conditions mentioned in clause 42(4) of GCC 2014.
 - j) However, a supplementary agreement/addendum to original agreement should be drawn subsequent to sanction of the variation by an officer not below the rank of SAG, which needs to be vetted by associated finance
 - k) Quantities operated in excess of 125% but up to 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender.
 - l) Quantities operated in excess of 140% but up to 150% of the agreement quantity of the concerned item, shall be paid at 96% of the rate awarded for that item in that particular tender.
- m) Variations in quantities of individual items beyond 150% will be prohibited and would be permitted only in exceptional unavoidable circumstances with the concurrence of associate finance and shall be paid at 96% of the rate awarded for that item in that particular tender.
- n) The variation in quantities as per the above formula will apply only to the individual items of the contract and not on the overall contract value.
- o) Execution of quantities beyond 150% of the overall agreement value should not be permitted and, if found necessary, should be only through fresh tenders or by negotiating with existing contractor, with prior personal concurrence of PFA/C/SC/SCR and approval of General Manager.
- p) The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1% of the total original agreement value.
- q) No such quantity variation limit shall apply for foundation items.
- r) As far as SSR/SOR items are concerned, the limit of 25% would apply to the value of SSR/SOR schedule as a whole and not on individual SSR/SOR items. However, in case of NS items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).
- s) For the tenders accepted at the Zonal Railways level, the variation in the quantities will be approved by the authority in whose powers the revised value of the agreement lies.
- t) For tenders accepted by General Manager, variations up to 125% of the original agreement value may be accepted by General Manager.

- u) For tenders accepted by Board Members and Railway Ministers, variations up to 110% of the original agreement value may be accepted by General Manager.
 - v) The aspect of vitiation of tender with respect to variation in quantities should be checked and avoided. In case of vitiation of the tender (both for increase as well as decrease of value of contract agreement), sanction of the competent authority as per single tender should be obtained.
 - w) In zonal contract the variation in the contract should not exceed 25% of the contract value or two lakhs, whichever is higher.
 - x) Revision to contract value shall be proposed by way of a variation statement in all the cases, where negotiations are required to be held, appropriate Tender Committee recommendations will be drawn and put-up to competent authority.
 - y) Gross value of the agreement due to the variation shall be taken for arriving at the competency of sanction. While working-out gross value, savings, if any shall not be taken into account.
 - z) These modified clauses/provisions shall be applicable with prospective effect in all future works contract. As such, the revised clause 42(4) to Indian Railways General Conditions of contract shall be applicable /incorporated in all future tenders.
- aa) In cases where decrease is involved during execution of contract:
The contract signing authority can decrease the items up to 25% of individual item without finance concurrence.
 - bb) For decrease beyond 25% for individual items or 25% of contract agreement value, the approval of an officer not less than rank of S.A.G Grade may be taken, after obtaining 'No Claim Certificate' from the contractor and with finance concurrence, giving Detailed reasons for each such decrease in the quantities.
 - cc) It should be certified that the work proposed to be reduced will not be required in the Same work.

27.10.3 Price variation:

27.10.3.1 Applicability: Price Variation Clause (PVC) shall be applicable only in tender having advertised value above Rs. 2 Crores. Provided further that, in a contract where PVC is applicable, following shall be outside the purview of price adjustments (i.e. shall be excluded from the gross value of the work for the purpose of price variation):

Materials supplied by Railway to the Contractors, either free or at fixed rate;

Any extra item(s) included in subsequent variation falling outside the purview of the Bill(s) of Quantities of tender, under clause 39. (1)(b) of GCC April 2022, unless applicability of PVC and 'Base Month' has been specially agreed, while fixing the rates of such extra item(s).

27.10.3.2 Base Month: The Base Month for 'Price Variation Clause' shall be taken as the one month prior to closing of tender, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month following the Base month. The Price Variation shall be based on the average Price Index of the quarter under consideration.

27.10.3.3 Validity:

Rates accepted by Railway Administration shall hold good till completion of work and no additional individual claim shall be admissible except:

- a) Payment/recovery for increase/decrease in GST on works contract or imposition/removal of any tax/cess on Works Contract as per Clause 37,
- b) Payment/recovery for overall market situation as per Price Variation Clause given hereunder.

27.10.3.4 Components of various items in a contract on which variation in prices be admissible, shall be steel, cement, ferrous material, non-ferrous material, insulators, zinc and other materials, labour, plant & machinery, fuel, explosives, detonators etc. Adjustment for variation in prices of these items shall be determined in the manner prescribed.

27.10.3.5 No price variation shall be admissible for fixed components.

27.10.3.6 The percentages of various components in various type of works shall be as specified for all item (s)/ Bill(s) of Quantities in tender document and the same shall be fixed as per table & Classifications given below:

(I). For Civil Engineering Works

S. No.	Classification/ Component		1A, 2 & 3A	4A	5A	6A	7	8A	9A	1B, 3B, 4B, 5B, 6B, 8B & 9B	1C, 3C, 4C, 5C, 6C, 8C & 9C	3D, 4D, 5D, 6D, 8D & 9D	3E, 4E, 5E, 6E 8E & 9E
1	Fixed	*	15	15	15	15	15	15	15	15	15	15	15
2	Labour	Lc	20	25	30	20	50	20	20	0	0	10	25
3	Steel	Sc	0	0	0	0	0	0	0	85	0	50	0
4	Cement	Cc	0	0	15	0	0	0	0	0	85	0	0
5	Plant Machinery & Spares	PMc	30	15	5	20	15	20	30	0	0	10	30
6	Fuel & Lubricants	Fc	25	15	5	15	15	20	15	0	0	10	20
7	Other materials	Mc	10	15	30	30	5	25	20	0	0	5	10
8	Detonators & Explosive	Ec	0	15	0	0	0	0	0	0	0	0	0
Total			100	100	100	100	100	100	100	100	100	100	100

* It shall not be considered for any price variation.

The classification mentioned in the table above represents following type of item(s) in the work(s) –

- 1 Earthwork in Formation
 - 1A All Item(s) excluding 1B or/and 1C
 - 1B Item(s) for supply of Steel
 - 1C Item(s) for supply of Cement
- 2 Ballast Supply Works
- 3 Tunnelling Works (Without Explosives)
 - 3A All Item(s) excluding 3B or/and 3C or/and 3D or/and 3E
 - 3B Item(s) for supply of Steel
 - 3C Item(s) for supply of Cement or/and Grout
 - 3D Item(s) for Fabrication & Erection of Structures including supply of Steel
 - 3E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.
- 4 Tunnelling Works (With explosives)
 - 4A All Item(s) excluding 4B or/and 4C or/and 4D or/and 4E
 - 4B Item(s) for supply of Steel
 - 4C Item(s) for supply of Cement or/and Grout

- 4D Item(s) for Fabrication & Erection of Structures including supply of Steel
- 4E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.
- 5 Building Works
 - 5A All Item(s) excluding 5B or/and 5C or/and 5D or/and 5E
 - 5B Item(s) for supply of Steel
 - 5C Item(s) for supply of Cement
 - 5D Item(s) for Fabrication & Erection of Structures including supply of Steel
 - 5E Item(s) for Fabrication & Erection of Structures excluding supply of Steel.
- 6 Bridges & Protection work
 - 6A All Item(s) excluding 6B or/and 6C or/and 6D or/and 6E
 - 6B Item(s) for supply of Steel
 - 6C Item(s) for supply of Cement
 - 6D Item(s) for Fabrication, Assembly, Erection& Launching of Girders including supply of Steel
 - 6E Item(s) for Fabrication, Assembly, Erection & Launching of Girders excluding supply of Steel
- 7 Permanent Way linking
- 8 Platform, Passenger Amenities
 - 8A All Item(s) excluding 8B or/and 8C or/and 8D or/and 8E
 - 8B Item(s) for supply of Steel item/fittings
 - 8C Item(s) for supply of Cement Item
 - 8D Item(s) for Fabrication & Erection of Structures including supply of Steel
 - 8E Item(s) for Fabrication & Erection of Structures excluding supply of Steel
- 9 Any Other Works not covered in Classification 1 to 8
 - 9A All Item(s) excluding 9B or/and 9C or/and 9D or/and 9E
 - 9B Item(s) for supply of Steel
 - 9C Item(s) for supply of Cement or/and Grout
 - 9D Item(s) for Fabrication & Erection of Structures including supply of Steel
 - 9E Item(s) for Fabrication & Erection of Structures excluding supply of Steel

27.10.3.7 Formulae: The Amount of variation in prices in various components (labour, material etc.) shall be worked out by the following formulae:

$$(i) L = \frac{(W \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (LQ - LB) \times LC}{LB \times 100}$$

$$(ii) M = \frac{(W \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (MQ - MB) \times MC}{MB \times 100}$$

$$(iii) F = \frac{(W \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (FQ - FB) \times FC}{FB \times 100}$$

$$(iv) E = \frac{(W) \times (EQ - EB) \times EC}{EB \times 100}$$

$$(v) PM = \frac{(W \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (PMQ - PMB) \times PMC}{PMB \times 100}$$

$$(vi) S = \frac{(W \text{ or } WS \text{ or } WSF) \times (SQ - SB) \times SC}{SB \times 100}$$

$$(vii) C = \frac{(W \text{ or } WC) \times (CQ - CB) \times Cc}{CB \times 100}$$

Where,

- L Amount of price variation in Labour
- M Amount of price variation in Materials
- F Amount of price variation in Fuel
- E Amount of price variation in Explosives
- PM Amount of price variation in Plant, Machinery and Spares

S	Amount of price variation in Steel Supply Item
C	Amount of price variation in Cement Supply
T	Percentage variation payable on the gross value of bill of Concreting (Bill(s) of Quantities for concrete items)
R	Percentage variation payable on the gross value of bill of Ferrous Items (Bill(s) of Quantities for ferrous items)
N	Percentage variation payable on the gross value of bill of Non-Ferrous Items (Bill(s) of Quantities for non-ferrous items)
I	Percentage variation payable on the gross value of bill of Insulator (Bill(s) of Quantities for Insulator items)
G	Percentage variation payable on the gross value of bill of General Works (Bill(s) of Quantities for General items)
Er	Percentage variation payable on the gross value of erection (Bill(s) of Quantities for Erection Item)
LC	% of Labour Component in the item(s)
MC	% of Material Component in the item(s)
FC	% of Fuel Component in the item(s)
EC	% of Explosive Component in the item(s)
PMC	% of Plant, Machinery and Spares Component in the item(s)
SC	% of Steel Supply item Component in the item(s)
CC	% of Cement Supply item Component in the item(s)
W	Gross value of work done by Contractor as per on-account bill(s) excluding the Gross value of work under WS or/and WC or/and WSF or/and WF or/and WSFL or/and WFL and cost of materials supplied by Railway either free or at fixed rate,
WS	Gross value of work done by Contractor for item(s) of supply of steel.
WC	Gross value of work done by Contractor for item(s) of supply of cement and /or supply of grout material.
WSF	Gross value of work done by Contractor for item(s) of Fabrication & Erection of Structures including supply of Steel.
WF	Gross value of work done by Contractor for Fabrication & Erection of Structures excluding supply of Steel.
WSFL	Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders including supply of Steel.
WFL	Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders excluding supply of Steel.
LB	Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the base period
LQ	Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration
MB	Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the base period
MQ	Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration
FB	The average of official prices of Diesel available on the official website of ‘Petroleum Planning and Analysis cell’ under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the base period
FQ	The average of official prices of Diesel available on the official website of ‘Petroleum Planning and Analysis cell’ under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the 3 months of the quarter under Consideration
EB	Index number of Monthly Whole Sale Price Index for the category ‘Explosive’ of (g).

Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the base period.

EQ Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g).

Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the average price index of 3 months of the quarter under consideration.

PMB Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction' – published in RBI

(Reserve Bank of India) Bulletin, for the base period.

PMQ Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction' – published in RBI

(Reserve Bank of India) Bulletin, for the average price index of 3 months of the quarter under consideration.

SB The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the base period.

SQ The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the 3 months of the quarter under consideration.

CB Index No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the base period

CQ No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the average price index of the 3 months of the quarter under consideration

RT IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is two months prior to date of inspection of material.

RO IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is one month prior to date of opening of tender.

PT IEEMA price index for Copper wire rods for the month which is two months prior to date of inspection of material.

PO IEEMA price index for Copper wire rods for the month which is one month prior to date of opening of tender.

ZT IEEMA price index for Zinc for the month which is two months prior to date of inspection of material

ZO IEEMA price index for Zinc for the month which is one month prior to date of opening of tender

IT RBI wholesale price index for the sub-group "Insulators" for the month which is two months prior to date of inspection of material

IO RBI wholesale price index for the sub-group "Insulators" for the month which is one month prior to date of opening of tender

27.10.3.8 The demands for escalation of cost shall be allowed on the basis of provisional indices as mentioned above in Clause 12.7. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

27.10.3.9 (1) Relevant categories of steel for the purpose of operating Price Variation formula as mentioned in this Clause shall be as under:

SL	Classification	Rates to be used for calculating SQ or SB
1	Reinforcement bars and other rounds	'Average of per tonne rates of 10mm dia TMT & 25mm dia TMT; confirming IS1786; Fe 500
2	All types and sizes of angles, channels and joists	Average of per tonne rates of 'Angle 75x75x6mm, Mild Steel Plate 10mm thickness and Channel 150x75mm; confirming IS2062, E250 Gr "A"

3	All types and sizes of plates	Average of per tonne rates of ‘MS Plates 10mm thickness and 25mm thickness; confirming IS2062, E250 Gr “A”
4	Any other section of steel not covered in the above categories	Average of price for the 3 categories covered under SL 1, 2 & 3 in this table.

(2). Relevant city for referring “JPC (Joint Plant Committee)” rates of steel items (SQ /SB) in different Zonal Railways shall be as under :

SL	City	Railway
1	Delhi	Northern , North Central, North Eastern, North Western
2	Kolkata	Eastern, East Central, East Coast, Northeast Frontier, South Eastern, Southeast Central
3	Mumbai	Central, Western, West Central
4	Chennai	Southern, South Central & South Western

27.10.3.10 Price Variation during Extended Period of Contract

The price adjustment as worked out above, i.e. either increase or decrease shall be applicable up-to the stipulated date of completion of work including the extended period of completion where such extension has been granted under Clause 17-A of the Standard General Conditions of Contract. However, where extension of time has been granted due to Contractor’s failure under Clause 17-B of the Standard General Conditions of Contract, price adjustment shall be done as follows:

- a. In case the indices increase above the indices applicable to the last month of original completion period or the extended period under Clause 17-A, the price adjustment for the period of extension granted under Clause 17-B shall be limited to the amount payable as per the Indices applicable to the last month of the original completion period or the extended period under Clause 17-A of the Standard General Conditions of Contract; as the case may be.
- b. In case the indices fall below the indices applicable to the last month of original/extended period of completion under Clause 17-A, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17-B of the Standard General Conditions of Contract.

SCHEDULE OF RATES & QUANTITIES

PS1 (TRD) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Prali vajinath/Kurduwadi main line for OHE arrangements.

Schedule-A1 OHE & PSI Items										
Sl. No.	Item No.	Description	Unit							
				Purch ase	Labou r / Erecti on	Purch ase	Labo ur / Erecti on	Purchas e	Labour / Erection	Total
1	1(a)	Preparation of Designs and drawings for OHE	TKM		6	0	20066	0	120396	120396
2	1(b)	Preparation of design and drawings for switching stations (SP/SSP)	Each		1	0	40828	0	40828	40828
3	1(c)	Preparation of Station working Rules DIAGRAM and WORKING Instructions	Each		4	0	11869	0	47476	47476
4	1(d)	Supply & instalation of traction working rule diagram boards	Sq.Ft		200	0	1271	0	254200	254200
5	1(f)	Preparation of Designs and drawings of sectioning drg	Each		1	0	14212	0	14212	14212
6	3(a)	Erection of Traction masts and main masts of Switching stations and LT supply Transformer station.	MT		64	0	3465	0	221760	221760
7	3(b)	Erection of Fabricated Small Part Steel work other than mast, TTC's, Portals, etc	MT		28	0	15267	0	427476	427476
8	3(e)	Supply and erection of Guy rod assembly.	Each	28	28	9331	1120	261268	31360	292628
9	3(g)	Supply of steel reinforcement for RCC work.	MT	0.5		71717	0	35858.5	0	35858.5
10	4(a)(i)	Supply without Insulator and Erection of Single bracket assembly for conventional OHE.	Each	186	158	12114	1080	2253204	170640	2423844
11	4(a)(ii)	Erection of Two Cantilever Assemblies on same structure or support for Conventional OHE	Each		16		1619	0	25904	25904
12	4(a)(iii)	Erection of Three Cantilever Assemblies on same structure or support for Conventional OHE	Each		12		1859	0	22308	22308
13	4(b)(i)	Supply without Insulator and erection of a pull off arrangement for conventional OHE	Each	1	1	10693	785	10693	785	11478
14	6(a)	Supply and Erection of regulated conventional OHE.	TKM	5.4	5.4	24271	48362	131063.4	261154.8	392218.2
15	7(a)	Erection Stringing of along feeder (either All Aluminum 25 kV Feeder (single spider) or copper feeder wire	KM	1	1		12004	0	12004	12004
16	7(b)	Erection of Copper Cross Feeder Wire	Each		4		2354	0	9416	9416
17	8(a)(v)	Supply and erection of regulating equipment (3 pulley type) with counter weight assembly for conventional OHE.	Each	16	16	70583	4000	1129328	64000	1193328
18	8(a)(xii)	Marking of "Y" - Measurement at BWA locations.	Each		16	0	185	0	2960	2960
19	8(b)(ii)	Supply without Insulator and erection of material for terminations of Conventional OHE conductor.	Each	24	24	8201	1120	196824	26880	223704

20	8(b) (iii)	Supply (Without Insulator) and Erection of Materials for Termination of Along Feeder(Aluminium/Copper)	Each	12	12	5192	1000	62304	12000	74304
21	8(b) (ix)	Supply (other than Insulators) and erection of materials for termination of copper cross feeder with gantries.	Set	8	8	8293	1000	66344	8000	74344
22	9(a)	Supply without Insulators and erection of anti creep with galvanised steel wire for conventional OHE.	Each	4	4	22000	3372	88000	13488	101488
23	10(a)	Extra on Item 6(a) or 6(c) for supply and erection of additional fittings required at a turn out , cross over or overlap etc.	Each	16	16	5733	1250	91728	20000	111728
24	11(a) (i)	Supply with out insulator and erection of 25 kV solid core cut-in insulator.	Each	18	18	1859	711	33462	12798	46260
25	11(a) (ii)	Supply without insulator and erection of 25 kV solid core suspension insulator.	Each	32	32	2022	494	64704	15808	80512
26	11(b)	Supply without insulator and erection of 25 kV Post Insulators.	Each	28	28	850	336	23800	9408	33208
27	12(a)	Supply without insulators and erection of 25 kV Section Insulator assembly for conventional OHE	Each	8	8	51930	3117	415440	24936	440376
28	12(c)	Erection of Light Weight Section Insulator	Each		2		4300	0	8600	8600
29	13(a)	Supply without insulators and erection of 25 kV Single Pole Isolator without earth contact assembly	Each	6	6	40128	2891	240768	17346	258114
30	13(b)	Supply without insulators and erection of 25 kV Double pole Isolator without earth contact assembly.	Each	2	2	67227	4188	134454	8376	142830
31	13(c)	Supply and Erection of Earth Contact Wire Assembly for an Isolator	Each	4	4	13357	412	53428	1648	55076
32	13(d)	Supply and Erection of an Interlocking Device	Each	4	4	4610	294	18440	1176	19616
33	15(a)	Supply and erection of 50 Sqmm of copper jumpers.(C-Jummpers, F- jumpper, Anti theft jummpers)	Each	20	20	756	356	15120	7120	22240
34	15(b)	Supply and Erection of 160 or 105 sq.mm Copper Jumper (Isolator Jumper, G-Jumper)	Each	36	36	2126	680	76536	24480	101016
35	15(c)	Supply and Erection of 160 sq. mm Large copper jumper wire between Aluminium Bus and Cross-feeder	Each	6	6	5008	612	30048	3672	33720
36	15(d)	Supply and Erection of 160 sq. mm Large copper jumper wire between Cross-feeder and OHE	Each	4	4	3345	612	13380	2448	15828
37	15(e)	Supply and Erection of Aluminium Jumper	Each	2	2	3654	342	7308	684	7992
38	16(a)	Supply and erection of structure bonds	Each	240	240	833	304	199920	72960	272880
39	16(b)	Supply and erection of longitudinal bond.	Each	34	34	604	274	20536	9316	29852
40	16(c)	Supply and erection of transverse and special bonds.	Each	69	69	951	326	65619	22494	88113
41	16(aa)	Drilling of holes on rails	Each		446	0	107	0	47722	47722
42	17(a)	Supply and erection of single Earth electrode at COP/FOB/PTFE/Steel Girder etc..	Each	20	20	3511	1347	70220	26940	97160
43	17(b)	Supply and Erection of Earth Bus	Metre	6	6	183	80	1098	480	1578
44	17 (c)	Supply and Erection of Single Earth Electrode TSS/SP/SSP/AT	Each	4	4	4142	1905	16568	7620	24188
45	17(d)	Supply and erection of Copper strips for equipment earthing.	Metre	10	10	959	85	9590	850	10440

46	17(e)	Supply and Erection of Earth leads 75 mm x 8 mm mild steel laid in the ground.	Metre	13	13	379	103	4927	1339	6266
47	17(h)	Supply and Erection of Earth leads 50 mm x 6 mm mild steel laid exposed	Metre	20	20	184	65	3680	1300	4980
48	17(i)	Supply and Erection of Mild steel rod 32 mm dia for Earth Mat	Metre	50	50	1056	69	52800	3450	56250
49	17(j)	Supply and Erection of 8 SWG G.I wire for earthing	Metre	10	10	33	25	330	250	580
50	18(a)	Erection of 25 KV vaccum Interruptors (BM)	Each		1	0	5596	0	5596	5596
51	18(b)	Erection of 25 KV vaccum Circuit Braker(CB)	Each		1	0	5596	0	5596	5596
52	19(a)	Erection of 25 KV (Type-I) Potential transformer	Each		1		1340	0	1340	1340
53	20(a)	Erection of 42KV Lightning Arrestors	Each		1	0	847	0	847	847
54	21	Supply and Erection of Terminal boards in control cubicle.	Each	1	1	21460	522	21460	522	21982
55	22(a)	Supply and erection of an iron clad 110V. DC. Fuse box.	Each	1	1	3738	110	3738	110	3848
56	22(b)	Supply and Erection of an Iron Clad 230 V AC Fuse Box	Each	1	1	4135	110	4135	110	4245
57	22(c)	Supply and Erection of 110 V Distribution Boards	Each	1	1	34692	771	34692	771	35463
58	23(a)	Erection of 110 V,40-AH Lead Acid Battery.	Each		1	0	8496	0	8496	8496
59	23(b)	Erection of Battery charger for 110 V, 40 Ah Lead Acid Battery	Each		1		1274	0	1274	1274
60	25(a)	Supply and installation of cable for control and indication (10 or 7 core, 2.5 sq. mm)	Metre	150	150	1118	21	167700	3150	170850
61	25(b)	Supply and installation of cable for heater supply(2 core, 4 sq. mm)	Metre	150	150	421	21	63150	3150	66300
62	25(c)	Supply and installation of cable for catenary indication(2 core, 2.5 sq. mm).	Metre	120	120	289	21	34680	2520	37200
63	25(d)	Supply and Erection of cable for 110 V DC Power supply (2 core. 4 sq. mm)	Metre	40	40	421	26	16840	1040	17880
64	25(e)(i)	Supply and Laying of 2 core, 70 sq mm XLPE Aluminium cable	Metre	40	40	212	26	8480	1040	9520
65	26(a)(i)	Supply and erection of Aluminum bus bar 36mm x 28mm.	Metre	180	180	612	72	110160	12960	123120
66	26(a)(i)	Supply and erection of COPPER bus bar 18mm.	Metre	100	100	2250	146	225000	14600	239600
67	26(b)(i)	Supply and erection of aluminum bus terminal (6480).	Each	24	24	1215	47	29160	1128	30288
68	26(b)(i)	Supply and erection of aluminum bus splice (6490).	Each	2	2	1162	47	2324	94	2418
69	26(b)(i)	Supply and erection of aluminum bus tee connector (6500)	Each	20	20	1593	42	31860	840	32700
70	26(b)(i)	Supply and erection of aluminum bus bar terminal connector 36/20mm. (6530).	Each	4	4	1062	42	4248	168	4416
71	26(b)(v)	Supply and erection of aluminum bus bar tap connector (6520).	Each	8	8	1800	47	14400	376	14776
72	26(b)(vi)	Supply and erection of flexiable bus splice (6550).	Each	8	8	3092	47	24736	376	25112

73	26(c)(i)	Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Terminal (6310-1)	Each	8	8	1231	47	9848	376	10224
74	26(c)(i)	Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Splice (6320)	Each	6	6	1416	47	8496	282	8778
75	26(c)(vii)	Supply and erection of rigid type bimetallic terminal connector suitable for 50mm dia AL tubular bus bar to terminal pad 25KV Isolator/CT (ID no 11090)	Each	1	1	1416	43	1416	43	1459
76	27(a)	Erection of 25 kV/240 V, 5/10/25/50 KVA Auxiliary Transformer	Each		2		7234	0	14468	14468
77	27(b)	Supply and Erection of 240 V L.T. Distribution Board in the control room for L.T supply transformer with changeover switch	Each	1	1	70000	1033	70000	1033	71033
78	28	Supply (without Insulators) and Erection of 25 kV Drop out fuse switch.for all oil/dry type L.T.Supply transformers of all capacities	Each	2	2	10219	563	20438	1126	21564
79	30(a)(i)	Supply and Erection of Fencing Panel at SP/SSP/TSS	Metre	100	100	3770	208	377000	20800	397800
80	30(a)(i)	Supply and Erection of Fencing Upright at SP/SSP/TSS	MT	1.2	1.2	115050	4825	138060	5790	143850
81	30(a)(ii)	Supply and Erection of Gates	Metre	6	6	5280	376	31680	2256	33936
82	30(b)(i)	Supply and Erection of Anti-climbing device at SP/SSP/TSS.	Metre	45	45	426	11	19170	495	19665
83	30(b)(i)	Supply and Erection of Anti-climbing device for Auxiliary Transformer	Each	1	1	1795	383	1795	383	2178
84	31	Modification to erected equipments:								
85	31(a)	Transfer of Overhead Equipment from one Mast or Support to another, including removal of Cantilever Assembly from old Mast or Support	Each		30	0	1870	0	56100	56100
86	31(b)	Provision of an additional bracket assembly / assemblies on a mast or support.	Each		30	0	2316	0	69480	69480
87	31(c)	Dismantling of Overhead Equipment	TKM		0.7		13957	0	9769.9	9769.9
88	31(e)	Splicing and Extension of Anchored OHE	Set		8		2558	0	20464	20464
89	31(f)	Dismantling of Section Insulator	Each		1		2622	0	2622	2622
90	31(g)	Slewing and Putting back of OHE in original position	Span		13		2286	0	29718	29718
91	31(h)	Dismantling of an Isolator	Each		1		1780	0	1780	1780
92	31(i)	Dismantling of Post Insulator	Each		8		336	0	2688	2688
93	31(j)(i)	Dismantling of Suspension Insulator	Each		2		494	0	988	988
94	31(j)(ii)	Dismantling of Cut-in Insulator	Each		4		589	0	2356	2356
95	31(k)(i)	Dismantlement of OHE Mast or structure by cutting	Each		16	0	3062	0	48992	48992
96	31(k)(i)	Dismantlement of upright of TTC's/portals by cutting.	Each		4	0	4376	0	17504	17504
97	31(l)(i)	Retrieval of traction masts, main masts, of Switching Station, TTC uprights etc.	Each		8	0	11520	0	92160	92160
98	31m	Releasing of Pole mounted LT supply transformer	Each		1		3617	0	3617	3617
99	31(n)	Dismantlement of guy rod	Each		8	0	524	0	4192	4192

100	31(o)	Releasing of Multiple Cantilever Crossarm cantilever assemblies where single cantilever assembly is leftover	Each		12	0	524	0	6288	6288
101	31(p)	Dismantling of Droparms/Booms/Temporary masts	MT		1	0	5359	0	5359	5359
102	31(q)	Splicing and Extension of Feeder conductor	Each		1		2986	0	2986	2986
103	31(r)	Dismantling of Cantilever assemblies including insulators.	Each		22	0	480	0	10560	10560
104	31(s)	Dismantling of Fabricated Steel or Small Parts Steel (SPS)	MT		1.4	0	709	0	992.6	992.6
105	31(t)(i)	Dismantling of a regulating equipment (Three pulley type) with counter weight assembly for conventional OHE.	Each		4	0	2542	0	10168	10168
106	31(t)(ii)	Dismantling of anti creep with galv. Steel wire.or Cadmium Catenary wire	Each		2	0	1480	0	2960	2960
107	31(t)(iv)	Dismantling of all typers of copper jumpers	Each		14	0	140	0	1960	1960
108	31(t)(v)	Dismantling of Termination for Conventional type Overhead Equipment	Each		4		515	0	2060	2060
109	31(t)(ix)	Re-adjustment of OHE Spans, including droppers	Span		14		4376	0	61264	61264
110	31(t)(x)	Dismantling of Structure Bond / Longitudinal Bond / Transverse and Special Bond	Each		22		145	0	3190	3190
111	32	100 % Extra on erection rates for work done under power block								
112	32/3(a)	Erection of Traction masts and main masts of Switching stations and LT Transformer station under power block..	MT		28	0	3465	0	97020	97020
113	32/3(b)	Erection of Fabricated Small Part Steel work other than mast, TTC's, Portals, etc under power block.	MT		12	0	15267	0	183204	183204
114	32/3(e)	Erection of Guy rod assembly under power block..	Each		12		1120	0	13440	13440
115	32/4(a)(i)	without Insulator and Erection of Single bracket assembly for conventional OHE under power block.	Each		52		1080	0	56160	56160
116	32/4(a)(ii)	Erection of Two Cantilever Assemblies on same structure or support for Conventional OHE under power block	Each		12		1619	0	19428	19428
117	32/4(a)(iii)	Erection of Three Cantilever Assemblies on same structure or support for Conventional OHE under power block	Each		9		1859	0	16731	16731
118	32/4(b)(i)	without Insulator and erection of a pull off arrangement for conventional OHE under power block	Each		1		785	0	785	785
119	32/6(a)	Erection of regulated conventional OHE under power block.	TKM		4.9		48362	0	236973.8	236973.8
120	32/7(a)	Erection Stringing of along feeder (either All Aluminum 25 kV Feeder (single spider) or copper feeder wire under power block	KM		1		12004	0	12004	12004
121	32/7(b)	Erection of Copper Cross Feeder Wire under power block	Each		4		2354	0	9416	9416

122	32/8(a) (v)	Erection of regulating equipment (3 pulley type) with counter weight assembly for conventional OHE. under power block	Each		14		4000	0	56000	56000
123	32/8(b) (ii)	without Insulator and erection of material for terminations of Conventional OHE conductor under power block	Each		12		1120	0	13440	13440
124	32/8(b) (iii)	(Without Insulator) and Erection of Materials for Termination of Along Feeder(Aluminium/Copper) under power block	Each		4		1000	0	4000	4000
125	32/8(b) (ix)	(other than Insulators) and erection of materials for termination of copper cross feeder with gantries under power block	Set		4		1000	0	4000	4000
126	32/9(a)	without Insulators and erection of anti creep with galvanised steel wire for conventional OHE under power block	Each		4		3372	0	13488	13488
127	32/10(a)	Extra on Item 6(a) or 6(c) for and erection of additional fittings required at a turn out , cross over or overlap etc. under power block	Each		16		1250	0	20000	20000
128	32/11(a) (i)	without insulator and erection of 25 kV solid core cut-in insulator under power block	Each		4		711	0	2844	2844
129	32/11(a) (ii)	without insulator and erection of 25 kV solid core suspension insulator under power block	Each		2		494	0	988	988
130	32/11(b)	without insulator and erection of 25 kV Post Insulators under power block	Each		20		336	0	6720	6720
131	32/12(a)	without insulators and erection of 25 kV Section Insulator assembly for conventional OHE under power block	Each		4		3117	0	12468	12468
132	32/12(c)	Erection of Light Weight Section Insulator under power block	Each		2		4300	0	8600	8600
133	32/13(a)	without insulators and erection of 25 kV Single Pole Isolator without earth contact assembly under power block	Each		5		2891	0	14455	14455
134	32/13(b)	without insulators and erection of 25 kV Double pole Isolator without earth contact assembly under power block	Each		2		4188	0	8376	8376
135	32/13(c)	Erection of Earth Contact Wire Assembly for an Isolator under power block	Each		2		412	0	824	824
136	32/15(a)	Erection of 50 Sqmm of copper jumpers.(C-Jumper, F-jumper, Anti theft jumper) under power block	Each		20		356	0	7120	7120
137	32/15(b)	Erection of 160 or 105 sq.mm under power block Copper Jumper (Isolator Jumper, G-Jumper)	Each		20		680	0	13600	13600
138	32/15(c)	Erection of 160 sq. mm Large copper jumper wire between Aluminium Bus and Cross-feeder under power block	Each		4		612	0	2448	2448
139	32/15(d)	Erection of 160 sq. mm Large copper jumper wire between Cross-feeder and OHE under power block	Each		4		612	0	2448	2448
140	32/15(e)	Erection of Aluminium Jumper under power block	Each		2		342	0	684	684
141	32/18(a)	Erection of 25 KV vacuum Interruptors (BM) under power block	Each		1		5596	0	5596	5596
142	32/18(b)	Erection of 25 KV vacuum Circuit Braker(CB) under power block	Each		1		5596	0	5596	5596

143	32/19(a)	Erection of 25 KV (Type-I) Potential transformer under power block	Each		1		1340	0	1340	1340
144	32/20(a)	Erection of 42KV Lightning Arrestors under power block	Each		1		847	0	847	847
145	32/26(a)(i)	Erection of Aluminum bus bar 36mm x 28mm under power block	Metre		10		72	0	720	720
146	32/26(a)(ii)	Erection of COPPER bus bar 18mm under power block	Metre		50		146	0	7300	7300
147	32/31(a)	Transfer of Overhead Equipment from one Mast or Support to another, including removal of Cantilever Assembly from old Mast or Support under power block	Each		17		1870	0	31790	31790
148	32/31(b)	Provision of an additional bracket assembly / assemblies on a mast or support. under power block	Each		17		2316	0	39372	39372
149	32/31(c)	Dismantling of Overhead Equipment under power block	TKM		0.7		13957	0	9769.9	9769.9
150	32/31(e)	Splicing and Extension of Anchored OHE under power block	Set		8		2558	0	20464	20464
151	32/31(g)	Slewing and Putting back of OHE in original position under power block	Span		13		2286	0	29718	29718
152	32/31(h)	Dismantling of an Isolator under power block	Each		1		1780	0	1780	1780
153	32/31(i)	Dismantling of Post Insulator under power block	Each		4		336	0	1344	1344
154	32/31(j)(i)	Dismantling of Suspension Insulator under power block	Each		2		494	0	988	988
155	32/31(j)(ii)	Dismantling of Cut-in Insulator under power block	Each		4		589	0	2356	2356
156	32/31(k)(i)	Dismantlement of OHE Mast or structure by cutting under power block	Each		16		3062	0	48992	48992
157	32/31(k)(ii)	Dismantlement of upright of TTC's/portals by cutting under power block	Each		8		4376	0	35008	35008
158	32/31(l)(i)	Retrieval of traction masts, main masts, of Switching Station, TTC uprights etc. under power block	Each		3		11520	0	34560	34560
159	32/31(m)	Releasing of Pole mounted LT transformer under power block	Each		1		3617	0	3617	3617
160	32/31(n)	Dismantlement of guy rod under power block	Each		7		524	0	3668	3668
161	32/31(o)	Releasing of Multiple Cantilever Crossarm cantilever assemblies where single cantilever assembly is leftover under power block	Each		5		524	0	2620	2620
162	32/31(p)	Dismantling of Droparms/Booms/Temporary masts under power block	MT		1		5359	0	5359	5359
163	32/31(q)	Splicing and Extension of Feeder conductor under power block	Each		2		2986	0	5972	5972
164	32/31(r)	Dismantling of Cantilever assemblies including insulators under power block	Each		22		480	0	10560	10560
165	32/31(s)	Dismantling of Fabricated Steel or Small Parts Steel (SPS) under power block	MT		1.4		709	0	992.6	992.6
166	32/31(t)(i)	Dismantling of a regulating equipment (Three pulley type) with counter weight assembly for conventional OHE under power block	Each		4		2542	0	10168	10168

167	32/31(t)(iv)	Dismantling of all typers of copper jumpers under power block	Each		20		140	0	2800	2800
168	32/31(t)(v)	Dismantling of Termination for Conventional type Overhead Equipment under power block	Each		4		515	0	2060	2060
169	32/31(t)(ix)	Re-adjustment of OHE Spans, including droppers under power block	Span		14		4376	0	61264	61264
170		Dismantlement of TSS equipment under power block								
171	32/45(a)	Erection of 25 KV Current Transformer under power block	Each		1		1911	0	1911	1911
172	34 (j)	Providing and Laying Pitching with Stone Boulders	Cu.M		20		6659	0	133180	133180
173	34 (k)	Supply and Spreading of 20 mm ballast at TSS/SSP/SP yards	Cu.M	50		1915		95750	0	95750
174	35	Internal and External Lighting of Switching (SP/SSP) Station Building	Each		1	0	37716	0	37716	37716
175	36(a)	Unloading of all type of Steel Structures.	MT		100	0	140	0	14000	14000
176	36(b)	Loading of all type of Steel Structures.	MT		100	0	240	0	24000	24000
177	37(a)	Unloading of all type of Copper & Aluminum conductors.	MT		6	0	120	0	720	720
178	37(b)	Loading of all type of Copper & Aluminum conductors.	MT		6	0	120	0	720	720
179	38	Transportation of OHE structures / Materials / Equipments	MT-KM		5000		116	0	580000	580000
180	40(a)	Supply and Erection of Number Plate (Enamel Type)	Each	150	150	516	100	77400	15000	92400
181	40(b)	Supply and Erection of Number Plate (Retro Reflective Type)	Each	20	20	1049	149	20980	2980	23960
182	41(b)	Supply and Erection of Enamel type Public Caution board	Each	20	20	2166	179	43320	3580	46900
183	41(c)	Supply and Erection of Enamel type Staff Caution board	Each	10	10	1384	179	13840	1790	15630
184	41(d)	Supply and Erection of Retro-Reflective Type Electric Engine Stop Board/Caution Unwired Turnout Board	Each	10	10	3410	179	34100	1790	35890
185	41(e)	Supply and Erection of Retro-Reflective Type Power Block Working Limit Board	Each	16	16	1284	179	20544	2864	23408
186	41(f)	Supply and Erection of Enamel type Caution Clearance to OHE nearby Restricted Board	Each	2	2	823	179	1646	358	2004
187	41(g)	Supply and Erection of Retro-Reflective type Danger Board for Height Gauge	Each	4	4	2562	179	10248	716	10964
188	41(h)	Supply and Erection of Vitreous Enamelled 25 kV Danger Board with skull & bones for Overline Structure (OLS) and Auxiliary Transformer	Each	2	2	352	179	704	358	1062
189	41(i)	Supply and Erection of Enamel Protected Area Board	Each	1	1	1475	179	1475	179	1654
190	41(j)	Supply and Erection of Retro-Reflective Sigma Board	Each	24	24	690	179	16560	4296	20856
191	41(k)	Supply and Erection of Vitreous Enamelled TSS/SP/SSP Name Board	Each	1	1	5588	179	5588	179	5767

192	41(l)	Supply and erection of set of Isolator operation OPEN/CLOSE boards	Set	2	2	1540	179	3080	358	3438
193	42	Supply and Erection of Shock Treatment charts Tri - lingual English, Hindi and telugu (Laminated)	Each	1	1	2862	204	2862	204	3066
194	45(a)	Erection of 25 KV Current Transformer	Each		1	0	1911	0	1911	1911
		TOTAL OF OHE&PSI items (Sch-A1)						7721553.9	4776939.6	12498493.5
Schedule-A2 : Foundation Items										
1	2(a) (i)	Concrete for foundations and plinth in Hard Soil	Cu. M	45		10004		450180	0	450180
2	2(a) (ii)	Concrete for foundations and plinth in Rocky Soil	Cu. M	150		10259		1538850	0	1538850
3	2(b)	Concrete for foundations and plinth in other than Hard and Rock Soil	Cu. M	599		9230		5528770	0	5528770
4	2 (c) (i)	Reinforced Concrete for foundation, plinth and trench	Cu. M	8		10179		81432	0	81432
5	2(C) (ii)	Reinforced Concrete for Cable Trench covers	sq.m	20		2893		57860	0	57860
6	2 (e)	Extra for supply & sinking of concrete shells (M15 grade)	Cu. M	3		7590		22770	0	22770
7	2 (f)	Casting of foundations using mechanized Augur (M15 grade)	Cu. M	3		8747		26241	0	26241
8	2(g)	Casting of single under reamed pile foundation (M15 grade)	Cu. M	3		8818		26454	0	26454
9	2(h) (i)	Reinforcement cement concrete, ratio 1:2:4 in columns with 20 mm and downgraded stone aggregate and coarse sand.	Cu. M	21		12691		266511	0	266511
10	2(h) (ii)	Reinforcement cement concrete, ratio 1:3:6 in pile caps with 20 mm and downgraded stone aggregate and coarse sand.	Cu. M	3		11679		35037	0	35037
11	2(h) (iii)	Mass concrete (PCC), ratio 1:4:8 stone with nominal size stone aggregate 40 mm gauge and ordinary sand in mud mat.	Cu. M	3		4472		13416	0	13416
12	2(i)	Breaking of foundation up to 200 mm below track formation and drain / PF surface etc	Cu. M	20		2952		59040	0	59040
		TOTAL OF Foundation Items (Sch-A2)						8106561	0	8106561
SCHEDULE B1 : STEEL SUPPLY										
1	3(as)	Supply of Rolled or Fabricated and Galvanized Traction Masts, Switching Station Masts, AT masts, Feeder masts etc	MT	62.95		132174		8320353.3	0	8320353.3
2	3(bs)	Supply of Fabricated and Galvanized structures such as TTCs, Portals, other than masts	MT	12		135370		1624440	0	1624440
3	3(cs)	Supply of Fabricated and Galvanized Small Parts Steel (SPS) other than Masts, TTCs and Portals.	MT	16.8		147256		2473900.8	0	2473900.8
		TOTAL OF STEEL SUPPLY						12418694	0	12418694.1
SCHEDULE B2 : COPPER SUPPLY										
3	6(cs)	Supply of 7 mm dia Hard Drawn Round Copper Dropper Wire	KG	60		1350		81000	0	81000
4	6(ds)	Supply of 5 mm dia Hard Drawn Round Copper Dropper Wire	KG	315		1250		393750	0	393750

5	7(bs)	Supply of 150 sq.mm Hard Drawn Stranded Copper Cross Feeder Wire	KG	170		1350		229500	0	229500
6	7(cs)	Supply of 130 sq.mm Cadmium Copper Large Span Wire	KG	150		1400		210000	0	210000
7	15(as)	Supply of 50 sq.mm Annealed Stranded Copper Jumper Wire	KG	30		1261		37830	0	37830
8	15(bs)	Supply of 160 sq.mm Annealed Stranded Copper Jumper Wire	KG	240		1355		325200	0	325200
		Total of Copper Supply						1277280	0	1277280

SCHEDULE B3 : INSULATOR SUPPLY

1	4(ax)	Supply of Porcelain Stay and Bracket Insulators for Item No. 4(a)(i) / 4(a)(iv)	Set	188		6255		1175940	0	1175940
2	8(bx)	Supply of Porcelain 9-ton Insulator for item no. 8(b)(ii)/8(b)(iii)/8(b)(vi)/8(b)(ix)/9(a)/9(b)/9(c)/9(d)/11(a)(i)/11(a)(ii)	Each	84		4145		348180	0	348180
3	11(bx)	Supply of Post Insulator for Item no. 11(b)	Each	28		5558		155624	0	155624
4	12(ax)	Supply of section and 9 ton Insulator for item No.12(a)	Set	8		10718		85744	0	85744
5	13(ax)	Supply of Post and Operating Rod Insulators for Item no. 13(a)	Set	6		14236		85416	0	85416
6	13(bx)	Supply of 25 KV Post& Operating rod insulators for item 13(b)	Set	2		28472		56944	0	56944
7	28(x)	Supply of 25 KV Post insulators for item 28	Set	2		11116		22232	0	22232
		Total OF INSULATOR SUPPLY						1930080	0	1930080

SCHEDULE B4 : GENERAL SUPPLY

1	7(as)	Supply of All Aluminium 25 kV Feeder conductor (Single Spider 19/3.99 mm).	KM	1		229628		229628	0	229628
2	12(cs)	Supply of Light Weight Section Insulator	Each	2		415151		830302	0	830302
3	18(as)	Supply of 25 kV Vacuum Interrupter (BM)	Each	1		303614		303614	0	303614
4	18(bs)	Supply of 25 kV Vacuum Circuit Breaker (CB)	Each	1		453474		453474	0	453474
5	19(as)	Supply of 25 kV Type-I Potential Transformer(PT)	Each	1		49939		49939	0	49939
6	20(as)	Supply of 42 kV, 10 kA Metal oxide Gapless type Lightning Arrester	Each	1		47456		47456	0	47456
7	23(as)	Supply of 110 V, 40 Ah Low Maintenance Lead Acid Battery	Each	1		129604		129604	0	129604
8	23(bs)	Supply of Battery Charger for 110 V, 40 Ah lead acid battery	Each	1		87763		87763	0	87763
9	27(bs)	Supply of 10 KVA, 25 kV/ 240 V Oil filled Auxiliary Transformer	Each	2		82225		164450	0	164450
10	28(s)	Supply of 25 kV Operating Rod For Drop Out Fuse Switch	Each	2		4161		8322	0	8322
11	45(as)	Supply of 25 kV Current Transformer CT Ratio 1500-750/5A	Each	1		54959		54959	0	54959
		TOTAL OF GENERAL Supply						2359511	0	2359511

SCHEDULE C : GENERAL ITEMS

1	3(z)	Portal Boom Splicing and Extension for Each Portal	Each		2		38000	0	76000	76000
2	16(z)	Disconnection & Reconnection of any type of bond	Each		100		160	0	16000	16000

3	17(z)(i)	Transportation & Erection of 13 m long 52/60 KG Released Rail from nominated place to work site	Number		1		5249	0	5249	5249
4	17(z)(ii)	Supply & Erection of High Productivity Fasteners(Rail Contact System) for fixing of Traction Bonds at Buried Rail Earthing Station. One Set comprises of M-12/20 Stainless Steel Nuts, Bolts & Washers etc.	Set	1		5444	5444	0	5444	
5	19(z)	Trimming/Cutting of Tree Branches including disposal of branches/Bushes outside yard (Note: Girth of more than 20 cm will only be considered as tree branch)	Each		20		170	0	3400	3400
		TOTAL OF GENERAL Items						5444	100649	106093
		SCHEDULE D : 2X25KV								
1	7(c)	Supply and Erection of Aerial Earth Conductor (AEC) with necessary accessories, fittings and fasteners on OHE mast/Portals.	KM	2	2	103343	19750	206686	39500	246186
		TOTAL of SCH -D: 2X25 kV ITEMS						206686	39500	246186
		SCHEDULE E : Other Items (NON-SOR)								
1		Supply, erection, testing & commissioning of RTU as per RDSO specification for SSP	Nos.	1	1	1568175	118965	1568175	118965	1687140
2		Modification upgradation testing and commissioning in existing standard SCADA software of RDSO specifications: TI/SPC/RCC/SCADA/0130 Rev-2 at RCC equipments for configuration, integration / hooking of additional RTU's of adjacent sections with master station			1		275000	0	275000	275000
3		Supply of control and relay panel for the control for 6 No's CB's / BM's		1		4980000		4980000	0	4980000
4		Supply of Contact wire Splice	Each	10		830		8300	0	8300
5		Supply of catenary wire Splice	Each	10		327		3270	0	3270
6		Manning of SSP/SP	Man Month		6		17480	0	104880	104880
7		Supply and erection of schematic diagram board in switching / traction sub stations	set	1	1	1840	230	1840	230	2070
8		Supply and erection of Standard First Aid Box	Each	1	1	460	115	460	115	575
9		Supply and erection of fire extinguishers	Set	1	1	11040	1380	11040	1380	12420
10		Supply and erection of fire buckets with stand.	Each	4	4	5520	690	22080	2760	24840
11		Optimizers	LS	1		94400		94400	0	94400
12		Multi purpose machine	Each	1		88500		88500	0	88500
13		Scanner	Each	1		35400		35400	0	35400
14		Plotter	Each	1		212400		212400	0	212400
15		Printer (A4) colour Lazer Jet	Each	2		29500		59000	0	59000
16		Data Analyser with output devices	Each	2		88500		177000	0	177000
17		Photo copier machine	Each	2		177000		354000	0	354000
18		Desk top compters	Each	2		88500		177000	0	177000
19		Chairs	Each	6		5900		35400	0	35400
		TOTAL Other Items (NON-SOR)						7828265	503330	8331595

PS2 (TRD) Proposed New Bypass Line at Parli Vaijanath station for connecting Parli vaijnath- Latur Road & Parli vaijnath - Parbhani Main lines for OHE arrangements.

Schedule-A1 : OHE&PSI items										
Sl. No.	Item No.	Description	Unit	App. Qty.		Base Rate in Rs.		Total Price in Rs.		
				Purchase	Labour / Erection	Purchase	Labour / Erection	Purchase	Labour / Erection	Total
1	1(a)	Preparation of Designs and drawings for OHE	TKM		5	0	20066	0	100330	100330
2	1(b)	Preparation of design and drawings for switching stations (SP/SSP)	Each		1	0	40828	0	40828	40828
3	1(d)	Supply & instalation of tractction working rule diagram boards	Sq.Ft		150	0	1271	0	190650	190650
4	1(f)	Preparation of Designs and drawings of sectioning drg	Each		1	0	14212	0	14212	14212
5	3(a)	Erection of Traction masts and main masts of Switching stations and LT supply Transformer station.	MT		63	0	3465	0	218295	218295
6	3(b)	Erection of Fabricated Small Part Steel work other than mast, TTC's, Portals, etc	MT		32	0	15267	0	488544	488544
7	3(e)	Supply and erection of Guy rod assembly.	Each	48	48	9331	1120	447888	53760	501648
8	3(g)	Supply of steel reinforcement for RCC work.	MT	0.5		71717	0	35858.5	0	35858.5
9	4(a)(i)	Supply without Insulator and Erection of Single bracket assembly for conventional OHE.	Each	200	150	12114	1080	2422800	162000	2584800
10	4(a)(ii)	Erection of Two Cantilever Assemblies on same structure or support for Conventional OHE	Each		32		1619	0	51808	51808
11	4(a) (iii)	Erection of Three Cantilever Assemblies on same structure or support for Conventional OHE	Each		18		1859	0	33462	33462
12	6(a)	Supply and Erection of regulated conventional OHE.	TKM	6.2	6.2	24271	48362	150480.2	299844.4	450324.6
13	7(a)	Erection Stringing of along feeder (either All Aluminum 25 kV Feeder (single spider) or copper feeder wire	KM	0.5	0.5		12004	0	6002	6002
14	7(b)	Erection of Copper Cross Feeder Wire	Each		6		2354	0	14124	14124
15	8(a) (v)	Supply and erection of regulating equipment (3 pulley type) with counter weight assembly for conventional OHE.	Each	31	31	70583	4000	2188073	124000	2312073
16	8(a) (xii)	Marking of "Y" - Measurement at BWA locations.	Each		31	0	185	0	5735	5735
17	8(b) (ii)	Supply without Insulator and erection of material for terminations of Conventional OHE conductor.	Each	31	31	8201	1120	254231	34720	288951
18	8(b) (iii)	Supply (Without Insulator) and Erection of Materials for Termination of Along Feeder(Aluminium/Copper)	Each	10	10	5192	1000	51920	10000	61920
19	8(b) (ix)	Supply (other than Insulators) and erection of materials for termination of copper cross feeder with gantries.	Set	4	4	8293	1000	33172	4000	37172
20	9(a)	Supply without Insulators and erection of anti creep with galvanised steel wire for conventional OHE.	Each	10	10	22000	3372	220000	33720	253720
21	10(a)	Extra on Item 6(a) or 6(c) for supply and erection of additional fittings required at a turn out , cross over or overlap etc.	Each	16	16	5733	1250	91728	20000	111728
22	11(a) (i)	Supply with out insulator and erection of 25 kV solid core cut-in insulator.	Each	8	8	1859	711	14872	5688	20560
23	11(a) (ii)	Supply without insulator and erection of 25 kV solid core suspension insulator.	Each	20	20	2022	494	40440	9880	50320

24	11(b)	Supply without insulator and erection of 25 kV Post Insulators.	Each	14	14	850	336	11900	4704	16604
25	12(a)	Supply without insulators and erection of 25 kV Section Insulator assembly for conventional OHE	Each	6	6	51930	3117	311580	18702	330282
26	12(c)	Erection of Light Weight Section Insulator	Each		2		4300	0	8600	8600
27	13(a)	Supply without insulators and erection of 25 kV Single Pole Isolator without earth contact assembly	Each	5	5	40128	2891	200640	14455	215095
28	13(b)	Supply without insulators and erection of 25 kV Double pole Isolator without earth contact assembly.	Each	1	1	67227	4188	67227	4188	71415
29	13(c)	Supply and Erection of Earth Contact Wire Assembly for an Isolator	Each	2	2	13357	412	26714	824	27538
30	13(d)	Supply and Erection of an Interlocking Device	Each	2	2	4610	294	9220	588	9808
31	15(a)	Supply and erection of 50 Sqmm of copper jumpers.(C-Jumper, F- jumper, Anti theft jumper)	Each	40	40	756	356	30240	14240	44480
32	15(b)	Supply and Erection of 160 or 105 sq.mm Copper Jumper (Isolator Jumper, G-Jumper)	Each	60	60	2126	680	127560	40800	168360
33	15(c)	Supply and Erection of 160 sq. mm Large copper jumper wire between Aluminium Bus and Cross-feeder	Each	4	4	5008	612	20032	2448	22480
34	15(d)	Supply and Erection of 160 sq. mm Large copper jumper wire between Cross-feeder and OHE	Each	4	4	3345	612	13380	2448	15828
35	16(a)	Supply and erection of structure bonds	Each	175	175	833	304	145775	53200	198975
36	16(b)	Supply and erection of longitudinal bond.	Each	60	60	604	274	36240	16440	52680
37	16(c)	Supply and erection of transverse and special bonds.	Each	50	50	951	326	47550	16300	63850
38	16(aa)	Drilling of holes on rails	Each		285	0	107	0	30495	30495
39	16(d)	Supply and Erection of Structure Bond on Platform Area	Each	15	15	1618	2369	24270	35535	59805
40	17(a)	Supply and erection of single Earth electrode at COP/FOB/PTFE/Steel Girder etc..	Each	16	16	3511	1347	56176	21552	77728
41	17(b)	Supply and Erection of Earth Bus	Metre	10	10	183	80	1830	800	2630
42	17 (c)	Supply and Erection of Single Earth Electrode TSS/SP/SSP/AT	Each	4	4	4142	1905	16568	7620	24188
43	17(d)	Supply and erection of Copper strips for equipment earthing.	Metre	10	10	959	85	9590	850	10440
44	17(e)	Supply and Erection of Earth leads 75 mm x 8 mm mild steel laid in the ground.	Metre	20	20	379	103	7580	2060	9640
45	17(f)	Supply and Erection of Earth leads 75 mm x 8 mm mild steel laid exposed	Metre	40	40	379	76	15160	3040	18200
46	17(h)	Supply and Erection of Earth leads 50 mm x 6 mm mild steel laid exposed	Metre	20	20	184	65	3680	1300	4980
47	18(a)	Erection of 25 KV vacuum Interruptors (BM)	Each		1	0	5596	0	5596	5596
48	19(a)	Erection of 25 KV (Type-I) Potential transformer	Each		1		1340	0	1340	1340
49	20(a)	Erection of 42KV Lightning Arrestors	Each		1	0	847	0	847	847
50	21	Supply and Erection of Terminal boards in control cubicle.	Each	1	1	21460	522	21460	522	21982
51	22(a)	Supply and erection of an iron clad 110V. DC. Fuse box.	Each	1	1	3738	110	3738	110	3848
52	22(b)	Supply and Erection of an Iron Clad 230 V AC Fuse Box	Each	1	1	4135	110	4135	110	4245
53	22(c)	Supply and Erection of 110 V Distribution Boards	Each	1	1	34692	771	34692	771	35463
54	23(a)	Erection of 110 V,40-AH Lead Acid Battery.	Each		1	0	8496	0	8496	8496

55	23(b)	Erection of Battery charger for 110 V, 40 Ah Lead Acid Battery	Each		1		1274	0	1274	1274
56	25(a)	Supply and installation of cable for control and indication (10 or 7 core, 2.5 sq. mm)	Metre	60	60	1118	21	67080	1260	68340
57	25(b)	Supply and installation of cable for heater supply(2 core, 4 sq. mm)	Metre	50	50	421	21	21050	1050	22100
58	25(c)	Supply and installation of cable for catenary indication(2 core, 2.5 sq. mm).	Metre	50	50	289	21	14450	1050	15500
59	25(d)	Supply and Erection of cable for 110 V DC Power supply (2 core. 4 sq. mm)	Metre	50	50	421	26	21050	1300	22350
60	25(e)(i)	Supply and Laying of 2 core, 70 sq mm XLPE Aluminium cable	Metre	30	30	212	26	6360	780	7140
61	25(e)(ii)	Supply and Laying of 2 core, 150 or 185 sq mm XLPE Aluminium cable	Metre	50	50	401	39	20050	1950	22000
62	26(a)(i)	Supply and erection of Aluminum bus bar 36mm x 28mm.	Metre	40	40	612	72	24480	2880	27360
63	26(a)(ii)	Supply and erection of COPPER bus bar 18mm.	Metre	80	80	2250	146	180000	11680	191680
64	26(b)(i)	Supply and erection of aluminum bus terminal (6480).	Each	4	4	1215	47	4860	188	5048
65	26(b)(ii)	Supply and erection of aluminum bus splice (6490).	Each	4	4	1162	47	4648	188	4836
66	26(b)(iii)	Supply and erection of aluminum bus tee connector (6500)	Each	4	4	1593	42	6372	168	6540
67	26(b)(iv)	Supply and erection of aluminum bus bar terminal connector 36/20mm. (6530).	Each	4	4	1062	42	4248	168	4416
68	26(b)(v)	Supply and erection of aluminum bus bar tap connector (6520).	Each	4	4	1800	47	7200	188	7388
69	26(b)(vi)	Supply and erection of flexible bus splice (6550).	Each	4	4	3092	47	12368	188	12556
70	26(b)(vi i)	Supply and erection of aluminum bus bar terminal connector bolted type (6830-1).	Each	4	4	677	42	2708	168	2876
71	26(c)(i)	Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Terminal (6310-1)	Each	8	8	1231	47	9848	376	10224
72	26(c)(ii)	Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Splice (6320)	Each	4	4	1416	47	5664	188	5852
73	27(a)	Erection of 25 kV/240 V, 5/10/25/50 KVA Auxiliary Transformer	Each		2		7234	0	14468	14468
74	28	Supply (without Insulators) and Erection of 25 kV Drop out fuse switch.for all oil/dry type L.T.Supply transformerss of all capacities	Each	2	2	10219	563	20438	1126	21564
75	30(a)(i)	Supply and Erection of Fencing Panel at SP/SSP/TSS	Metre	35	35	3770	208	131950	7280	139230
76	30(a)(ii)	Supply and Erection of Fencing Upright at SP/SSP/TSS	MT	0.5	0.5	115050	4825	57525	2412.5	59937.5
77	30(a)(iii)	Supply and Erection of Gates	Metre	10	10	5280	376	52800	3760	56560
78	30(b)(i)	Supply and Erection of Anti-climbing device at SP/SSP/TSS.	Metre	25	25	426	11	10650	275	10925
79	30(b)(ii)	Supply and Erection of Anti-climbing device for Auxiliary Transformer	Each	1	1	1795	383	1795	383	2178
80	31	Modificationto erected equipments:						0	0	0
81	31(a)	Transfer of Overhead Equipment from one Mast or Support to another, including removal of Cantilever Assembly from old Mast or Support	Each		50	0	1870	0	93500	93500
82	31(b)	Provision of an additional bracket assembly / assemblies on a mast or support.	Each		10	0	2316	0	23160	23160
83	31 (c)	Dismantling of Overhead Equipment	TKM		2		13957	0	27914	27914

84	31(d)	Dismantling of Along Feeder Wire (Aluminium or Copper)	KM		0.2		6028	0	1205.6	1205.6
85	31(e)	Splicing and Extension of Anchored OHE	Set		6		2558	0	15348	15348
86	31(f)	Dismantling of Section Insulator	Each		2		2622	0	5244	5244
87	31(g)	Slewing and Putting back of OHE in original position	Span		10		2286	0	22860	22860
88	31(h)	Dismantling of an Isolator	Each		3		1780	0	5340	5340
89	31(i)	Dismantling of Post Insulator	Each		4		336	0	1344	1344
90	31(j)(i)	Dismantling of Suspension Insulator	Each		4		494	0	1976	1976
91	31(j)(ii)	Dismantling of Cut-in Insulator	Each		2		589	0	1178	1178
92	31(k)(i)	Dismantlement of OHE Mast or structure by cutting	Each		30	0	3062	0	91860	91860
93	31(k)(ii)	Dismantlement of upright of TTC's/portals by cutting.	Each		5	0	4376	0	21880	21880
94	31(l)(i)	Retrieval of traction masts, main masts, of Switching Station, TTC uprights etc.	Each		10	0	11520	0	115200	115200
95	31m	Releasing of Pole mounted LT supply transformer	Each		1		3617	0	3617	3617
96	31(n)	Dismantlement of guy rod	Each		6	0	524	0	3144	3144
97	31(o)	Releasing of Multiple Cantilever Crossarm cantilever assemblies where single cantilever assembly is leftover	Each		10	0	524	0	5240	5240
98	31(p)	Dismantling of Droparms/Booms/Temporary masts	MT		2	0	5359	0	10718	10718
99	31(q)	Splicing and Extension of Feeder conductor	Each		1		2986	0	2986	2986
100	31(r)	Dismantling of Cantilever assemblies including insulators.	Each		30	0	480	0	14400	14400
101	31(s)	Dismantling of Fabricated Steel or Small Parts Steel (SPS)	MT		2	0	709	0	1418	1418
102	31(t)(i)	Dismantling of a regulating equipment (Three pulley type) with counter weight assembly for conventional OHE.	Each		4	0	2542	0	10168	10168
103	31(t)(iii)	Dismantling of anti creep with galv. Steel wire.or Cadmium Catenary wire	Each		1	0	1480	0	1480	1480
104	31(t)(iv)	Dismantling of all typers of copper jumpers	Each		20	0	140	0	2800	2800
105	31(t)(v)	Dismantling of Termination for Conventional type Overhead Equipment	Each		2		515	0	1030	1030
106	31(t)(vii)	Dismantlement of Termination for Along Feeder (Aluminium or Copper)	Each		2		506	0	1012	1012
107	31(t)(viii)	Transfer of Feeder Wire from one Mast or Support to another Mast or Support	Each		4		2411	0	9644	9644
108	31(t)(ix)	Re-adjustment of OHE Spans, including droppers	Span		20		4376	0	87520	87520
109	31(t)(x)	Dismantling of Structure Bond / Longitudinal Bond / Transverse and Special Bond	Each		20		145	0	2900	2900
110	32	100 % Extra on erection rates for work done under power block						0	0	0
111	32/3(a)	Erection of Traction masts and main masts of Switching stations and LT Transformer station under power block..	MT		16	0	3465	0	55440	55440
112	32/3(b)	Erection of Fabricated Small Part Steel work other than mast, TTC's, Portals, etc under power block.	MT		18	0	15267	0	274806	274806
113	32/3(e)	Erection of Guy rod assembly under power block..	Each		8		1120	0	8960	8960
114	32/4(a)(i)	without Insulator and Erection of Single bracket assembly for conventional OHE under power block.	Each		40		1080	0	43200	43200

115	32/4(a)(ii)	Erection of Two Cantilever Assemblies on same structure or support for Conventional OHE under power block	Each		12		1619	0	19428	19428
116	32/4(a)(iii)	Erection of Three Cantilever Assemblies on same structure or support for Conventional OHE under power block	Each		12		1859	0	22308	22308
117	32/6(a)	Erection of regulated conventional OHE under power block.	TKM		5.7		48362	0	275663.4	275663.4
118	32/7(a)	Erection Stringing of along feeder (either All Aluminum 25 kV Feeder (single spider) or copper feeder wire under power block	KM		0.5		12004	0	6002	6002
119	32/7(b)	Erection of Copper Cross Feeder Wire under power block	Each		6		2354	0	14124	14124
120	32/8(a)(v)	Erection of regulating equipment (3 pulley type) with counter weight assembly for conventional OHE. under power block	Each		7		4000	0	28000	28000
121	32/8(b)(ii)	without Insulator and erection of material for terminations of Conventional OHE conductor under power block	Each		7		1120	0	7840	7840
122	32/8(b)(iii)	(Without Insulator) and Erection of Materials for Termination of Along Feeder(Aluminium/Copper) under power block	Each		6		1000	0	6000	6000
123	32/8(b)(ix)	(other than Insulators) and erection of materials for termination of copper cross feeder with gantries under power block	Set		4		1000	0	4000	4000
124	32/9(a)	without Insulators and erection of anti creep with galvanised steel wire for conventional OHE under power block	Each		4		3372	0	13488	13488
125	32/10(a)	Extra on Item 6(a) or 6(c) for and erection of additional fittings required at a turn out , cross over or overlap etc. under power block	Each		8		1250	0	10000	10000
126	32/11(a)(i)	without insulator and erection of 25 kV solid core cut-in insulator under power block	Each		8		711	0	5688	5688
127	32/11(a)(ii)	without insulator and erection of 25 kV solid core suspension insulator under power block	Each		14		494	0	6916	6916
128	32/11(b)	without insulator and erection of 25 kV Post Insulators under power block	Each		14		336	0	4704	4704
129	32/12(a)	without insulators and erection of 25 kV Section Insulator assembly for conventional OHE under power block	Each		6		3117	0	18702	18702
130	32/12(c)	Erection of Light Weight Section Insulator under power block	Each		1		4300	0	4300	4300
131	32/13(a)	without insulators and erection of 25 kV Single Pole Isolator without earth contact assembly under power block	Each		5		2891	0	14455	14455
132	32/13(b)	without insulators and erection of 25 kV Double pole Isolator without earth contact assembly under power block	Each		1		4188	0	4188	4188
133	32/13(c)	Erection of Earth Contact Wire Assembly for an Isolator under power block	Each		2		412	0	824	824
134	32/15(a)	Erection of 50 Sqmm of copper jumpers.(C-Jumpper, F- jumpper, Anti theft jumpper) under power block	Each		40		356	0	14240	14240
135	32/15(b)	Erection of 160 or 105 sq.mm under power block Copper Jumper (Isolator Jumper, G-Jumper)	Each		40		680	0	27200	27200

136	32/15(c)	Erection of 160 sq. mm Large copper jumper wire between Aluminium Bus and Cross-feeder under power block	Each		4		612	0	2448	2448
137	32/15(d)	Erection of 160 sq. mm Large copper jumper wire between Cross-feeder and OHE under power block	Each		4		612	0	2448	2448
138	32/18(a)	Erection of 25 KV vacuum Interruptors (BM) under power block	Each		1		5596	0	5596	5596
139	32/19(a)	Erection of 25 KV (Type-I) Potential transformer under power block	Each		1		1340	0	1340	1340
140	32/20(a)	Erection of 42KV Lightning Arrestors under power block	Each		1		847	0	847	847
141	32/26(a) (i)	Erection of Aluminum bus bar 36mm x 28mm under power block	Metre		10		72	0	720	720
142	32/26(a) (ii)	Erection of COPPER bus bar 18mm under power block	Metre		40		146	0	5840	5840
143	32/26(b) (i)	Erection of aluminum bus terminal (6480) under power block	Each		2		47	0	94	94
144	32/26(b) (ii)	Erection of aluminum bus splice (6490) under power block	Each		2		47	0	94	94
145	32/26(b) (iii)	Erection of aluminum bus tee connector (6500) under power block	Each		2		42	0	84	84
146	32/26(b) (iv)	Erection of aluminum bus bar terminal connector 36/20mm. (6530) under power block	Each		2		42	0	84	84
147	32/26(b) (v)	Erection of aluminum bus bar tap connector (6520) under power block	Each		2		47	0	94	94
148	32/26(b) (vi)	Erection of flexible bus splice (6550) under power block	Each		2		47	0	94	94
149	32/26(b) (vii)	Erection of aluminum bus bar terminal connector bolted type (6830-1) under power block	Each		2		42	0	84	84
150	32/26(c) (i)	Erection of Solid Copper Busbar under power block Connector - 18 mm Bus Terminal (6310-1)	Each		4		47	0	188	188
151	32/26(c) (ii)	Erection of Solid Copper Busbar under power block Connector - 18 mm Bus Splice (6320)	Each		4		47	0	188	188
152	32/27(a)	Erection of 25 kV/240 V, 5/10/25/50 KVA Auxiliary Transformer under power block	Each		2		7234	0	14468	14468
153	32/31(a)	Transfer of Overhead Equipment from one Mast or Support to another, including removal of Cantilever Assembly from old Mast or Support under power block	Each		10		1870	0	18700	18700
154	32/31(b)	Provision of an additional bracket assembly / assemblies on a mast or support. under power block	Each		10		2316	0	23160	23160
155	32/31 (c)	Dismantling of Overhead Equipment under power block	TKM		2		13957	0	27914	27914
156	32/31(d)	Dismantling of Along Feeder Wire (Aluminium or Copper) under power block	KM		0.2		6028	0	1205.6	1205.6
157	32/31(e)	Splicing and Extension of Anchored OHE under power block	Set		6		2558	0	15348	15348
158	32/31(f)	Dismantling of Section Insulator under power block	Each		1		2622	0	2622	2622
159	32/31(g)	Slewing and Putting back of OHE in original position under power block	Span		8		2286	0	18288	18288
160	32/31(h)	Dismantling of an Isolator under power block	Each		3		1780	0	5340	5340
161	32/31(i)	Dismantling of Post Insulator under power block	Each		4		336	0	1344	1344

162	32/31(j) (i)	Dismantling of Suspension Insulator under power block	Each		8		494	0	3952	3952
163	32/31(j) (ii)	Dismantling of Cut-in Insulator under power block	Each		2		589	0	1178	1178
164	32/31(k) (i)	Dismantlement of OHE Mast or structure by cutting under power block	Each		30		3062	0	91860	91860
165	32/31(k) (ii)	Dismantlement of upright of TTC's/portals by cutting under power block	Each		5		4376	0	21880	21880
166	32/31(l) (i)	Retrieval of traction masts, main masts, of Switching Station, TTC uprights etc. under power block	Each		4		11520	0	46080	46080
167	32/31m	Releasing of Pole mounted LT transformer under power block	Each		1		3617	0	3617	3617
168	32/31(n)	Dismantlement of guy rod under power block	Each		6		524	0	3144	3144
169	32/31(p)	Dismantling of Droparms/Booms/Temporary masts under power block	MT		1		5359	0	5359	5359
170	32/31(q)	Splicing and Extension of Feeder conductor under power block	Each		2		2986	0	5972	5972
171	32/31(r)	Dismantling of Cantilever assemblies including insulators under power block	Each		30		480	0	14400	14400
172	32/31(s)	Dismantling of Fabricated Steel or Small Parts Steel (SPS) under power block	MT		2		709	0	1418	1418
173	32/31(t) (i)	Dismantling of a regulating equipment (Three pulley type) with counter weight assembly for conventional OHE under power block	Each		4		2542	0	10168	10168
174	32/31(t) (iv)	Dismantling of all typers of copper jumpers under power block	Each		20		140	0	2800	2800
175	32/31(t) (viii)	Transfer of Feeder Wire from one Mast or Support to another Mast or Support under power block	Each		10		2411	0	24110	24110
176	32/31(t) (ix)	Re-adjustment of OHE Spans, including droppers under power block	Span		10		4376	0	43760	43760
177	34 (f)	Excavation of Earth, filling including compaction in all kinds of soil	Cu.M		24		298	0	7152	7152
178	34 (j)	Providing and Laying Pitching with Stone Boulders	Cu.M		100		6659	0	665900	665900
179	34 (k)	Supply and Spreading of 20 mm ballast at TSS/SSP/SP yards	Cu.M		20		1915	0	38300	38300
180	35	Internal and External Lighting of Switching (SP/SSP) Station Building	Each		1	0	37716	0	37716	37716
181	36(a)	Unloading of all type of Steel Structures.	MT		100	0	140	0	14000	14000
182	36(b)	Loading of all type of Steel Structures.	MT		100	0	240	0	24000	24000
183	37(a)	Unloading of all type of Copper & Aluminum conductors.	MT		10	0	120	0	1200	1200
184	37(b)	Loading of all type of Copper & Aluminum conductors.	MT		10	0	120	0	1200	1200
185	38	Transportation of OHE structures / Materials / Equipments	MT-KM		5000		116	0	580000	580000
186	40(a)	Supply and Erection of Number Plate (Enamel Type)	Each	200	200	516	100	103200	20000	123200
187	40(b)	Supply and Erection of Number Plate (Retro Reflective Type)	Each	10	10	1049	149	10490	1490	11980

188	41(a)	Supply and Erection of Retro-Reflective type DJ ON (CLOSE)/DJ OFF (OPEN)/ 500 m/250 m/Train-18/MEMU Neutral Section Boards	Each	2	2	1865	179	3730	358	4088
189	41(b)	Supply and Erection of Enamel type Public Caution board	Each	2	2	2166	179	4332	358	4690
190	41(c)	Supply and Erection of Enamel type Staff Caution board	Each	2	2	1384	179	2768	358	3126
191	41(d)	Supply and Erection of Retro-Reflective Type Electric Engine Stop Board/Caution Unwired Turnout Board	Each	2	2	3410	179	6820	358	7178
192	41(e)	Supply and Erection of Retro-Reflective Type Power Block Working Limit Board	Each	2	2	1284	179	2568	358	2926
193	41(f)	Supply and Erection of Enamel type Caution Clearance to OHE nearby Restricted Board	Each	1	1	823	179	823	179	1002
194	41(g)	Supply and Erection of Retro-Reflective type Danger Board for Height Gauge	Each	2	2	2562	179	5124	358	5482
195	41(h)	Supply and Erection of Vitreous Enamelled 25 kV Danger Board with skull & bones for Overline Structure (OLS) and Auxiliary Transformer	Each	2	2	352	179	704	358	1062
196	41(i)	Supply and Erection of Enamel Protected Area Board	Each	1	1	1475	179	1475	179	1654
197	41(j)	Supply and Erection of Retro-Reflective Sigma Board	Each	2	2	690	179	1380	358	1738
198	41(k)	Supply and Erection of Vitreous Enamelled TSS/SP/SSP Name Board	Each	1	1	5588	179	5588	179	5767
199	41(l)	Supply and erection of set of Isolator operation OPEN/CLOSE boards	Set	2	2	1540	179	3080	358	3438
200	42	Supply and Erection of Shock Treatment charts Tri - lingual English, Hindi and telugu (Laminated)	Each	3	3	2862	204	8586	612	9198
		TOTAL OF OHE&PSI items (Sch-A1)						8046661.7	5595554.5	13642216.2
		Schedule-A2 : Foundation Items								
1	2(a) (i)	Concrete for foundations and plinth in Hard Soil	Cu. M	63		10004	630252	0		630252
2	2(a) (ii)	Concrete for foundations and plinth in Rocky Soil	Cu. M	40		10259	410360	0		410360
3	2(b)	Concrete for foundations and plinth in other than Hard and Rock Soil	Cu. M	400		9230	3692000	0		3692000
4	2 (c) (i)	Reinforced Concrete for foundation, plinth and trench	Cu. M	6		10179	61074	0		61074
5	2(C) (ii)	Reinforced Concrete for Cable Trench covers	sq.m	10		2893	28930	0		28930
6	2 (e)	Extra for supply & sinking of concrete shells (M15 grade)	Cu. M	10		7590	75900	0		75900
7	2(i)	Breaking of foundation up to 200 mm below track formation and drain / PF surface etc	Cu. M	20		2952	59040	0		59040
		TOTAL OF Foundation Items (Sch-A2)						4957556	0	4957556
		SCHEDULE B1 : STEEL SUPPLY								
1	3(as)	Supply of Rolled or Fabricated and Galvanized Traction Masts, Switching Station Masts, AT masts, Feeder masts etc	MT	63		132174	8326962	0		8326962
2	3(bs)	Supply of Fabricated and Galvanized structures such as TTCs, Portals, other than masts	MT	15		135370	2030550	0		2030550

3	3[cs]	Supply of Fabricated and Galvanized Small Parts Steel (SPS) other than Masts, TTCs and Portals.	MT	17		147256		2503352	0	2503352
		TOTAL OF STEEL SUPPLY						12860864	0	12860864
		SCHEDULE B2 : COPPER SUPPLY								
3	6(cs)	Supply of 7 mm dia Hard Drawn Round Copper Dropper Wire	KG	40		1350		54000	0	54000
4	6(ds)	Supply of 5 mm dia Hard Drawn Round Copper Dropper Wire	KG	410		1250		512500	0	512500
5	7(bs)	Supply of 150 sq.mm Hard Drawn Stranded Copper Cross Feeder Wire	KG	350		1350		472500	0	472500
6	7(cs)	Supply of 130 sq.mm Cadmium Copper Large Span Wire	KG	400		1400		560000	0	560000
7	15(as)	Supply of 50 sq.mm Annealed Stranded Copper Jumper Wire	KG	50		1261		63050	0	63050
8	15(bs)	Supply of 160 sq.mm Annealed Stranded Copper Jumper Wire	KG	400		1355		542000	0	542000
		TOTAL OF COPPER SUPPLY						2204050	0	2204050
		SCHEDULE B3 : INSULATOR SUPPLY								
1	4(ax)	Supply of Porcelain Stay and Bracket Insulators for Item No. 4(a)(i) / 4(a)(iv)	Set	200		6255		1251000	0	1251000
2	8(bx)	Supply of Porcelain 9-ton Insulator for item no. 8(b)(ii)/8(b)(iii)/8(b)(vi)/8(b)(ix)/9(a)/9(b)/9(c)/9(d)/11(a)(i)/11(a)(ii)	Each	97		4145		402065	0	402065
3	11(bx)	Supply of Post Insulator for Item no. 11(b)	Each	14		5558		77812	0	77812
4	12(ax)	Supply of section and 9 ton Insulator for item No.12(a)	Set	6		10718		64308	0	64308
5	13(ax)	Supply of Post and Operating Rod Insulators for Item no. 13(a)	Set	5		14236		71180	0	71180
6	13(bx)	Supply of 25 KV Post & Operating rod insulators for item 13(b)	Set	1		28472		28472	0	28472
7	28(x)	Supply of 25 KV Post insulators for item 28	Set	4		11116		44464	0	44464
		Total OF INSULATOR SUPPLY						1939301	0	1939301
		SCHEDULE B4 : GENERAL SUPPLY								
1	7(as)	Supply of All Aluminium 25 kV Feeder conductor (Single Spider 19/3.99 mm).	KM	0.5		229628		114814	0	114814
2	12(cs)	Supply of Light Weight Section Insulator	Each	2		415151		830302	0	830302
3	18(as)	Supply of 25 kV Vacuum Interrupter (BM)	Each	1		303614		303614	0	303614
4	19(as)	Supply of 25 kV Type-I Potential Transformer(PT)	Each	1		49939		49939	0	49939
5	20(as)	Supply of 42 kV, 10 kA Metal oxide Gapless type Lightning Arrester	Each	1		47456		47456	0	47456
6	23(as)	Supply of 110 V, 40 Ah Low Maintenance Lead Acid Battery	Each	1		129604		129604	0	129604
7	23(bs)	Supply of Battery Charger for 110 V, 40 Ah lead acid battery	Each	1		87763		87763	0	87763
8	27(bs)	Supply of 10 KVA, 25 kV/ 240 V Oil filled Auxiliary Transformer	Each	2		82225		164450	0	164450
9	28(s)	Supply of 25 kV Operating Rod For Drop Out Fuse Switch	Each	2		4161		8322	0	8322
		TOTAL OF GENERAL Supply						1736264	0	1736264
		SCHEDULE C : GENERAL ITEMS								

1	3(z)	Portal Boom Splicing and Extension for Each Portal	Each		1		38000	0	38000	38000
2	19(z)	Trimming/Cutting of Tree Branches including disposal of branches/Bushes outside yard (Note: Girth of more than 20 cm will only be considered as tree branch)	Each		10		170	0	1700	1700
		TOTAL OF GENERAL Items						0	39700	39700
		SCHEDULE E : Other Items NON-SOR								
1	1	Supply, Erection, Testing & Commissioning of Remote Station Equipments at remote stations as per RDSO Spec No. TI/SPC/RCC/SCADA/0134 for SSP.	Nos.	1	1	156817 5	118965	1568175	118965	1687140
2	2	Modification upgradation testing and commissioning in existing standard SCADA software of RDSO specifications: TI/SPC/RCC/SCADA/0130 Rev-2 at RCC equipments for configuration, integration / hooking of additional RTU's of adjacent sections with master station	Nos.		1		275000	0	275000	275000
3	3	Erection of maintenace free earth kit	set		2		10972	0	21944	21944
4	4	Supply of maintenace free earth kit	set	2		14620		29240	0	29240
5	5	Supply and erection of Standard First Aid Box	Each	1	1	844	211	844	211	1055
6	6	Supply and erection of fire extinguishers	Set	1	1	20256	2532	20256	2532	22788
7	7	Supply and erection of fire buckets with stand.	Each	1	1	10128	1266	10128	1266	11394
		TOTAL of Other Items NON- SOR						1628643	419918	2048561

EXPLANATORY NOTES

SCHEDULE A1: OHE & PSI Items

Item 1(a) - Preparation of Design & Drawings for Overhead Equipment

The price shall cover per TKM basis for site survey, design and preparation of complete layout plan of each station/section (i.e. including existing unmodified portion) and all related drawings for overhead equipment. The OHE is to be designed as per RDSO/CORE standards.

In case of modification works in existing electrified area, soil classification as per nearby locations may be adopted. The preparation of Layout plans (LOPs) and other designs are to be finalized by the contractor in consultation & in close coordination with Railway Engineer In-charge. The price shall include the following scope.

Layout Plan (LOP):

After site survey and based on the engineering scale plan, contractor will submit proposed OHE layout plan for approval. After approval of proposed layout plan, the work is to be started. The contractor may be asked to prepare the layout plans based on the site details if the Railway Engineer In-charge is not able to supply the Engineering scale plan (ESP).

Feeder will also be applicable independently in case of feeders running on independent structures (not supporting OHE) along or across tracks.

Note: As advised by Railway Engineer In-charge, Part LOP may be submitted for planning to start the work at site apart from Full LOP. In case of big yards, showing complete LOP in zero size sheet is not feasible to check at site. Hence, Part LOPs may be submitted as advised by Railway Engineer In-charge.

Cross Section Drawing (CSD):

The price shall cover design and preparation of complete cross section drawings (CSDs) of each location as per RDSO/CORE standards. The contractor shall submit CSDs for approval. In-so-far as yards between outer most points and crossings are concerned, cross section drawings for each structure shall indicate guy rods, if any, the cross section of the formation, height and nature of the bank, whether new or old, nature of soil, type of foundation block, structure proposed, reverse deflection of the structure and all necessary particulars for erection of the foundation and the structures.

Note: (i) In open line sections, cross-sections drawings (CSDs) shall be submitted in the proforma, separately for each Railway line. (ii) For special foundation, drawings with all necessary details shall be submitted to the Purchaser. (iii) In case of side bearing foundation with extra depth, formation details as such location and necessary details for anchor foundation will be submitted. (iv) Prior to CSD preparation, a soil test should be conducted as per requirements to determine the exact soil-bearing capacity and soil type

Structure Erection Drawing (SED):

The Contractor shall submit structure erection drawings for each location for approval incorporating all the details included in the cross section drawing for the structure and the details of the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure. For structures with isolators, the details of electrical

connections shall also be incorporated. In open line section, the contractor shall submit structure erection particulars in the 'SED' proforma separately for each main line track in addition to particular details as indicated in the proforma for cross-section drawings.

The price shall also include the following, if required:

- i) Preparation of long section drawings of overhead equipment including detailed study of over line structures such as foot over bridges, road over bridges etc. for maintaining the specified height of contact wire and requisite clearances. Contractor has to submit four (04) hard copy sets and soft copy (Auto Cad) to the purchaser.
- ii) Preparation of Bonding plan drawings and supply of 4 hard copy sets as well as soft copy. Contractor has to submit four (04) hard copy sets and soft copy (Auto Cad) to the purchaser.

Approved Drawings:

Contractor has to prepare above mentioned /or all relevant in-principle drawings and submit 01 set of check paper print for verification from railway. Contractor has to make suitable corrections/modifications raised on check prints, and submit 02 sets for approval.

As Erected Drawings:

After completion of work at site, contractor has to prepare '**as erected drawings**' of proposed works as per site in one (01) set check paper print for verification from railway. After incorporation of remarks on check print, contractor have to submit five (05) hard copy sets along with one tracing print and soft copy (Auto Cad) to the purchaser.

Notes For Measurements: For the purpose of payment against this item, the length of track shall be measured as under:

1. General: By the difference in the chainages of the length under consideration, as incorporated in the layout plans.
2. Turnouts: The track taking off shall be deemed as starting from the toe of the switch of the Turnout.
3. Cross-overs: The length of track shall be taken as the difference in the chainages of the toes of switches of the two turnouts constituting the crossover.
4. Diamond crossing with or without slips: The two tracks crossing each other shall be measured independently as per note 1 above as though there were no crossing. No extra shall be provided for slip points.
5. Dead ends and tops of loops: The lengths for payment under this item shall be up to the chainage of anchor mast of the terminating OHE.

The length of line to be considered for purpose of item 1(a) shall be measured

- i) by the distance between the center line of the two structures to which the feeders/return feeders/conductors are anchored, in case of feeders running along the track if such feeder/return feeders/conductors are running completely on independent structures or

- ii) by the distance between the center of the two structures supporting the OHE on either side of the first and last independent structure in case of feeders/return feeders/conductors running along the track supporting OHE.

Item 1(b) - Preparation of Design & Drawings for Switching Station (SP/SSP)

The price shall include the cost of preparation of design and drawing of switching station (SP/SSP) as per latest RDSO drawings & specifications. Also, it includes the necessary additions/alterations required for addition of an interrupter along with other equipment in existing SP/SSP.

The price shall cover supply of detailed drawings as mentioned below:

- a) Schematic Diagram
- b) Location Plan
- c) General Arrangement Drawing (GAD)
- d) Foundation Layout Drawing.
- e) Fencing Layout Drawing
- f) Earth mat Layout
- g) Cable trench Drawing.
- h) Cable Run Drawing
- i) Structure Assembly Drawing
- j) Any other essential drawings required in connection with SP/SSP.

Approved Drawings:

Contractor has to prepare above mentioned /or all relevant in-principle drawings of proposed work and submit one (01) set check paper print for verification from railway. Contractor have to make suitable corrections/ modifications raised on check prints, and submit two (02) sets of drawings for approval.

As Erected Drawings:

After completion of work at site, contractor has to prepare '**as erected drawing**' of proposed works per site submerged in existing portion of SP/SSP in one (01) set check paper print for verification from railway. After incorporation of remarks on check print, contractor have to submit five (05) hard copy sets along with one tracing print and soft copy (Auto Cad) to the purchaser.

Item 1(c) - Preparation of Traction Working Rule Diagram along with Working Instructions [Appendix-G]

The price shall include the preparation of the Traction Working Rule diagram (SWR Drawing) and the development of station working instructions for incorporation in Appendix-G of SWR Book at station. Traction working rule diagram is to be prepared based on Approved Layout plan and approved SIP duly incorporating signals and all elementary sections clearly. SWR (Appendix-G) should contain all instructions in connection with power block working section wise, sub section wise and protections to be taken etc.

Contractor has to prepare the SWR drawing in AutoCAD format and the instructions in MS Word format for Railway approval and submit one (01) set check paper print for verification from railway. Contractor has to make suitable corrections/ modifications raised on check prints, and submit 02 hard copy set of drawings for approval of competent authority. Upon approval, the Contractor shall supply six (06) hard copy sets of the drawings along with one soft copy, complete with coloring, operational rules, and a proper cover. The work shall be carried out in accordance with the ACTM and G&SR guidelines.

Note: (1) SWR drawings are to be printed in A3 Paper along with lamination.
(2) SWR Instructions are to be printed in A4 Paper.

Item 1(d) - Supply & Installation of Traction Working Rule Diagram Boards

The price shall include the supply and installation of fabricated Traction Working Rule Diagram (SWRD)/Sectioning/Schematic Diagram Boards of various sizes at designated locations, including Stations/Junction cabins, TPC cubicles, OHE/PSI depot, etc. The boards must be fabricated using 3 mm thick ACP (Aluminium Composite Panels) sheets, supported by iron framing, and finished with aluminium beading for durability and a professional appearance. The SWRD drawings shall be printed on adhesive vinyl, with elementary sections distinctly marked in different colours for clarity. Installation of the boards shall be carried out in accordance with the requirements and directions of the Railway Engineer In-charge at station, cabins, Depot and TPC.

Note: Dimensions of Traction working rule diagram boards are to be decided in consultation with Railway Engineer In-charge.

Item 1(e) - Preparation of Design & Drawings for Traction Substation (TSS)

The price shall include the cost of preparation of design and drawing of Traction Substation (TSS). The design & drawings for TSS should be prepared as per latest RDSO drawings & specifications. The price shall also include duly incorporating the necessary additions/alterations required for addition of an interrupter along with other equipment or addition of extra bay.

The price shall cover supply of detailed drawings as mentioned below:

- a) Schematic Diagram
- b) Location Plan
- c) General Arrangement Drawing (GAD)
- d) Foundation Layout Drawing.
- e) Fencing Layout Drawing
- f) Earth mat Layout
- g) Cable trench Drawing.
- h) Cable Run Drawing
- i) Structure Assembly Drawing
- j) Control Room Building Drawing
- k) Baffle Wall Drawing

l) Any other essential drawings required in connection with TSS.

Approved Drawings:

Contractor has to prepare above mentioned /or all relevant drawings of proposed work and submit 01 set check paper prints for verification from railway. Contractor has to make suitable corrections/modifications raised on check prints, and submit 02 sets of drawings for approval.

As Erected Drawings:

After completion of work at site, contractor has to prepare '**as erected drawing**' of proposed works per site submerged in existing portion of TSS in 01 set check paper print for verification from railway. After incorporation of remarks on check print, contractor have to submit five (05) hard copy sets along with one tracing print and soft copy (Auto Cad) to the purchaser.

Item 1(f) - Preparation and Designing of sectioning diagram.

The price shall include the preparation of Sectioning diagram for each station. If required for the sectioning diagram, the Contractor shall develop it based on the approved Signal Interlocking Plan (SIP) and Engineering Scale Plan (ESP), copies of which will be provided by the Railways at no cost. If required, wiring drawing is also to be submitted by contractor.

Contractor has to prepare drawings of proposed work and submit one (01) set check paper print for verification from railway. Contractor has to make suitable corrections/ modifications raised on check prints, and submit 02 hard copy sets and PDF version of drawings for approval. Upon approval, five (05) hard copy sets of the drawings, along with one tracing print and a soft copy in AutoCAD format, shall be supplied to the purchaser. The work shall be carried out in accordance with ACTM and G&SR standards.

Item 1(g) - Design and Preparation of Structure Erected Drawing (SED)

The price shall cover for site survey, design and preparation of complete SED of each location based on existing LOP. This item will be operated for single / isolated locations or for AT Stations. The design is to be prepared as per RDSO/CORE standards. The price shall also cover soil investigation and testing in an approved manner, for new sidings and branch lines. In case of modification works in existing electrified area, soil classification as per nearby locations may be adopted. The price shall include the following scope.

Cross Section Drawings:

The price shall cover design and preparation of complete cross section drawings of each location as per RDSO/CORE standards (i.e. including existing unmodified portion). The contractor shall submit two sets of blue print for approval. In-so-far as yards between outer most points and crossings are concerned, cross section drawings for each structure, shall indicate (a) guy rods, if any, (b) the cross section of the formation, (c) height and nature of the bank, whether new or old, (d) nature of soil, (e) type of foundation block, (f) structure proposed, (g) reverse deflection of the structure and all necessary particulars for erection of the foundation and the structures.

Note: (i) In open line sections, cross-sections drawings shall be submitted in the proforma, separately for each Railway line. (ii) For special foundation, drawings with all necessary details shall be submitted to the Purchaser. (iii) In case of side bearing foundation with extra depth, formation details as such location and necessary details for anchor foundation will be submitted. (iv) Prior to CSD preparation, a soil test should be conducted as per requirements to determine the exact soil-bearing capacity and soil type

Structure Erection Drawings:

The Contractor shall submit structure erection drawings for each location for approval incorporating all the details included in the cross section drawing for the structure and the details of the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure.

For structures with isolators, the details of electrical connections shall also be incorporated. In open line section, the contractor shall submit structure erection particulars in the 'SED' proforma separately for each main line track in addition to particular details as indicated in the proforma for cross-section drawings.

Approved Drawings:

Contractor has to prepare above mentioned /or all relevant drawings and submit 01 set of check paper print for verification from railway. Contractor has to make suitable corrections/ modifications raised on check prints, and submit 02 sets for approval.

As Erected Drawings:

After completion of work at site, contractor has to prepare 'as erected drawings' of proposed works as per site in one (01) set check paper print for verification from railway. After incorporation of remarks on check print, contractor has to submit five (05) hard copy sets and soft copy (Auto Cad) to the purchaser.

Item 3(a) - Erection of Traction Masts, Feeder Masts, AT Mast and Main Masts of Switching Stations

The price shall include the cost for erection (either manually or by crane), alignment and setting before grouting of individual traction masts, main masts of switching post, booster transformer stations, masts for LT supply transformer station, dwarf masts whether rolled or fabricated

Note: For the purpose of payment, the weight of individual traction mast shall be determined for each type on the basis of the payable weights per meter length shown below for standard types. For special type masts, the payable weight per meter length will be indicated by the Purchaser at the time of approval of designs.

Sl. No	Type of Mast	Weight in kg per meter including galvanization.
1	BFB 6"x6"	38.30
2	RSJ 8"x6"	53.30
3	B 150	39.07
4	B 175	44.61
5	B 200	50.76
6	B 225	61.50
7	B 250	70.72
8	K 150	38.18
9	K 175	43.72
10	K 200	49.87
11	K 225	37.50
12	K 250	66.72
13	S 1	53.39
14	S 3	76.40
15	S 4	53.39
16	S 5	111.53
17	S 6	53.39
18	S 7	76.40
19	S 8	111.53
20	S100	23.72

21	S101	19.98
22	T150	38.18
23	Dwarf mast	--

Item 3(b) - Erection of TTCs, Portals and Small Parts Steel (SPS)

The price shall include the cost of erection (either manually or by crane), alignment and setting before grouting, wherever required, of portals, gantries, two/three tracks cantilever (TTC) structures and tower/steel work for feeders for traction sub-station, drop arms, standard super masts, suspension brackets for feeders and return conductors, complete with anchor plates drilled and welded in position, multiple cantilever cross arm, chairs, adaptors for bracket assemblies and all other small part steel works, the erection of which is carried out by the Contractor irrespective of whether they are supplied by the Purchaser or the Contractor. The prices shall also include erection of galvanized bolts, nuts washers etc. wherever required as per approved designs and drawings.

Note for Item 3(b):

- i) For the purpose of payment against items 3(b) weight of structures or fabricated steel work will be calculated based on gross weight including galvanization. There will be no addition for increased weight due to painting (or) weld material or reduction for holes or skew cuts.
- ii) The rates against item 3(b) shall be applicable to the erection of small part steel work, which are not covered under the various other items of work. Unless specifically indicated none of the other items of work shall include the cost of erection of small part steel work, which will invariably be paid for under item 3(b) as applicable.
- iii) All required galvanized bolts, nuts and washers are to be claimed under item 3(cs) of Schedule-B1, wherever not provided. Quantity requirement is to be decided as per site condition.

Note for Item 3(a), 3(b):

- The price shall also include the straightening of masts/portal uprights bent during transit and cutting of masts/portal uprights to suit the site conditions.
- The mast/structures cut to suit site condition, proportionate weight will only be paid under item 3(a)/3(b).
- The quantity schedule for item no 3(a) & 3(b) are prepared based on certain drawings given during preparation of schedule and as per site requirements.

Item 3(e) - Supply and Erection of Guy Rod Assembly

The price shall include the supply and erection of guy rod assemblies of various lengths for traction masts, portals, TTCs, feeder masts, or supports as per RDSO Drg No. ETI/OHE/P/5000 (Rev.B) or its latest revision & RDSO Drg No. ETI/OHE/01403/SH.1&2 or its latest revision. All necessary parts shall be grouted into the anchor block complete with bolts, nuts, and other required fittings. The price shall exclude supply and erection of small parts steel, if any.

The supply materials include the following components:

RI No.	Description of components	Qty per unit for Normal Anchor	Qty per unit for Dwarf Mast Anchor
5001/5001-1/5001-3	Anchor bolts (complete with Nuts, Locknuts and Split pins)	-	2
5002	Guy rod Stirrup	1	1
5004/5005/5006-1/9070/ 9071	Guy Rod (complete with Nuts, Locknuts, Washer and Split pins)	1	1
5007-1	Anchor 'V' bolt (complete with Nuts, Locknuts, Punched Washer and Split pins)	1	-
5008	Anchor Loop	1	-
5220	Guy Rod Double Strap Assembly complete with bolt, nut, washers and pins.	1 or 2	1

Item 3(g) - Supply of Steel Reinforcement for RCC Work

The price shall include the supply of tested quality of steel for reinforcement of appropriate size and for reinforcement steel above 8mm (or) suitable dia. shall be High strength deformed steel bars conforming to IS:1786/1985.

The cost towards cutting straightening hooking, bending, erecting and placing and keeping in position including all lead and lift and including cost of binding wire shall be inclusive in item 2(h)(i), 2(h)(ii) or under appropriate item respectively.

Test certificates for steel will be furnished by the contractor at his own cost from a laboratory approved by the Engineer-in-Charge. Nothing extra will be paid for unauthorized overlaps and wastage of steel involved in cutting the bars to their required sizes.

Item 4(a)(i) - Supply (without Insulators) and Erection of Single Cantilever Assembly for Conventional OHE

Supply: The price shall include the supply of a single cantilever assembly mounted on a traction mast, support or drop arm. The price includes the cost of all components complete with fasteners excluding stay & bracket insulators, dropper wires, and small parts steel if any. The supply of cantilever assembly shall conform to RDSO Drg No. ETI/OHE/G/02106 (Rev. C) (SH.1 & 3) or its latest revisions & RDSO Drg No. ETI/OHE/G/02104 (Mod. C) (SH.1) or its latest revisions.

The supply materials include the following components:

<u>Rly. ID No.</u>	<u>Description of components</u>	<u>Qty for IR Cantilever</u>	<u>Qty for OR Cantilever</u>
3021	Mast Fitting for Hook Insulator with two nos. GI Bolt.	1 Set	1 Set
2400	Tubular Stay Arm Assembly (2401 - 25 mm Stay Tube - 1 No (2.5meters) , 2402-1 - Tubular Stay Adjuster (large) 16 hole - 1 No, 2403-1 - Tubular Stay Sleeve - 1 No, 2402 - Stud Bolt 10 mm with Lock Nut - 2 No)	1 Set	1 Set
2110-1/2130- 1/ 2380	Standard/Large Catenary Suspension Bracket with U Bolt - 2Nos, Nut - 4Nos, Spring Washers - 4 Nos	1 Set	1 Set
1160/1170	Suspension Clamp with U Bolt - 2 Nos, Pin - 1 No, Lock Plate - 2Nos, Nut - 4Nos, Split Pin - 1 No, Punched Washers - 1 No OR Double Suspension Clamp with U Bolt - 2 Nos, Pin - 1 No, Lock Plate - 1 Nos, Nut - 4 Nos, Split Pin - 1 No, Punched Washers - 1 No for anti-creep location	1 Set	1 Set
3070-1/3070- 2	Mast Bracket Fitting Assembly (150/200) with two nos. GI Bolt.	1 Set	1 Set
2080/2040	Large Bracket Tube (3.8 m length) with Tube Cap (2104-1) or Standard Bracket Tube (Suitable length) with Tube Cap	1Set	1Set
2150-1 or 2160-1	Register Arm Hook assembly complete with bolts, nuts and lock nuts.	1 Set	-
2422-2	Register Arm Eye Piece 25 mm	1	-
2421/2420-1	Register Arm Tube (3.8m length) with Tube Cap (2423-1)	1 Set	-
2431	Raised Register Arm Tube (25mm dia) (3.5 m length) with dropper clip (2423-1)	-	1 Set
2360	25 mm Drop Bracket Assembly complete with bolt, locknut	1 Set	-
2550-1/2	Standard Anti-Wind Clamp complete with Strap, Bolt, Nut, Spring Washer, Snap Head Rivet	1 Set	-

2390/2540/2520	<p>BFB Steady Arm Assembly (2390/2540/2520 - BFB Steady arm - 1 No, 2391- BFB Steady arm Hook - 1 No, 2392 - BFB Steady Arm Swivel - 1 No, AL Rivets - 4 Nos)</p> <p>Or Bent Steady Arm assembly (if required)</p>	1 Set	-
1174	Packing Saddle	1 No	1 No
1220	Contact wire swivel clip (1221) and pin (1222)	1 Set	1 Set
2270-4/2270-5/ 2460style-2	<p>49 mm Register Arm Dropper Assembly (2270-5) for Pull-off CL Excluding dropper wire (2277- Dropper Clip (49 mm) - 1 No, 2461-1 - Dropper Clip (34 mm) - 1 No, 2 Nos - Bolt, Lock Nut, Spring Washer, Spilt Pin) OR</p> <p>38mm Register Arm Dropper Assembly (2270-4) Pull-off CL Excluding dropper wire (2274-1 -Dropper Clip (38 mm) - 1 No, 2461-1 - Dropper Clip (34 mm) - 1 No, 2 Nos - Bolt, LockNut, Spring Washer, Spilt Pin) OR</p> <p>25 mm Register Arm Dropper Assembly (2460) for Push-off CL Excluding dropper wire (2461 - Dropper Clip (25 mm) - 1 No or 2461-1 - Dropper Clip (34 mm) - 1 No, 2 Nos - Bolt, LockNut, Spring Washer, Spilt Pin)</p>	1 Set	-
2470 style-02	<p>25 mm Raised Register Arm Dropper Assembly (2470) Excluding dropper wire (2471-1 - Dropper Clip (25 mm) - 1 No, 2 Nos - Bolt, LockNut, Spring Washer, Spilt Pin)</p>	-	1 Set
	Stay Fasteners (Bolt, Nut, LockNut, Washer)	1 Set	1 Set
	Bracket Fasteners (U-Bolt, Nut, Lock Nut, Washer)	1 Set	1 Set
1371-3	Raised Register Arm Clamp	-	1 Set

2432	RRA Adjuster	-	1 Set
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Erection: The price shall include fabrication and erection of a single cantilever assembly mounted on a traction mast, support or drop arm. This includes installations on high- or low-level platforms, at turnouts, over bridges, at overlaps, and at locations with reduced encumbrance or at termination locations. It includes the erection of all components, including stay & bracket insulators and dropper wires, fasteners. But, excludes small parts steel if any.

The erection of cantilever assembly shall conform to RDSO Drg No. ETI/OHE/G/02106 (Rev. C) (SH .1 & 3) or its latest revisions & RDSO Drg No. ETI/OHE/G/02104 (Mod. C) (SH .1) or its latest revisions.

Note: Any additional material required for erection of cantilever assembly, the contractor has to supply at his own cost.

Item 4(a)(ii) - Erection of Two Cantilever Assemblies on same structure or support for Conventional OHE

The price shall cover erection of Two Cantilever Assemblies at overlap/turnout/crossover on same structure or support.

Unit 'Each' represents Two Cantilevers.

Item 4(a)(iii) - Erection of Three Cantilever Assemblies on same structure or support for Conventional OHE

The price shall cover erection of Three Cantilever Assemblies at overlap/turnout/crossover on same structure or support.

Unit 'Each' represents Three Cantilevers.

Note: (1) Any fasteners which are required, but not covered under above item are to be supplied under item no. 3(cs) of schedule B1.

(2) The erection of a single cantilever assembly falls under item no. 4(a)(i) of Sch-A1. For structures or supports requiring two or three cantilevers, the corresponding operations should be carried out under item nos. 4(a)(ii) and 4(a)(iii) of Sch-A1 respectively.

Item 4(a)(iv) - Supply (without Insulators) and Erection of Single Cantilever Assembly for Tramway OHE

Supply: The price shall include the supply of a single cantilever assembly mounted on a traction mast, support, or drop arm. The price includes the cost all components complete with fasteners except for solid core insulators, dropper wires, and small steel parts. The supply of cantilever assembly shall conform to RDSO Drg No. ETI/OHE/G/04204 (Rev. B) or its latest revisions.

The supply materials include the following components:

<u>Rly. ID No.</u>	<u>Description of components</u>	<u>Qty per unit</u>
3021	Mast Fitting for Hook Insulator with two nos. GI Bolt.	1
2400	Tubular Stay Arm Assembly (2401 - 25 mm Stay Tube - 1 No, 2402/2402-1 - Tubular Stay Adjuster - 1 No, 2403-1 - Tubular Stay	1 Set

	Sleeve - 1 No, 2402 - Stud Bolt 10 mm with Lock Nut - 2 No)	
2380	Hook Bracket with U Bolt - 2 Nos, Nut - 4 Nos, Spring Washers - 4 Nos	1 Set
2140	Large Catenary Direct Clamp	1 Set
2160-1	Register Arm Hook assembly complete with bolts, nuts and lock nuts.	1 Set
2080	Large Bracket Tube (Suitable length) with Tube Cap (2104-1)	1 Set
3070-1/3070-2	Mast Bracket Fitting Assembly (150/200) with two nos. GI Bolt.	1 Set
2540-1	BFB Steady Arm Assembly (2540 - BFB Steady arm - 1 No, 2391- BFB Steady arm Hook - 1 No, 2392 - BFB Steady Arm Swivel - 1 No, AL Rivets - 4 Nos)	1 Set
2550-3	Anti wind clamp for Tramway	1 set
1220	Contact wire swivel clip	1 set
	Stay Fasteners (Bolt, Nut, LockNut, Washer)	1 Set
	Bracket Fasteners (U-Bolt, Nut, LockNut, Washer)	1 Set

Erection: The price shall include the fabrication and erection of a single cantilever assembly mounted on a traction mast, support, or drop arm. This includes installations on high or low platforms, in the vicinity of turnouts, over bridges, at overlaps, and at locations with reduced encumbrance or terminating wires. It includes the erection of all components, including solid core insulators and dropper wires, but excludes small steel parts. The erection of cantilever assembly shall conform to RDSO Drg No. ETI/OHE/G/04204 (Rev. B) or its latest revisions.

Item 4(a)(v) - Erection of Two Cantilever Assemblies on same structure or support for Tramway OHE

The price shall cover erection of Two Cantilever Assemblies at overlap/turnout/crossover on same structure or support.

Unit 'Each' represents Erection of Two Cantilevers.

Item 4(a)(vi) - Erection of Three Cantilever Assemblies on same structure or support for Tramway OHE

The price shall cover erection of Three Cantilever Assemblies at overlap/turnout/crossover on same structure or support.

Unit 'Each' represents Erection of Three Cantilevers.

Note: (1) Any fasteners which are required but not covered under above item are to be supplied under item no. 3(cs) of schedule B1.

(2) The erection of a single cantilever assembly falls under item no. 4(a)(iv). For structures or supports requiring two or three cantilevers, the corresponding operations should be carried out under item nos. 4(a)(v) and 4(a)(vi), respectively.

Item 4(b)(i) - Supply (without Insulators) and Erection of a Pull Off arrangement for Conventional OHE

Supply: The price shall include the supply of all components required for a pull-off arrangement to pull one equipment only excluding SPS, solid core insulators, conductor, small jumper (50 sq.mm). The supply of cantilever assembly shall conform to RDSO Drg No. ETI/OHE/G/03301 or its latest revisions.

The supply materials include the following components

<u>Rly. ID No.</u>	<u>Description of components</u>	<u>Qty per unit</u>
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	2
5030	Anchor Double Strap Assembly with Snap Head Pin, Punched Washer, Split Pin	2
1350	Thimble (Packing saddle)	4
1320	U Clamp	8
1192	Catenary Dropper Clip complete with bolt, nut, spring washer and split pin	4
2340	(Low speed) Steady Arm Assembly	1
1220	Contact Wire Swivel Clip & pin	1
1160	Suspension clamp complete with U-bolt - 2 Nos, pin - 1 No., Nut - 4 Nos, suspension clamp lock plate - 2 Nos, split pin - 1 No., Punched Washer A-12 - 1 No.	1
5190-2	Equalising Plate Assembly complete with snap head pin, punched washer and split pin	1
1330	U Clamp	2
1311	Pull off clamp distance piece	1

Erection: The price shall include the erection of all components including solid core insulators, small jumper wire and conductors excluding SPS. The erection of cantilever assembly shall conform to RDSO Drg No. ETI/OHE/G/03301 or its latest revisions.

Item 4(b)(ii) - Supply (without Insulators) and Erection of a Pull Off arrangement for Tramway OHE

Supply: The price shall include the supply of all components required for a pull-off arrangement to pull one equipment only excluding SPS, solid core insulator (RI No.6020) and conductor.

Erection: The price shall include the erection of all components including solid core insulators, small jumpers and conductors excluding SPS.

Item 6(a) - Supply and Erection of Regulated Conventional OHE

Supply: The price shall include the supply of all components, such as dropper clips, parallel clamps for jumpering, complete with bolts and nuts, if any. However, it shall exclude supply of contact wire, catenary, dropper wire, jumper wire, terminating wire(s), and small parts steel works.

The supply materials include the following components

Rly. ID No.	Description of components	Qty. per unit
1040-2	Contact wire parallel clamp small complete with bolt, nut and spring washer	12
1030-3/1030-2	PG Clamps complete with bolt, nut and spring washer	8
1180	Contact wire dropper clip (107/150) with locking wire	133
1192	Catenary dropper clip complete with bolt, nut, spring washer and Split Pin	133

Erection: The price shall include the erection of all components, including wires and conductors such as contact wire, catenary, droppers, jumpers, and galvanized steel or terminating wires, if any, but shall exclude small parts steel work, if applicable. The price shall cover adjustment of OHE height & stagger at the specified rail level as per track.

Note: The termination of conductors is not included in this item. Terminations are to be operated under item no. 8(b)(ii) OF Sch-A1 separately.

Item 6(b) - Erection of Regulated Contact Wire Only

Erection: The price shall cover the erection of all components, including wires and conductors such as contact wire, catenary, droppers, jumpers, and galvanized steel or terminating wires, if any, but shall exclude small parts steel work, if applicable. The price shall cover adjustment of OHE height & stagger at the specified rail level as per track.

Note: The termination of conductors is not included in this item and Terminations are to be operated under item no. 8(b)(ii)/8(b)(vi) of Sch-A1 separately.

Item 6(c) - Supply and Erection of Regulated Contact Wire (Regulated with Bridle Wire)

Supply: The price shall include the supply of all components including bridle wire clamps, dropper clips, parallel clamps for jumpering, complete with bolts and nuts etc, if any, but excluding contact wire, dropper wire, jumper wire and terminating wire/s and small parts steel works.

The supply materials include the following components:

Rly. ID No.	Description of components	Qty. per unit
1070-1	Bridle Wire Clamp Small complete with 2 Nos of bolt, nut, spring washer & punched washer	40 Set
1030-3/1030-2	PG Clamps complete with 1 No. of bolt, nut and spring washer	8 Set

1180	Contact wire dropper clip (107) with locking wire	40 Set
1194	Bridle wire dropper clip complete with 1 No. of bolt, nut, spring washer and split pin	40 Set

Erection: The price shall cover the erection of all components, including wires and conductors such as contact wire, bridle wire, droppers, jumpers, and galvanized steel or terminating wires, if any, but shall exclude small parts steel work, if applicable. The price shall cover adjustment of OHE height & stagger at the specified rail level as per track.

Note: The termination of conductors is not included in this item. Terminations are to be operated under item no. 8(b)(vi) separately.

Note for Measurement:

1. For the purpose of payment against item 6(a), 6(b) and 6(c), the length of over head equipment, which shall include terminating wires and galvanized steel wire, shall be measured from the centre lines of the traction masts/structures at which the two ends of each tension length of over head equipment are anchored.
2. The length shall be the difference between the actual chainages of the two traction masts/structures at which the ends of each tension length are anchored or by the sum of the actual spans between the same two points whichever is higher as included in the "as erected" layout plans. For purpose of progress payment reference to layout plans as approved shall be made. The price under items 6(a), 6(b) & 6(c) does not cover the cost of supply and erection of cut-in insulators, the supply and erection of which shall be paid for under item 11(a), (b), (c).
3. In the case of splicing and extension of anchored OHE, the actual length of wire used at site from ending clamp/splice to the splice/ending clamp will be reckoned for measurement purpose under item No. 6(a), 6(b) and 6(c).

Item 7(a) - Erection/Stringing of Along Feeder (either All Aluminium 25 kV Feeder conductor (single spider) or Copper Feeder wire)

Erection: The price shall include the erection and stringing of Along Feeder either 25 kV All Aluminium Feeder conductor (single spider) or Copper Feeder conductor.

Note: The price does not include the erection of suspension assembly, termination and small part steel work, complete with bolts and nuts etc., if any.

Item 7(b) - Erection of Copper Cross Feeder Wire

Erection: The price shall include the erection of 25 kV feeder wire across the track at the location of SP/SSP/FP/TSS etc.

Unit 'Each' represents length of cross feeder upto 40 m.

Note: The termination of cross feeder is not included in this item, will be paid under item 8(b)(ix) of Sch-A1.

Item 7(c) - Erection of Large span wire (130 Sq. mm)

Erection: The price shall include the erection of 130 sq. mm cadmium copper large span wire.

Note: The price shall not include termination and large span wire ending clamps, will be paid under relevant items (8(b)(i)/8(b)(ii)) of Sch-A1.

Item 8(a)(iv) - Supply of Regulating Equipment Without Counter-Weight Assembly

Supply: The price shall include only supply of 3 pulley type (3:1) regulating equipment without counter-weight assembly for conventional type OHE. The supply of ATD shall conform to RDSO Drg No. ETI/OHE/P/5500 or its latest revisions, ETI/OHE/G/00195 (Rev.A) or its latest revision & RDSO specification no. TI/SPC/OHE/ATD/0060 or its latest revision.

The supply materials include the following components

Rly. ID No.	Description of components	Qty. per unit
5500	Regulating Equipment Three-Pulley type modified pulley groove (3:1 ratio) complete with Anti-falling Rods (Tie rods), clevis & eye (forged), Arms, Spacers, All Fasteners	1 Set
	SS Wire Rope (8 m)	1
5341	SS Wire Rope Ending Clamp with Wedge RI No. 5321	2
5183	Double Eye Distance Rod	1
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2
5030	Anchor Double Strap Assembly with Snap Head Pin, Punched Washer, Split Pin	3

Note: (1) The mast anchor fittings along with fasteners required for erection of regulating equipment will be paid separately under item 3(cs) of Sch - B1. Only forged fittings are to be used.

(2) The price shall not include supply of termination, which will be paid for under item 8(b)(ii)/8(b)(vi) of Sch-A1.

(3) The erection component shall be executed under item 8(a)(v) of Sch-A1, as the erection will be carried out using counterweights supplied by the Railways.

Item 8(a)(v) - Supply and Erection of Regulating Equipment With Counter-Weight assembly for Conventional OHE

Supply: The price shall include the supply of 3 pulley type (3:1) regulating equipment with counter-weight assembly for conventional type OHE including SS wire rope with ending clamp, 9 tonne adjuster with double strap assembly and anti-theft guide tube assembly. The price shall cover cost of all components required for Regulated Equipment along with fasteners.

The supply of ATD shall conform to RDSO Drg No. ETI/OHE/P/5500 or its latest revisions, ETI/OHE/P/5090 or its latest revisions, ETI/OHE/G/00195 (Rev.A) or its latest revision & RDSO specification no. TI/SPC/OHE/ATD/0060 or its latest revision.

The supply materials include the following components

Rly. ID No.	Description of components	Qty. per unit
5500	Regulating Equipment Three-Pulley type modified pulley groove (3:1 ratio) complete with Anti-falling Rods (Tie rods), clevis & eye (forged), Arms, Spacers, All Fasteners	1 Set
5091	40 KG Cast Iron Base Weight	1
5092	40 KG Cast Iron Counter Weight	15
5093	20 KG Cast Iron Counter Weight	1
5098	5 KG Cast Iron Counter Weight	1
5099	Counter Weight Eye Rod with split pin, nut, punched washer	1 Set
5060-2	Counter Weight Guide Tube (5.6 m) with All Fasteners	1 Set
	SS Wire Rope (8 m)	1
5341	SS Wire Rope Ending Clamp with Wedge RI No. 5321	2
5183	Double Eye Distance Rod	1
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2
5030	Anchor Double Strap Assembly with Snap Head Pin, Punched Washer, Split Pin	3

- Note:** (1) The mast anchor fittings along with fasteners required for erection of regulating equipment will be paid separately under item 3(cs) of Sch - B1. Only forged fittings are to be used.
- (2) The price shall not include supply of termination, which will be paid for under item 8(b)(ii) of Sch-A1.

Erection: The price shall include the erection of 3 pulley type (3:1) regulating equipment (ATD) with counter-weight assembly for conventional type OHE including SS wire rope with ending clamp, 9 tonne adjuster with double strap assembly and anti-theft guide tube assembly conform to RDSO Drg No. ETI/OHE/P/5500 or its latest revisions, ETI/OHE/P/5090 or its latest revisions, ETI/OHE/G/00195 (Rev.A) or its latest revision & RDSO specification no. TI/SPC/OHE/ATD/0060 or its latest revision.

The price shall also cover adjustment of the entire regulating equipment and includes the erection of provision of anti-falling arrangement as per RDSO Drawing No. - TI/DRG/OHE/ATD /RDSO/00001/99/2 (Latest) & + (Latest).

Note: The price shall not include erection of termination and SPS, which will be paid for under item 8(b)(ii) and 3(b) of Sch-A1 respectively.

Item 8(a)(vi) - Supply and Erection of Regulating Equipment With Counter-Weight assembly for Tramway Type OHE

Supply: The price shall include the supply of 3 pulley type (3:1) regulating equipment with counter-weight assembly for tramway type OHE including SS wire rope with ending clamp, 9 tonne adjuster with double strap assembly and anti-theft guide tube assembly. The price shall cover cost of all components required for Regulated Equipment along with fasteners.

The supply of ATD shall conform to RDSO Drg No. ETI/OHE/P/5500 or its latest revisions, ETI/OHE/P/5090 or its latest revisions, ETI/OHE/G/00195 (Rev.A) or its latest revision & RDSO specification no. TI/SPC/OHE/ATD/0060 or its latest revision.

The supply materials include the following components

Rly. ID No.	Description of components	Qty. per unit
5500	Regulating Equipment Three-Pulley type modified pulley groove (3:1 ratio) complete with Anti-falling Rods (Tie rods), clevis & eye (forged), Arms, Spacers, All Fasteners	1 Set
5091	40 KG Cast Iron Base Weight	1
5092	40 KG Cast Iron Counter Weight	9
5098	5 KG Cast Iron Counter Weight	3
5099	Counter Weight Eye Rod with Split Pin, Nut, Punched Washer	1 Set
5060-2	Counter Weight Guide Tube (5.6 m) with All Fasteners	1 Set
	SS Wire Rope (8 m)	1
5341	SS Wire Rope Ending Clamp with Wedge RI No. 5321	2
5183	Double Eye Distance Rod	1
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	3

Note: (1) The mast anchor fittings along with fasteners required for erection of regulating equipment will be paid separately under item 3(cs) of Sch - B1. Only forged fittings are to be used.

(2) The price shall not include supply of termination, which will be paid for under item 8(b)(vi) of Sch-A1.

Erection: The price shall include the erection of 3 pulley type (3:1) regulating equipment (ATD) with counter-weight assembly for conventional type OHE including SS wire rope with ending clamp, 9 tonne adjuster with double strap assembly and anti-theft guide tube assembly confirming to RDSO Drg No. ETI/OHE/P/5500 or its latest revisions, ETI/OHE/P/5090 or its latest revisions,

ETI/OHE/G/00195 (Rev.A) or its latest revision & RDSO specification no. TI/SPC/OHE/ATD/0060 or its latest revision.

The price shall also cover adjustment of the entire regulating equipment and includes the erection of provision of anti-falling arrangement as per RDSO Drawing No. - TI/DRG/OHE/ATD /RDSO/00001/99/2 (Latest) & + (Latest).

Note: The price shall not include erection of termination and SPS, which will be paid for under item 8(b)(ii) and 3(b) respectively.

Item 8(a)(xii) - Marking/Painting of temperature and 'Y' - Measurement on OHE Structures at BWA locations.

The price shall include marking/painting of temperature and 'Y' measurement scale on OHE masts at [ATD] BWA locations. The price shall also include the cost of paint.

Item 8(b)(i) - Supply (without Insulator) and Erection of material for termination of single conductor of OHE or terminating wire

Supply: The price shall include the supply of all materials necessary for the termination of single conductor (contact wire / catenary wire / anti-creep wire termination on one side / large span wire) on a traction mast or structure **but excluding 9 ton insulator assembly and terminating wire, if any.**

The supply materials include the following components

Rly. ID. No.	Description of Components	Qty per unit for Cont wire Termination	Qty per unit for Cat wire Termination	Qty per unit for AC wire for one side termination	Qty per unit for LS wire termination
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	1 No	1 No	1 No	---
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	2 Nos	2 Nos	2 Nos	2Nos
1110-2	Contact wire ending clamp complete with pin, split pin and punched washer	1 No	---	---	---
1120/ 1120-1	Catenary Wire Ending clamp complete with pin, split pin and punched washer	----	1 No	---	---
1140	Large span wire ending clamp complete with snap head pin, split pin and punched washer	----	----	----	2 Nos
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	1 No	1No	1 No	1 No
1360/1120	Steel wire ending clamp or Catenary wire ending clamp	--	---	1 No	---

Erection: The price shall include the erection of all materials including the 9 ton insulator assembly for termination of single conductor (contact wire / catenary wire / anti-creep wire termination on one side / large span wire).

Note: 1) In case of "V" type anchorage is adopted for terminating a single conductor such an arrangement would be counted as two off under item 8(b)(i), for the purpose of payments.

2) The price shall not include the supply and erection of large span wire, which can be claimed under Sch-B2 item no. 7(cs) for supply and Sch-A1 item no 7(c) for erection.

Item 8(b)(ii) - Supply (without Insulator) and Erection of materials for Termination of Conventional OHE

Supply: The price shall include the supply of all materials necessary for the termination of double conductors of overhead equipment on a traction mast or structure but excluding 9 tonne insulators, mast anchor fittings and terminating wire.

The supply materials include the following components

Rly. ID. No.	Description of Components	Qty. per unit
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	1 No
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	4 Nos
5190-1/5190-2/5191-1-2/5192/5192-1-2/5194-1/5195-2	Equalizing Plate/Compensating Plate with snap head pin, split pin and punched washer	1 No
1110-2	Contact wire ending clamp complete with pin, split pin and punched washer	1 No
1120/1120-1	Catenary Wire Ending clamp complete with pin, split pin and punched washer	1 No
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	3 Nos
1140	Large span wire ending clamp complete with snap head pin, split pin and punched washer	2 Nos (As Required)

Erection: The price shall include the erection of all materials for OHE termination including the 9-tonne insulator assembly.

Note: The price shall also include supply and erection of large span wire ending clamps, if required for any termination.

Item 8(b)(iii) - Supply (without Insulators) and Erection of materials for Termination of Along Feeder (Aluminium/Copper)

Supply: The price shall include the supply of all materials required for the termination of an all-aluminium (spider) / copper feeder but excluding the cost of 9 tonne insulators, mast anchor fittings adjuster. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/05145-1 (Rev.A) or its latest revisions.

The supply materials include the following components

Rly. ID. No.	Description of Components	Qty per unit for AL Feeder	Qty per unit for Cu Feeder
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	1 No	1 No
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	2No	2 No
1600	20 mm Strain Clamp complete with U-bolt - 3 Nos, Nut - 6 Nos, Punched Washer A-14 - 6 Nos, snap head pin - 1 No., punched washer A-18 - 1 No., split pin - 1 No.	1 No	-
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	1 No	1 No
1130	Feeder wire ending clamp complete with snap head pin, split pin and punched washer	-	1 No

Erection: The price shall include the erection of all materials including the 9-tonne insulator assembly. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/05145-1 (Rev.A) or its latest revisions.

Item 8(b)(vi) - Supply (without Insulators) and Erection of Materials for Termination of Tramway OHE

Supply: The price shall include the supply of all materials necessary for the termination of overhead equipment conductor on a traction mast or structure **but excluding 9 tonne insulator assembly, mast anchor fittings and terminating wire**. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/04212 or its latest revisions.

The supply materials include the following components

Rly. ID. No.	Description of Components	Qty. per unit
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	1 No
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	2 Nos
1110-2	Contact wire ending clamp complete with pin, split pin and punched washer	1 No

5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	1 No
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Erection: The price shall include the erection of all materials for OHE termination including the 9-tonne insulator assembly. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/04212 or its latest revisions.

Item 8(b)(ix) - Supply (without Insulators) and Erection of Materials for Termination for Copper Cross Feeder

Supply: The Price shall include the supply of all materials required for termination of copper cross feeder wire (37/2.25mm HDBC) **but excluding 9-Ton insulator assembly**, mast anchor fitting. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/05121 or its latest revisions.

The supply materials include the following components.

Rly. ID. No.	Description of Components	Qty. per unit
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	2 Nos
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	4 Nos
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2 Nos
1130	Feeder wire ending clamp complete with snap head pin, split pin and punched washer	2 Nos

Erection: The price shall include the erection of all materials including 9-ton insulator and termination of cross feeder at both ends with gantries. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/05121 or its latest revisions.

Note: Fittings required for termination of one cross feeder at both ends constitute one set.

Notes to item 8(b)(i), 8(b)(ii), 8(b)(iii), 8(b)(vi) & 8(b)(ix):

- 1) The price shall not include SPS items, wherever required will be paid under item 3(cs) of Sch-B1 w.r.t supply and under item 3(b) of Sch-A1 w.r.t erection.
- 2) The prices shall not include the cost of jumper connection (i) between feeders and (ii) or feeders to a bus-bar, overhead equipment or isolator switch which will be paid for under item 15(a) to 15(e) of Sch-A1.

Item 9(a) - Supply (without Insulators) and Erection of Anti-creep with galvanised steel wire for Conventional OHE

Supply: The price shall include the supply of all materials for anti-creep including adjusters, galvanized steel wire at its terminations on either side on structures, ending clamps and fittings but excluding the cost of 9-ton insulator assembly and small parts steel work, if any. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

The supply materials include the following components

Rly.ID No.	Description of components	Qty. per unit
-	Galvanised steel wire (19/2.50 mm)	As required
1360	Steel wire ending clamp	2 Nos
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2 Nos
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	4 Nos
3010/5040	Clevis assembly complete with pin/snap head pin, split pin and punched washer	2 Nos
1170	Double suspension clamp complete with U-bolt - 2 Nos, Packing saddle - 1 No., Nut - 4 Nos, suspension clamp lock plate - 2 Nos, PIN - 1 No., split pin - 1 No., Punched Washer A-12 - 1 No.	1 No
1040-3	PG Clamps with bolt, nut and spring washer	2 Nos

Erection: The price shall include the erection of all materials including 9-ton insulator assembly but excluding small parts steel work, if any. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

Note: In case, the anti-creep extends beyond one span on either side of anti creepcentre, payment for the supply and erection of extra length shall be paid additionally at the rate of 20% of the rate for 9(a) for each extra span.

Item 9(b) - Supply (without Insulators) and Erection of Anti-creep with galvanised steel wire for regulated Tramway OHE

Supply: The price shall include the supply of all materials for anti-creep for the tramway type OHE. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions. The supply materials include the following components but excluding the cost of 9-ton insulator assembly and small parts steel work, if any.

Rly.ID No.	Description of components	Qty. per unit
-	Galvanised steel wire (19/2.50 mm)	As required
1360	Steel wire ending clamp	2 Nos
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2 No
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	4 Nos
3010/5040	Clevis assembly complete with pin/snap head pin, split pin and punched washer	2 No

2140	Large catenary direct clamp	1 No
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Erection: The price shall include the erection of all materials of anti-creep arrangement for the tramway type OHE. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

Note: In case, the anti-creep extends beyond one span on either side of anti creepcentre, payment for the supply and erection of extra length shall be paid additionally at the rate of 20% of the rate for 9(a) for each extra span.

Item 9(c) - Supply (without Insulators) and Erection of Anti-creep with cadmium copper catenary wire for Conventional OHE in polluted area (excluding supply of cadmium copper catenary wire)

Supply: The price shall include the supply of all materials for anti-creep including, adjusters, as its terminations on either side of structure, ending clamps and fittings but excluding cadmium copper catenary wire, mast anchor fittings and 9-ton insulator assembly for polluted zone and small parts steel, if any. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

The supply materials include the following components

Rly.ID No.	Description of components	Qty. per unit
1123/1120/1122	Catenary ending clamp	2 Nos
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2 Nos
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	4 Nos
3010/5040	Clevis assembly complete with pin/snap head pin, split pin and punched washer	2 Nos
1170	Suspension clamp complete with U-bolt - 2 Nos, Packing saddle - 1 No., Nut - 4 Nos, suspension clamp lock plate - 2 Nos, PIN - 1 No., split pin - 1 No., Punched Washer A-12 - 1 No.	1 No
1040-3	PG Clamps with bolt, nut and spring washer	2 Nos

Erection: The price shall include the erection of all materials including cadmium copper catenary wire, 9-ton insulators assembly but excluding small parts steel work, if any. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

Note: In case, the anti-creep extends beyond one span on either side of anti creepcentre, payment for the supply and erection of extra length shall be paid additionally at the rate of 20% of the rate for 9(a) for each extra span.

Item 9(d) - Supply (without Insulators) and Erection of Anti-creep with cadmium copper catenary wire for Tramway OHE in polluted area (excluding supply of cadmium copper catenary wire)

Supply: The price shall include the supply of all materials for anti-creep including, adjusters, as its terminations on either side of structure, ending clamps and fittings but excluding cadmium copper catenary wire, mast anchor fittings and 9-ton insulator assembly for polluted zone and small parts steel work, if any for tramway type OHE. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

The supply materials include the following components

Rly.ID No.	Description of components	Qty. per unit
1123/1120/1122	Catenary ending clamp	2 Nos
5020	9-ton Adjuster (Double Eye) complete with bolt, nut and split pin	2 Nos
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	4Nos
3010/5040	Clevis assembly complete with pin/snap head pin, split pin and punched washer	2 Nos
2140	Large catenary direct clamp	1 No
1170	Suspension clamp complete with U-bolt - 2 Nos, Packing saddle - 1 No., Nut - 4 Nos, suspension clamp lock plate - 2 Nos, PIN - 1 No., split pin - 1 No., Punched Washer A-12 - 1 No.	1 No

Erection:. The price shall include the erection of all materials including cadmium copper catenary wire, 9-ton insulators assembly but excluding small parts steel work, if any for tramway type OHE. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/02111 or its latest revisions.

Note: In case, the anti-creep extends beyond one span on either side of anti creepcentre, payment for the supply and erection of extra length shall be paid additionally at the rate of 20% of the rate for 9(a) for each extra span.

Note for item 9(a) to 9(d):

The price shall not include the cost of any additional cut-in or suspension insulator which will be paid for under item no. 11(a)(i)/11(a)(ii) w.r.to erection

Item 10(a) - Extra on item 6(a) or 6(c) for Supply and Erection of additional fittings required at a turnout, cross-over or over-lap

Supply: The price shall include the supply of additional components and fittings required at turnouts, crossings or over-laps (insulated or un-insulated) including overlaps, knuckle or crossing equipment at a turnout, or a diamond crossing and parallel clamps for jumper connections between

two sets of overhead equipment conductor at a turnout, diamond crossings, overlaps or neutral section, but excluding jumper wire.

The supply materials include the following components

Rly. ID No.	Description of components	Qty. per unit
1030-3/1030-2	PG Clamps, Bolt with Nut and Spring Washer	6
1040-2	PG Clamps, Bolt with Nut and Spring Washer	4
1180	Contact wire dropper clip (107Sqmm)	6
1192	Catenary dropper clip, Bolt with Nut, Spring Washer and Split Pin	6
1110-2	Contact wire ending clamp, Snap Head Pin, Split Pin and Punched Washer	1
1120 or 1120-1	Catenary ending clamp, Snap Head Pin, Split Pin and Punched Washer	1
1140	Large span wire ending clamp (130) , Snap Head Pin, Split Pin and Punched Washer	2

Erection: The price shall include the erection of all materials including jumper wire, and all adjustments required at turnouts, crossings, overlaps and neutral sections.

Item 11(a)(i) - Supply (without Insulator) and Erection of 25 kV Solid Core Cut-in Insulator.

Supply: The price is applicable to the provision of an additional 9 tonne cut-in-insulator on a flat rate basis such as in a head span, cross span or in span wire or an overhead equipment conductor at an insulated overlap, anti-creep not provided for in other items. The price shall cover supply of all components required for the cut-in-insulator assembly, including appropriate terminal fittings for the conductor **but excluding 9-tonne insulator**.

The supply materials include the following components

Rly.ID No.	Description of components	Qty. per unit
1110-2/1120-1/1140	Contact wire ending clamp (1110-2)/ Catenary ending clamp (1120-1)/Large Span Wire ending clamp (130) (1140) / Steel wire ending clamps complete with all fasteners	2

Erection: This price shall cover erection of all components including 9-tonne insulator but excluding small parts steel work, if any.

Item 11(a)(ii) - Supply (without Insulator) and Erection of 25 kV Solid Core Suspension Insulator.

Supply: The price is applicable to the provision of a 9-tonne suspension insulator assembly for suspension of an all-aluminium 25 KV feeder (single or double SPIDER), 150 sq. mm copper feeder

wire, 130 sq.mm Large span wire or 65 sq.mm cadmium catenary wire (or) any other similar type of suspension. The price shall cover supply of all components, required for the suspension assembly including the appropriate suspension clamp **but excluding 9 tonne insulator and small parts steel work** if any. The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/05143 (Rev. B) or its latest revisions.

The supply materials include the following components

Rly.ID No.	Description of components	Qty. per unit for Al feeder	Qty. per unit for Cu feeder	Qty per unit for LS wire/Steel wire/Cu catenary wire
5040	18 mm Single Clevis Assembly complete with pin, split pin and punched washer	1 No	1 No	1 No
5030	Anchor Double Strap Assembly complete with pin, split pin and punched washer	1 No	1 No	1 No
1580/1160	Suspension clamp complete with U-bolt - 2 Nos, Nut - 4 Nos, spring washer - 4 Nos, Punched Washer A-14 - 4 Nos, pin - 1 No., punched washer A-18 - 1 No., split pin - 1 No. OR Suspension clamp complete with U-bolt - 2 Nos, Nut - 4 Nos, suspension clamp lock plate - 2 Nos, PIN - 1 No., split pin - 1 No., Punched Washer A-12 - 1 No.	1 No	1 No	1 No
	Flat Armour Tape with Ferrules 2 Nos	1 set	-	-
1272	18 mm brass suspension clevis with snap head pin, split pin and punched washer	-	1 No	1 No

Erection: The price shall cover erection of all components including the 9-tonne insulator assembly but excluding small parts steel work, if any. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/05143 (Rev. B) or its latest revisions.

Note: Any additional fasteners required in connection with this item are to be supplied under item 3(cs) of Schedule B1 and erection under item 3(b) of Schedule A1

Item 11(b) - Supply (without Insulators) and Erection of 25 kV Post Insulator

Supply: The price is applicable to the provision of a 25 kV post insulator to support copper or aluminium jumper / busbars. The price shall cover supply of all components and fittings/angle iron (outrigger) to support the jumpers including fasteners and saddles but excluding supply of post insulators and small parts steel works if any. The price shall also include supply of stud bolts.

Erection: The price shall include the erection of all components required for the assembly including the post insulator, fasteners but excluding small parts steel work if any.

Item 12(a) - Supply (without Insulators) and Erection of 25 kV Section Insulator Assembly for Conventional OHE

Supply: The price shall include the supply of all components required for a section insulator assembly but excluding supply cost of sectioning core insulators, 9-tonne insulator and dropper wires. The supply of materials shall conform to RDSO Drg No. RE/33/G/05181 or its latest revisions, ETI/OHE/P/6140 or its latest revisions, ETI/OHE/P/6120 or its latest revisions, ETI/OHE/P/6181-1 or its latest revisions, ETI/OHE/P/6180-2 or its latest revisions, ETI/OHE/P/6170 or its latest revisions.

The supply materials include the following components

Rly.ID No.	Description of components	Qty. per unit
1120	Catenary ending clamp complete with snap head pin, punched washer, split pin	2 sets
1192	Catenary dropper clip assembly along with bolt, nut, spring washer and spilt pin	4 sets
6170	Parallel clamp for double contact wire complete with bolt, nut and spring washer	12 sets
6181-1	Section Insulator Double Strap Assembly (Double Strap (6181-1 - 2 Nos, Pivot Pin (6182) - 2 Nos, Punched washers - 2 Nos, Split pins - 2 Nos,	4 sets
6120	Contact Wire End Link Assembly (Contact wire end link (RI - 6121) - 1 No, Pin \varnothing 16x60 (6122) - 2 Nos, Pin \varnothing 18x75 (6123) - 1 No, Bolt M12x50/50 with Lock Nut - 1 No, Bolt M16x55/45 with Lock Nut - 1 No, Split cotter pin 4x36 - 1 No, Split cotter pin 4x40 - 2 Nos, Washer A-20 - 2 Nos, Washers A-18 - 1 No	1 set
6130	Cross Beam Assembly (Cross Beam (RI - 6131) - 1 No, Saddle Pin \varnothing 12x45 (6132) - 2 Nos, Pin \varnothing 18x75 (6123) - 1 No, Bolt M16x55/45 with Lock Nut - 1 No, Bolt M10x30/30 with Lock Nut - 4 Nos, Split cotter pin 4x36 - 2 Nos, Split cotter pin 3.2x28 - 2 Nos	1 set
6140	Runner Assembly (Runner Bracket (RI - 6141) - 2 Nos, Runner Left (RI - 6142) - 1 No, Runner Right (RI - 6143) - 1 No, special stud M12 with Nut (RI - 6144) - 2 Nos, Bolt M14x100/45 - 2 Nos, Spring Washer - 2 Nos, Split Pin - 2 Nos)	1 set

Erection: The price shall include the erection and adjustment of all components including sectioning & 9-ton insulator assembly, droppers etc. The erection of materials shall conform to RDSO Drg No.

RE/33/G/05181 or its latest revisions, ETI/OHE/P/6140 or its latest revisions, ETI/OHE/P/6120 or its latest revisions, ETI/OHE/P/6181-1 or its latest revisions, ETI/OHE/P/6180-2 or its latest revisions, ETI/OHE/P/6170 or its latest revisions.

Item 12(b) - Supply (without Insulators) and Erection of 25 kV Section Insulator Assembly for Tramway OHE

Supply: The price shall cover supply of all components required for a standard section insulator assembly including special arrangements for supporting the equipment and terminal fittings **but excluding supply of section insulator (core insulator) as required.** The supply of materials shall conform to RDSO Drg No. ETI/OHE/G/04207 or its latest revisions.

Erection: The price shall include the erection and adjustment of all components such as sectioning & 9-ton insulator assembly, droppers etc. The erection of materials shall conform to RDSO Drg No. ETI/OHE/G/04207 or its latest revisions.

Item 12(c) - Erection of Light Weight Section Insulator

Erection: The price shall include the erection of Light Weight Section Insulator Assembly covering the entire assembly as per RDSO Specification No. TI/SPC/OHE/LWTSI/0060 (Rev.1) with A&C Slip No.1 or latest with all accessories, fittings and fasteners.

Item 13(a) - Supply (without Insulators) and Erection of 25 kV Single Pole Isolator without earth contact assembly

Supply: The price shall include the supply of a 25 kV single pole isolator (1250 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision, RDSO Drg No. ETI/OHE/G/05513 or its latest revisions, ETI/OHE/G/05516 or its latest revisions. The price shall exclude the supply of post & operating rod insulators.

The supply materials include the following components

RI No.	Component	Qty
-	Single Pole Isolator Assembly with all accessories including Arcing Horn, Operating Rod, Operating Rod Guides, Padlock with two keys etc with all Fasteners (Nut, Bolt, Washer)	1 set
1009	19 mm Terminal Connector Assembly with Fasteners (Nut, Bolt, Flat & Spring Washers)	2 or more as per requirement.
-	Integral Lock	2

Erection: The price shall include the erection of a 25 kV single pole isolator (1250 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision, ETI/OHE/G/05513 or its latest revisions, ETI/OHE/G/05516 or its latest revisions. It includes the erection of the post and operating rod insulators also.

Note: 1. The price does not include the supply and erection of SPS complete with bolts, nuts, and other fasteners required for supporting the isolators and operating rods on gantries or masts.

2. Also, it excludes the supply and erection of insulators for jumper support and the corresponding jumper connectors. This item is to be operated under 11(b)

3. 18 mm copper bus bar or 36 mm Aluminium bus bar with associated connectors for provision of isolator on TTCs/Portals shall be claimed separately under item no. 26 of Schedule A1.

Item 13(b) - Supply (without Insulators) and Erection of 25 kV Double Pole Isolator without earth contact assembly.

Supply: The price shall include the supply of a 25 kV double pole isolator (1250 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision. The price shall exclude the supply of post & operating rod insulators.

The supply materials include the following components.

RI No.	Component	Qty
-	Double Pole Isolator Assembly with all accessories including Arcing Horn, Operating Rod, Operating Rod Guides, Padlock with two keys etc with all Fasteners (Nut, Bolt, Washer)	1 set
1009	19 mm Terminal Connector Assembly with Fasteners (Nut, Bolt, Flat & Spring Washers)	3 or more As per Requirement
-	Integral Lock	2

Erection: The price shall include the erection of a 25 kV double pole isolator (1250 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision. However, the price will only include the erection of the post and operating rod insulators.

Note: 1. The price does not include the supply and erection of SPS complete with bolts, nuts, and other fasteners required for supporting the isolators and operating rods on gantries or masts.

2. Also, it excludes the supply and erection of insulators for jumper support and the corresponding jumper connectors. This item is to be operated under 11(b)

3. 18 mm copper bus bar or 36 mm Aluminium bus bar with associated connectors for provision of isolator on TTCs/Portals shall be claimed separately under item no. 26 of Schedule A1.

Item 13(c) - Supply and Erection of Earth Contact Assembly for an Isolator

Supply& Erection:The price shall include the supply and erection of Earth Contact Assembly for an Isolator as per specification no. TI/SPC/PSI/ISOLTR/0210 or latest.

Item 13(d) - Supply and Erection of an Interlocking device

Supply& Erection:The price shall include the supply and erection of Interlocking device for an Isolator as per specification no. TI/SPC/PSI/ISOLTR/0210 or latest.

Item 13(e) - Supply (without Insulators) and Erection of 132 kV Double Pole Isolator without earth contact assembly

Supply: The price shall include the supply of a 132 kV double pole isolator (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision.

The price shall exclude the supply of post & operating rod insulators.

The supply materials include the following components.

RI No.	Component	Qty
-	132 kV Double Pole Isolator Assembly with all accessories including Arcing Horn, Operating Rod, Operating Rod Guides, Padlock with two keys etc with all Fasteners (Nut, Bolt, Washer) with suitable Terminal Connectors	1 set
-	Integral lock/Inter Lock	As Required

Erection: The price shall include the erection of a 132 kV double pole isolator (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision. However, the price will only include the erection of the post and operating rod insulators.

Note: 1. The price does not include the supply and erection of SPS complete with bolts, nuts, and other fasteners required for supporting the isolators and operating rods on gantries or masts.

2. Also, it excludes the supply and erection of insulators for jumper support and the corresponding jumper connectors. This item is to be operated under 11(b)

3. 18 mm copper bus bar or 36 mm Aluminium bus bar with associated connectors for provision of isolator on TTCs/Portals shall be claimed separately under item no. 26 of Schedule A1.

Item 13(f) - Supply (without Insulators) and Erection of 25 kV Single Pole Isolator (1600 A) without earth contact assembly

Supply: The price shall include the supply of a 25 kV single pole isolator (1600 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision. The price shall exclude the supply of post & operating rod insulators.

The supply materials include the following components

RI No.	Component	Qty
-	25 kV Single Pole Isolator Assembly (1600 A) with all accessories including Arcing Horn, Operating Rod, Operating Rod Guides, Padlock with two keys etc with all Fasteners (Nut, Bolt, Washer) with suitable Terminal Connectors	1 set
-	Integral lock / Inter Lock	As Required

Erection: The price shall include the erection of a 25 kV single pole isolator (1600 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its

latest revision. However, the price will only include the erection of the post and operating rod insulators.

- Note:** 1. The price does not include the supply and erection of SPS complete with bolts, nuts, and other fasteners required for supporting the isolators and operating rods on gantries or masts.
2. Also, it excludes the supply and erection of insulators for jumper support and the corresponding jumper connectors. This item is to be operated under 11(b)
3. 18 mm copper bus bar or 36 mm Aluminium bus bar with associated connectors for provision of isolator on TTCs/Portals shall be claimed separately under item no. 26 of Schedule A1.

Item 13(g) - Supply (without Insulators) and Erection of 25 kV Double Pole Isolator (1600 A) without earth contact assembly.

Supply: The price shall include the supply of a 25 kV double pole isolator (1600 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision. The price shall exclude the supply of post & operating rod insulators.

The supply materials include the following components

RI No.	Component	Qty
-	25 kV Double Pole Isolator Assembly (1600 A) with all accessories including Arcing Horn, Operating Rod, Operating Rod Guides, Padlock with two keys etc with all Fasteners (Nut, Bolt, Washer) with suitable Terminal Connectors	1 set
-	Integral lock/Inter Lock	As Required

Erection: The price shall include the erection of a 25 kV double pole isolator (1600 A) (excluding the earth contact assembly) in accordance with RDSO Specification No. TI/SPC/PSI/ISOLTR/0210 or its latest revision. However, the price will only include the erection of the post and operating rod insulators.

- Note:** 1. The price does not include the supply and erection of SPS complete with bolts, nuts, and other fasteners required for supporting the isolators and operating rods on gantries or masts.
2. Also, it excludes the supply and erection of insulators for jumper support and the corresponding jumper connectors. This item is to be operated under 11(b)
3. 18 mm copper bus bar or 36 mm Aluminium bus bar with associated connectors for provision of isolator on TTCs/Portals shall be claimed separately under item no. 26 of Schedule A1.

Item 14(a) - Erection of PTFE Neutral Section Assembly

The price shall include the erection, testing and commissioning of PTFE short neutral section assembly as per RDSO Spec No. TI/SPC/OHE/SNS/0000 REV-1 or latest if any, with all accessories.

Item 15(a) - Supply and Erection of 50 sq.mm Copper Jumper (C-Jumper, F-Jumper, Anti-Theft Jumper) (excludes copper jumper supply)

Supply: The price shall include the supply of PG Clamps with Bolt M16x50/38 & Nut, Spring Washer as per RDSO Drg No. ETI/OHE/P/1040-2 (Rev-E) or latest, Drg No. ETI/OHE/P/1040-3 (Rev-B) or

latest and Specification No. TI/SPC/OHE/Fittings/0130(10/13), Rev-1 or latest, RDSO Drg No. ETI/OHE/G/05107 or its latest revision.

The supply materials include the following components

RI No.	Component	Qty
1040-2 /1040-3	PG Clamps with bolt, nut and spring washer for C-Jumper / F-Jumper / Anti-Theft Jumper	2 Nos for C-Jumper/ 3 Nos for F-Jumper/ 4 Nos for Anti-Theft Jumper

Erection: The price shall include erection of complete 50 sq.mm jumper assembly (C-Jumper/F-Jumper/ Anti-Theft Jumper) including Jumper Wire & PG Clamp with bolt, nut and spring washer.

Note: The supply cost for 50 sq.mm Jumper wire is excluded and will be paid under item no. 15(as) of Sch-B2.

Item 15(b) - Supply and Erection of 160 or 105 sq.mm Copper Jumper (Isolator Jumper, G-Jumper) (excludes copper jumper supply)

The price shall include the supply of PG Clamps with Bolt M16x50/38 & Nut, Spring Washer as per DRG No. ETI/OHE/P/1030-2 (Mod-D) or latest, DRG No. ETI/OHE/P/1030-3 (Rev-A) or latest and Specification No. TI/SPC/OHE/Fittings/0130(10/13), Rev-1 or latest.

The supply materials include the following components

RI No.	Component	Qty
1030-2 /1030-3	PG Clamps with bolt, nut and spring washer for 160 sq. mm jumper / 105 sq. mm jumper	8 Nos

Erection: The price shall also include erection of complete 160/105 sq.mm jumper assembly (Isolator Jumper, G-Jumper) including Jumper Wire & PG Clamp with bolt, nut and spring washer.

Note: The supply cost for 105/160 sq.mm Jumper wire is excluded and will be paid under item no. 15(bs)/15(cs) of Sch-B2.

Item 15(c) - Supply and Erection of Large copper jumper wire 160 sq. mm between Aluminium Bus and Cross-feeder (excludes copper jumper supply)

Supply: This jumper shall be provided between Aluminium bus and the copper cross feeder at SP/SSP/FP locations.

The supply materials include the following components

RI No.	Component	Qty
1050-3	PG Clamps with bolt, nut and spring washer	6 Nos
1009	19 mm Terminal connector	1 No

6480	AL Bus Terminal connector (6480) with Bi-metallic strip	1 No
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Erection: The price covers the erection of the complete jumper assembly including Y Jumper as per site requirement.

Note: The supply cost for 160 sq.mm Jumper wire is excluded and will be paid under item no. 15(bs) of Sch-B2.

Item 15(d) - Supply and Erection of Large copper jumper wire 160 sq. mm between Cross-feeder and OHE (excludes copper jumper supply)

Supply: This jumper shall be provided between copper cross feeders and OHE. The supply materials include the following components

RI No.	Component	Qty
1050-3	PG Clamps with bolt, nut and spring washer	6 Nos
1030-3	PG Clamps with bolt, nut and spring washer	4 Nos

Erection: The price covers the erection of the complete jumper assembly including Y Jumper as per site requirement.

Note: The supply cost for 160 sq.mm Jumper wire is excluded and will be paid under item no. 15(bs) of Sch-B2.

Item 15(e) - Supply and Erection of Aluminium Jumper

Supply & Erection: The price shall cover on a flat rate basis the supply and erection of an aluminium jumper of size 19/7/1.4mm bare 3/4H generally confirming to IS:8130 complete with all components and fittings required for providing jumper connection, including parallel clamps, bimetallic ALCU strips wherever required, and terminal or tee clamps at either end.

The price shall be applicable for any aluminium jumper/connections in any combination between feeders, return conductors, overhead equipment, and isolators and outgoing bus bars or switching stations and booster stations.

Item 16(a) - Supply and Erection of Structure Bond

Supply & Erection: The price includes the complete supply and installation of the structure bond between the structure and rail, in accordance with RDSO Drawing No. ETI/OHE/P/7000 (Rev.F) or the latest version, and Code No. ETI/OHE/71(11/90)-REV 1 or its latest revision.

The price includes the supply of all required materials such as **MS Flat 40 x 6 mm** (in suitable lengths), **GI Bolt M16x50/38**, along with corresponding nuts, spring washers, and punched washers. Additionally, it covers the provision of a heat-shrinkable PVC sleeve for structure bonding on track-circuited rails, for providing proper insulation and protection.

The price also covers all necessary preparation work such as shaping and drilling the bond, ensuring precise fitting and secure erection of all materials.

Moreover, the price includes painting of the bond with **primary coat of red oxide and secondary coat of black bituminous paint** grade 85/25 (Fully Blown) as per **IS: 702 - 1961** after fabrication of bond.

Item 16(b) - Supply and Erection of Longitudinal Bond

Supply & Erection: The price includes the complete supply and installation of the longitudinal bond between the two rails, in accordance with RDSO Drawing No. ETI/OHE/P/7030 (Rev.F) or the latest version, and Code No. ETI/OHE/71(11/90)-REV 1 or its latest revision.

The price includes the supply of all required materials such as **MS Flat 40 x 6 mm** (in suitable lengths), **GI Bolt M16x65/38**, along with corresponding nuts, spring washers, and punched washers.

The price also covers all necessary preparation work such as shaping and drilling the bond, ensuring precise fitting and secure erection of all materials.

Moreover, the price includes painting of the bond with **primary coat of red oxide and secondary coat of black bituminous paint** after fabrication of bond.

Item 16(c) - Supply and Erection of Transverse & Special Bond

Supply & Erection: The price includes the complete supply and installation of the longitudinal bond between the two rails, in accordance with RDSO Drawing No. ETI/OHE/P/05251 (Rev.A) or the latest version, and Code No. ETI/OHE/71(11/90)-REV 1 or its latest revision.

The price includes the supply of all required materials such as **MS Flat 40 x 6 mm** (in suitable lengths), **GI Bolt M16x65/38**, along with corresponding nuts, spring washers, and punched washers. Additionally, it covers the provision of a heat-shrinkable PVC sleeve for bonding on track-circuited rails, providing proper insulation and protection.

The price also covers all necessary preparation work such as shaping and drilling the bond, ensuring precise fitting and secure erection of all materials.

Moreover, the price includes painting of the bond with **two coats of black bituminous paint**, after fabrication of bond.

Item 16(aa) - Drilling of Holes on Rails

The price covers drilling of holes on rails for provision of all types of bonds with suitable template approved by purchaser. The price shall also cover chamfering of the holes after drilling.

Note: Rail hole drilling is to be done with magnetic core drilling machine.

Item 16(d) - Supply and Erection of Structure Bond on Platform Area

Supply & Erection: The price shall include the supply and erection of the structure bond in the platform area as per RDSO Drawing No. ETI/OHE/P/7000 (Rev. F) or the latest version, and Code No. ETI/OHE/71(11/90)-REV 1 or its latest revision.

The bonds shall be securely embedded by cutting the concrete to a minimum depth of 15cm and covering them with concrete to ensure stability, preventing any exposure or lifting at the ends. The width of the bond groove on the platform shall be a minimum of 10 cm, allowing for the easy installation of the 40x6 MS flat bond. Any damage to tiles or granite during the process shall be repaired and restored to their original condition.

The price also includes all necessary preparation work, such as shaping and drilling the bond, ensuring precise fitting, and securely erecting all materials. Additionally, the price covers the

provision and installation of heat-shrinkable PVC tubing for the structure bond under the track circuit rail.

It also includes the supply and erection of doublecleats with fasteners for the platform bond to prevent any projection of the bond. Also, it is to be ensured that the PF bond is not exposed on PF area and coping of PF.

Moreover, the price includes painting of the bond with **two coats of black bituminous paint**, grade 85/25 (Fully Blown) as per **IS: 702 - 1961 after fabrication and before installation** of bond.

Item 17(a) - Supply and Erection of Single Earth Electrode at COP/FOB/PTFE/Steel Girder etc

Supply & Erection: The price shall cover supply and erection of an earth electrode assembly as per RDSO Drawing No. ETI/OHE/P/7020 (mod-B) or latest for COP/FOB/CLS/PTFE/Steel Girder/Single line track circuit area/earthing for isolators/buried rail etc.

The pipe shall be embedded as far as possible vertically into the ground, except when hard rock is encountered, where it may be buried inclined to the vertical, the inclination being limited to 30° from the vertical. The price also includes 3.1 m long mild steel galvanized single perforated pipe of not less than 40 mm nominal bore and 48.4 mm dia, embedded into the ground by driving or otherwise complete with fasteners, protective concrete box with lids and lugs suitable for directly connecting mild steel flats of size 40 mm x 6 mm/ 50 mm x 6 mm as per RDSO specification No. ETI/OHE/71 (11/90)-REV 1 or latest. Price of MS flat will be paid separately under relevant item.

The price shall also include the testing of earth resistance value & painting the same [Background Yellow, Marking with Black] on one side of protection box. The price shall also include the white washing of earth pit box with cover for earthing station. Bentonite powder is as per requirement is to be added till earth resistance is reached within limits.

The price also includes provision of charcoal and salt as per site requirement.

Item 17(b) - Supply and Erection of Earth Bus

Supply & Erection: The price shall cover supply of 50 mm x 6 mm MS strip confirming to IS-1731:1971 & Grade -A to IS-2062:1969 (MS flat) required for equipment earthing, connecting traction structures to the nearest non-track circuited rail or earth electrode or existing grid, including all fasteners like bolts(16x50x37), spring washers, flat washers etc at both ends. The price shall also cover erection of MS strip laid in the ground at depth of 60/30 cm / exposed as per requirement / site conditions.

Required fabrication, cutting, bending, welding & drilling is to be carried out by Contractor. The price shall also include painting as per code of practice for earthing.

Note: The payment will be made for the actual MS strip used at site for earthing & not for residual portion of MS strip leftover during fabrication / cutting.

Item 17(c) - Supply and Erection of Single Earth Electrode at TSS/SP/SSP/AT

Supply & Erection: The price shall cover supply and erection of an earth electrode assembly as per RDSO Drawing No. ETI/PSI/222-1 or latest revision, with charcoal & salt, all accessories & fasteners for 4.0 m length earth electrode at TSS/SSP/SP/AT's. The pipe shall be embedded as far as possible vertically into the ground, except when hard rock is encountered, where it may be buried inclined to the vertical, the inclination being limited to 30° from the vertical.

The price also includes 4.0 m long mild steel galvanized single perforated pipe of not less than 40 mm nominal bore and 48.4 mm dia, embedded into the ground by driving or otherwise complete

with protective concrete box with lids and lugs suitable for directly connecting two mild steel flats of size 50 mm x 6 mm / 75 mm x 8 mm as per RDSO specification No. TI / SPC / PSI / EARTHING / 0210. Salt and river sand to be mixed on the surface as one layer. Alternative layers of charcoal & salt shall be provided 150 mm around the earth pipe for embedded portion and each layer shall be 30 cm. Price of MS flat will be paid separately under relevant item.

The price shall also include the testing of earth resistance value & painting the same [Background Yellow, Marking with Black] on one side of protection box. Bentonite powder is as per requirement is to be added till earth resistance is reached within limits..

The individual resistance value of Earthing Station of a pole mounted LT supply transformer station shall not exceed 10 Ohms. If this value cannot be achieved with one electrode, additional electrodes shall have surrounded earth treated with charcoal and salt filling. For additional earth electrodes separate payment will be made.

Item 17(d) - Supply and Erection of Copper Strips (25 x 3 mm) for Equipment Earthing

Supply & Erection: The price shall cover supply and erection of 25 mm x 3 mm copper strips to connect the earth terminals of equipments like potential transformers, lightning arresters, L.T. supply transformers to the main masts of the gantries on which they are mounted. The price shall cover all fastenings required for fixing the copper strips along any structure member of the gantry.

Item 17(e) - Supply and Erection of Earth leads 75 mm x 8 mm laid in the ground

Supply & Erection: The price shall cover supply and installation per meter length 75 x 8 mm mild steel flat, buried at a depth of 60 cm below ground level. The price shall also cover connections of the mild steel flats to the earth electrodes to constitute the main earth ring and to the earthed terminals of the 132/25 kV Transformers etc. as required.

Note: The price for excavation of earth is excluded and will be paid under item 34(f) of Sch - A1.

Item 17(f) - Supply and Erection of Earth leads 75 mm x 8 mm mild steel laid exposed

Supply & Erection: The price shall cover supply and installation per meter length of 75 x 8 mm mild steel flat, painted all around with two coats of painting to colour grass green shade-218 of IS:5 passing through cable trench or exposed above ground level. The price shall also cover the connections of the steel flats to the earth electrodes, to constitute the main earth ring and to the earthed terminals of the various equipment as required.

Item 17(g) - Supply and Erection of Earth leads 50 mm x 6 mm mild steel laid in the ground.

Supply & Erection: The price shall cover supply and installation per meter length of 50 x 6 mm mild steel flat buried at a depth of 60 cm below ground level. The price shall also cover connections of the steel flats to the main earth ring and to the steel structures and metallic frame work/terminals of various equipment, as required.

Note: The price for excavation of earth is excluded and will be paid under item 34(f) of Sch - A1.

Item 17(h) - Supply and Erection of Earth leads 50 mm x 6 mm mild steel laid exposed

Supply & Erection: The price shall cover supply and installations per meter length of 50 X 6 mm mild steel flat painted all around with two coats of painting to colour grass green shade – 218 of IS:5 passing through cable trench or exposed above ground level. The price shall also cover the connections of the steel flats to the main earth ring and to the steel structures and metallic frame work/ terminals of various outdoor equipment as required.

Item 17(i) - Supply and Erection of Mild steel rod 32 mm dia for Earth Mat

Supply & Erection: The price shall cover supply and installation per meter length of bare mild steel rod of dia 32 mm, to be buried at a depth of 60 cm below the ground level to form the earthing grid and connected to earth electrodes. The price shall also cover jointing of the M.S. rods to form earthing grid and connection to M.S. flats for system earthing.

Note: The price for excavation of earth is excluded and will be paid under item 34(f) of Sch - A1.

Item 17(j) - Supply and Erection of 8 SWG G.I wire for earthing

Supply & Erection: The price shall cover supply and erection of 8 SWG G.I wire per meter, used for earthing of remote-control cubicles, fencing panels, control panels DB's etc.

Item 17(k) - Supply and Erection of Earth Screen Wire

Supply & Erection: The price shall cover supply and stringing per meter length of 19/2.5 mm [70kg/mm] galvanized steel stranded wire. It shall include the supply and erection of suitable terminations using strain clamps adjuster [on one side only] etc. It shall also include connecting by means of suitable terminal spades the end of the earth screen wire to the main members of the columns of portals gantries across which these wires are strung or to 50 x 6 mm MS flat earth leads. For purpose of payment, the clear span between the structures on which earth wire is run shall be adopted.

Item 18(a) - Erection of 25 kV Vacuum Interrupter (BM)

Erection: The price shall cover erection, testing & commissioning of Vacuum Type Interrupters complete with supporting frame-work, terminal connectors, accessories, operating mechanism, and all fittings etc for their efficient and trouble-free operation. The price for erection shall include alignment and grouting of the Interrupter on its foundation block and mounting of accessories, if any, in their respective positions.

The price also covers grouting, modifications, if any to the existing supporting steel structure/frame, positioning the mechanism box on foundation block and also the other accessories in their respective positions. In case of modification/alteration required for the existing foundation/structure, the contractor shall submit the designs/drawings for the modification/alteration with supporting explanatory notes, calculation etc. to the Purchaser/railways for approval. Concrete for modification/alteration to the foundation shall paid under item no. 2 of Sch-A2.

All the tools & plant, equipment/instruments required for testing and commissioning of the interrupter shall be arranged by the Contractor.

Item 18(b) - Erection of 25 kV Vacuum Circuit Breaker (CB)

Erection: The price shall cover erection, testing & commissioning of 25 kV Vacuum Type Circuit Breaker complete with supporting frame work and terminal connectors for their efficient and trouble-free operation. The price for erection shall include alignment & grouting of the Circuit breaker on its foundation block and mounting of accessories, if any, in their respective positions.

The price also covers grouting, modifications, if any to the existing supporting steel structure/frame, positioning the mechanism box on foundation block and the other accessories in their respective positions. In case of modification/alteration required for the existing foundation/structure, the contractor shall submit the designs/drawings for the modification/alteration with supporting

explanatory notes, calculation etc. to the Purchaser/railways for approval. Concrete for modification/alteration to the foundation shall be paid under item no. 2 of Sch-A2.

All necessary tools, equipment, instruments including power supply required for carrying out necessary checks, tests and commissioning shall be arranged by the contractor.

Item 18(c) - Erection of 132/220 kV Double Pole Circuit Breaker of SF-6 type

Erection: The price shall cover erection, testing & commissioning of 132 or 220 kV SF-6 Type Circuit Breaker complete with supporting frame work and terminal connectors for their efficient and trouble-free operation. The price for erection shall include alignment & grouting of the Circuit breaker on its foundation block and mounting of accessories, if any, in their respective positions.

The price also covers grouting, modifications, if any to the existing supporting steel structure/frame, positioning the mechanism box on foundation block and also the other accessories in their respective positions. In case of modification/alteration required for the existing foundation/structure, the contractor shall submit the designs/drawings for the modification/alteration with supporting explanatory notes, calculation etc. to the Purchaser/railways for approval. Concrete for modification/alteration to the foundation shall be paid under item no. 2 of Sch-A2.

All necessary tools, equipment, instruments including power supply required for carrying out necessary checks, tests and commissioning shall be arranged by the contractor

Item 19(a) - Erection of 25 kV Type-I Potential Transformer (PT)

Erection: The price shall cover erection of a 25 kV Potential Transformer Type-I (Indication) complete with all fittings and accessories as per relevant specifications, including terminal connectors and fixing bolts. The price for erection shall include proper alignment of the potential transformer in position.

Note: The price shall not include the cost of any small parts steel work and jumper.

Item 19(b) - Erection of 25 kV Type-II Potential Transformers (PT)

Erection: The price shall cover supply and erection of a 25 kV Potential Transformer Type-II (Protection) complete with all fittings and accessories as per relevant specifications, including terminal connectors and fixing bolts. The price for erection shall include proper alignment of the transformer in position. The price shall also cover the erection of an enamelled number plate and fixing bolts.

Note: The price shall not include the cost of any small parts steel work and jumper.

Item 20(a) - Erection of 42 kV Lightning Arrester

Erection: The price shall cover erection of 42 kV, Metal Oxide Gapless Lightning Arrester complete with all fittings & accessories as per relevant specifications including terminal connectors and fasteners etc. The cost of erection shall include proper alignment of the lightning arrester in position. Erection should also comply to TI/MI/0048 Rev-1 dated 27/07/2021. Any Base modification for fixing of Lightning arrester as per Specification TI/SPC/PSI/MOGTLA/0101 (2/15)

Note: The price shall not include the cost of any small parts steel work and jumper.

Item 20(b) - Erection of 120 kV Lightning Arrester

Erection: The price shall cover erection of 120 kV, Metal Oxide Gapless Lightning Arrester (suitable for 132 kV TSS) lightning arrester complete with all fittings and accessories. The cost of erection shall include proper alignment of the LA in position.

Note: The price shall not include the cost of any small parts steel work and jumper.

Item 20(c) -Erection of 198 kV Lightning Arrester

Erection: The price shall cover erection of 198, kV Metal Oxide Gapless Lightning Arrester (suitable for 220 kV TSS) lightning arrester complete with all fittings and accessories. The cost of erection shall include proper alignment of the LA in position.

Note: The price shall not include the cost of any small parts steel work and jumper.

Item 21 - Supply and Erection of Terminal Boards in control cubicles

Supply & Erection: The price shall cover supply and erection of Terminal Board consisting of six terminal strips for connecting the cables as per RDSO drawing ETI/PSI/501 (latest). Terminal Board shall be mounted on the wall of remote-control cubicle building at a height of 1 m above the floor level.

The price also includes proper numbering of Terminal strips for Interrupter and potential transformer to indicate the equipment to which it is connected. Numbers shall be engraved on mounting plate with colour contrasting with the colour of Bakelite. The price shall also include terminal board cover of foam lining.

Item 22(a) - Supply and Erection of an Iron Clad 110 V DC Fuse Box

Supply & Erection: The price shall cover supply and erection of a 15A, 110V Iron clad or latest two way fuse box on the wall inside the remote control cubicle. The fuse box shall be complete with two fuse carriers and bases.

Item 22(b) - Supply and Erection of an Iron Clad 230 V AC Fuse Box

Supply & Erection: The price shall cover supply and erection of a 15A, 230V AC. Iron clad or latest 4-way fuse box on the wall inside the remote control cubicle, for heater supply of Interrupters. The fuse box shall contain four fuse carriers and bases.

Item 22(c) - Supply and Erection 110 V Distribution Boards

Supply & Erection: The price shall cover supply and erection of a 110 V Distribution Boards as per latest RDSO spec. The price shall include the grouting of the frame work of the distribution board in position or mounting it on the wall and necessary connections.

Item 23(a) - Erection of 110 V, 40 Ah Lead Acid Battery

Erection: The price shall cover erection of 110V, 40 Ah lead acid battery complete with stand, accessories, and a tool board. The price for erection shall include installation and connecting of the battery, but exclude the cost of connecting cables, the supply and erection of which will be paid for under appropriate Item. The price for erection shall include installation, connecting, initial charging at site if required and commissioning of the battery.

Item 23(b) - Erection of Battery charger for 110 V, 40 Ah Lead Acid Battery

Erection: The price shall include the erection of battery charger for a 110 V, 40 Ah lead acid batteries complete with connecting lead and plug for connection to 230 V AC supply. The price for erection shall include mounting of the charger in position and connecting it up to the 230V AC. distribution board in the control cubicles. The price shall not include supply and erection of any cable for connecting the charger to the 110V battery which shall be paid for under appropriate item.

Item 24(a) - Erection of 110 V, 200 Ah Lead Acid Battery

Erection: The price shall cover erection of 110 V, 200 Ah lead acid battery complete with stand, accessories, and a tool board. The price for erection shall include installation and connecting of the battery, but exclude the cost of connecting cables, the supply and erection of which will be paid for under Item 25. The price for erection shall include installation, connecting, charging at site if required and commissioning of the battery.

Item 24(b) - Erection of Battery charger for 110 V, 200 Ah Lead Acid Battery.

Erection: The price shall cover erection of battery charger for a 110 V, 200 Ah lead acid battery complete with connecting lead and plug for connection to 230 V A.C. supply. The price for erection shall include mounting of the charger in position and connecting it up to the 230V A.C. distribution board in the control cubicles. The price shall not include supply and erection of any cable for connecting the charger to the 110V battery which shall be paid for under appropriate item.

Item 25(a) - Supply and Erection of cable for Control and Indication (10 or 7 core, 2.5 sq. mm)

Supply & Erection: The price shall include the supply and installation, measured per meter, of a 1100V grade PVC insulated and sheathed armoured (heavy-duty) cable, in compliance with IS:1554 (Part-I)-1988. The cable will be 7/10 core, 2.5 sq.mm copper conductor, running from each circuit breaker or interrupter to the Control and Relay Board. The price also shall include supply and installation of terminal connectors at both ends, if necessary, as well as any conduits required for protection or routing.

Item 25(b) - Supply and Erection of cable for Heater Supply (2 core, 4 sq. mm)

Supply & Erection: The price shall include the supply and installation, measured per meter, of a 1100V grade PVC insulated and sheathed armoured (heavy-duty) cable, in compliance with IS:1554 (Part-I)-1988. The cable will be 2 core, 4 sq.mm copper conductor, running from (i) each interrupter to interrupter (ii) from interrupter to 230 V AC Fuse box (iii) From Fuse box to LT distribution board.

The price also shall include supply and installation of terminal connectors at both ends, if necessary, as well as any conduits required for protection or routing.

Item 25(c) - Supply and Erection of cable for Catenary Indication (2 core, 2.5 sq. mm)

Supply & Erection: The price shall include the supply and installation, measured per meter, of a 1100V grade PVC insulated and sheathed armoured (heavy-duty) cable, in compliance with IS:1554 (Part-I)-1988. The cable will be 2 core, 2.5 sq.mm copperconductor, running from line indication type potential transformer to terminal board and from 240V AC LT distribution board to terminal board.

The price also shall include supply and installation of terminal connectors at both ends, if necessary, as well as any conduits required for protection or routing, to be embedded between the steel work based and the cable trench and shall include all fastenings on masts and structural members to support them.

Item 25(d) - Supply and Erection of cable for 110 V DC Power supply (2 core, 4 sq. mm)

Supply & Erection: The price shall cover supply and installation per meter length of PVC 1100V grade, 4 sq.mm (copper conductor) 2 core and sheathed armoured (heavy-duty) cable, from each current transformer to the control and relay board, from 110V DC distribution board to the control and Relay Board and from 240V AC. LT distribution board to Battery Chargers.

The price also shall include supply and installation of terminal connectors at both ends, if necessary, as well as any conduits required for protection or routing.

Item 25(e)(i) - Supply and Laying of 2 core, 70 sq. mm XLPE Aluminium cable

The price shall include the supply and laying of 2 core, 70 sq.mm XLPE insulated, PVC Sheathed, 1100 V, armoured Aluminium conductor.

Item 25(e)(ii) - Supply and Laying of 2 core, 185 / 150 sq. mm XLPE Aluminium cable

The price shall include the supply and laying of 2 core, 185 / 150 sq.mm XLPE insulated, PVC Sheathed, 1100 V, armoured Aluminium conductor.

Note for Item 25(a) to 25(e)(ii):

1. The length of cables shall be the actual distance measured along the lengths of the cable between the starting and terminating points of each cable.
2. For purpose of payment fraction of a meter in the total length of cable of each type used at a switching station, shall be rounded off to the next higher meter.
3. Price under item 25 do not include cost of concrete cable trenches which will be paid for under appropriate item.
4. The price shall also include releasing existing cables. All released cables and connectors shall be handed over to the concerned TRD depot.
5. The price for erection of cables shall include cable boxes, metallic glands, identification labels, terminal connectors, copper lugs and leading inducts or pipes as required.
6. The price for erection shall include connecting up of the cable at either end. It shall also include clamping of the cable on steel supports, fixing in the trenches, on the structures, on the framework of the equipment or on the wall of the control room as required.

Item 26(a)(i) - Supply and Erection of Aluminium Bus Bar 36 mm x 28 mm

Supply & Erection: The price shall cover supply and erection of aluminium bus bar 36 mm x 28 mm including bending and shaping.

Item 26(a)(ii) - Supply and Erection of 18 mm Copper Bus Bar

Supply & Erection: The price shall cover supply and erection of copper bus bar 18 mm including bending and shaping.

Item 26(b)(i) - Supply and Erection of Aluminium Bus Terminal (6480)

Supply & Erection: The price shall include the supply and erection of Aluminium Bus Terminal (6480) for 25 kV Isolator including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6480 or latest. The price shall also include the supply and erection of ALCU strip if required to be provided at junction.

Item 26(b)(ii) - Supply and Erection of Aluminium Bus Splice (6490)

Supply & Erection: The price shall include the supply and erection of Aluminium Bus Splice (6490) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6490 or latest.

Item 26(b)(iii) - Supply and Erection of Aluminium Bus TEE connector (6500)

Supply & Erection: The price shall include the supply and erection of Aluminium Bus TEE connector (6500) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6500 or latest.

Item 26(b)(iv) - Supply and Erection of Aluminium Bus Bar Terminal connector 36/20 mm(6530)

Supply & Erection: The price shall include the supply and erection of Aluminium Bus Bar Terminal connector (6530) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6500 or latest for connecting the 20 mm spider conductor to the 36 mm Aluminium Bus Bar at Traction Substation.

Item 26(b)(v) - Supply and Erection of Aluminium Bus Bar Tap connector (6520)

Supply & Erection: The price shall include the supply and erection of Aluminium Bus Bar Tap connector (6520) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6520 or latest for cadmium catenary tapped from 36 mm O/D Aluminium Bus Bar for Drop Out switch in switching station.

The price shall also include the supply and erection of ALCU strip if required to be provided at junction.

Item 26(b)(vi) - Supply and Erection of Aluminium Flexible Bus Splice (6550)

Supply & Erection: The price shall include the supply and erection of Aluminium Flexible Bus Splice (6550) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6550 or latest for making expansion joints in long 36 mm Aluminium Bus Bar.

The price shall also include the supply and erection of ALCU strip if required to be provided.

Item 26(b)(vii) - Supply and Erection of Aluminium Bus Terminal connector bolted type (6830-1)

Supply & Erection: The price shall include the supply and erection of Aluminium Bus Terminal connector bolted type (6830-1) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6550 or latest for making expansion joints in long 36 mm Aluminium Bus Bar.

Item 26(c)(i) - Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Terminal (6310-1)

Supply & Erection: The price shall include the supply and erection of 18 mm Bus Terminal (6310-1) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6310-1 or latest.

Item 26(c)(ii) - Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Splice (6320)

Supply & Erection: The price shall include the supply and erection of 18 mm Bus Splice (6320) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/6320 or latest.

Item 26(c)(iii) - Supply and Erection of Solid Copper Busbar Connector- 18 mm Bus TEE Joint (6330)

Supply & Erection: The price shall include the supply and erection of 18 mm Bus TEE Joint (6330) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. RE/33/P/6330 or latest.

Item 26(c)(iv) - Supply and Erection of Solid Copper Busbar Connector - 18 mm Bus Terminating TEE (6350)

Supply & Erection: The price shall include the supply and erection of 18 mm Bus Terminating TEE (6350) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. RE/33/P/6350 or latest.

Item 26(c)(v) - Supply and Erection of Aluminium Bus Bar 50 mm x 39 mm

Supply & Erection: The price shall include the supply and erection, measured per meter, of 50 mm x 39 mm dia. aluminium tube to serve as bus-bar or equipment to equipment bus bar connection in the traction sub-station, wherever required. The price shall include straightening, shaping and connecting/clamping of the conductor to the equipment terminals/bus bar supports as required

Item 26(c)(vi) - Supply and Erection of ACSR conductor (Zebra 61/3.18 mm)

Supply & Erection: The price shall include the supply and erection per meter length of 61/3.18 mm (ZEEBRA ACSR) conductor to serve as bus bar or equipment to equipment/bus bar connection in the traction substation, wherever required. The price shall include strengthening, shaping and connecting/clamping of the conductor to the equipment terminals/bus bar supports as required.

Item 26(c)(vii) - Supply and Erection of Rigid type Bi-metallic Terminal connector suitable for 50 mm dia AL Tubular Bus Bar to Terminal Pad of 25 kV Isolator/CT (ID no 11090)

Supply & Erection: The price shall include the supply and erection of Rigid type Bi-metallic Terminal connector suitable for 50 mm dia AL Tubular Bus Bar to Terminal Pad of 25 kV Isolator/CT (ID no 11090) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11090 or latest. The price shall also include the supply and erection of ALCU strip if required to be provided.

Item 26(c)(viii) - Supply and Erection of Expansion Type Terminal connector to suit 50 mm dia AL Tubular Bus Bar to Terminal Pad of 25 kV C.T/Isolator/ C.B & Interrupter (ID no 11060)

Supply & Erection: The price shall include the supply and erection of Expansion Type Terminal connector to suit 50 mm dia AL Tubular Bus Bar to Terminal Pad of 25 kV C.T/Isolator/ C.B & Interrupter (ID no 11060) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11060 or latest. The price shall also include the supply and erection of AL-CU strip if required to be provided. The copper flexible connector (80 x 80 mm) suitable for 50 mm dia AL busbar shall be supplied as advised by Railway Engineer In-charge.

Item 26(c) (ix) - Supply and Erection of 25 kV System Rigid Bus Splice connector to suit 50 mm O/D AL Tube on Both ways. (ID no 11180)

Supply & Erection: The price shall include the supply and erection of 25 kV System Rigid Bus Splice connector to suit 50 mm O/D AL Tube on Both ways. (ID no 11180) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11180 or latest.

Item 26(c)(x) - Supply and Erection of 25 kV System TEE connector to suit 50 mm O/D AL Tubular Bus Bar to 50 mm O/D AL Bus Bar (ID no 11150)

Supply & Erection: The price shall include the supply and erection of 25 kV System TEE connector to suit 50 mm O/D AL Tubular Bus Bar to 50 mm O/D AL Bus Bar (ID no 11150) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11150 or latest.

Item 26(c)(xi) - Supply and Erection of Rigid Through connector to suit 50 mm dia AL Tubular Bus Bar and Spider AAC Conductor for 25 kV PT Type-II (ID no 11110)

Supply & Erection: The price shall include the supply and erection of Rigid Through connector to suit 50 mm dia AL Tubular Bus Bar and Spider AAC Conductor for 25 kV PT Type-II (ID no 11110) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11110 or latest.

Item 26(c)(xii) - Supply and Erection of 25 kV System TEE connector to suit 50 mm O/D AL Tube and Spider AAC Conductor (ID no 11140)

Supply & Erection: The price shall include the supply and erection of 25 kV System TEE connector to suit 50 mm O/D AL Tube and Spider AAC Conductor (ID no 11140) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11140 or latest.

Item 26(c)(xiii) - Supply and Erection of TEE connector to Suit Zebra (28.58 DIA) ACSR Conductor on Both ways for 220 kV System (ID no 11040)

Supply & Erection: The price shall include the supply and erection of TEE connector to Suit Zebra (28.58 DIA) ACSR Conductor on Both ways for 220 kV System (ID no 11040) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11040 or latest.

Item 26(c)(xiv) - Supply and Erection of 220 kV System Bi-metallic Terminal Connector to suit ZEBRA (28.62 DIA) ACSR Conductor and Al/Cu Pad Isolator/CT/BT (ID no 11120/11030)

Supply & Erection: The price shall include the supply and erection of 220 kV System Bi-metallic Terminal Connector to suit ZEBRA (28.62 DIA) ACSR Conductor and Al/Cu Pad Isolator/CT/BT (ID no 11120/11030) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11120 or latest (or) ETI/PSI/P/11030 or latest. The price shall also include the supply and erection of AL-CU strip if required to be provided at junction.

Item 26(c)(xv) - Supply and Erection of Rigid type connector on S.I. to suit 50 O/D AL Bus Bar for 25 kV System (ID no 11200)

Supply & Erection: The price shall include the supply and erection of Rigid type connector on S.I. to suit 50 O/D AL Bus Bar for 25 kV System (ID no 11200) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11200 or latest.

Item 26(c)(xvi) - Supply and Erection of 25 kV System TEE Connector to suit 36 mm O/D AL Bus Bar to 50 mm O/D AL Bus Bar (11240)

Supply & Erection: The price shall include the supply and erection of 25 kV System TEE Connector to suit 36 mm O/D AL Bus Bar to 50 mm O/D AL Bus Bar (11240) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11240 or latest.

Item 26(c)(xvii) - Supply and Erection of Siding clamp for 50 mm AL Busbar (11190)

Supply & Erection: The price shall include the supply and erection of Siding clamp for 50 mm AL Busbar (11190) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11190 or latest.

Item 26(c)(xviii) - Supply and Erection of 220 kV system Rigid connector on SI to suit ZEBRA (28.58 mm dia) ACSR Conductor (ID no 11050)

Supply & Erection: The price shall include the supply and erection of 220 kV system Rigid connector on SI to suit ZEBRA (28.58 mm dia) ACSR Conductor (ID no 11050) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11050 or latest.

Item 26(c)(xix) - Supply and Erection of Rigid type Bi-metallic connector for 50 mm AL Busbar (ID no 11070)

Supply & Erection: The price shall include the supply and erection of Rigid type Bi-metallic Terminal connector suitable for 50 mm dia AL Tubular Bus Bar to 30 dia Cu Stud of 25 kV Current Transformer (ID no 11070) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11090 or latest. The price shall also include the supply and erection of ALCU strip if required to be provided.

Item 26(c)(xx) - Supply and Erection of 25 KV Expansion Bus Coupler to suit 50 mm AL Busbar (ID no 11210)

Supply & Erection: The price shall include the supply and erection of 25 KV Expansion Bus Coupler to suit 50 mm AL Busbar (ID no 11210) including Fasteners (GI Nut, Bolt & Washer etc.) as per RDSO Drawing No. ETI/PSI/P/11210 or latest.

Item 27(a) -Erection of 25 kV/240 V 5/10/25/50/100 kVA Auxiliary Transformer

Erection: The price shall include erection of 25kV/240V LT supply transformer of capacity 5/10/25/50/100kVA, at site, as per the RDSO's latest specification complete with terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. The price shall also cover oil filtration and pre commissioning tests confirming to IS 1866 and as approved by the Employers or Engineer. The contractor shall make his own arrangement for oil filtration equipment, as well as power supply required for the same, all necessary tools, equipment, instruments required for carrying out oil filtration/checks/tests and the contractor shall arrange for commissioning.

Note: Contractor at his own cost shall do the replenishment of the transformer oil on account of testing and leakages during the warranty period.

Item 27(b) - Supply and Erection of 240 V L.T. Distribution Board in the control room for L.T supply transformer with changeover switch

Supply & Erection: The price shall include the supply and erection of 240 V L.T. Distribution Board in the control room for L.T supply transformer with changeover switch.

Item 28 - Supply (without Insulators) and Erection of 25 kV Drop Out Fuse switch for Auxiliary Transformer of all capacities and for Type-I PTs

Supply & Erection: The price shall include the supply and erection of 25 kV DO fuse switch complete with all mounting accessories and terminal connectors as required excluding the supply of 25 kV solid core insulator as per RDSO Drg No. ETI/PSI/038 or its latest revision.

The price shall not include erection of small parts steel work. The actual quantity will be decided by Railway Engineer In-charge. The provision of DO fuse switch for Type-I PTs shall also be claimed under this item.

Item 30(a)(i) - Supply and Erection of Fencing Panel at SP/SSP/TSS

Supply & Erection: The price shall include the supply and erection of fencing panel as per RDSO Specification No. ETI/C/0186 SH-1 for SP/SSP & ETI/PSI/121 for TSS or latest revision. The price also shall include two coats of red oxide zinc chromate primer confirming to IS: 2074 and finished with two coats of aluminium paint.

The prices shall not include supply and erection of fencing up-rights, anti-climbing devices. But, shall include the cost of fasteners and the price shall be for a meter length of the panels, 2.4 m for SP/SSP or 2.5 m for TSS height measured in the plan view of the appropriate approved drawings. However dimensions of fencing panels are to be done as approved by Railway Engineer In-charge.

Item 30(a)(ii) - Supply and Erection of Fencing Upright at SP/SSP/TSS

Supply & Erection: The price shall include the supply and erection of fencing upright as per RDSO specification No. ETI/C/0186 SH-2 for SP/SSP & ETI/PSI/121 for TSS or latest revision. The price also shall include two coats of red oxide zinc chromate primer to IS: 2074 and finished with two coats of aluminium paint.

The price shall be on the basis of black weight of the steel with no deduction for holes or skew cut or no increase for weld materials.

Note: The cost of foundation of uprights will be paid under appropriate item.

Item 30(a)(iii) - Supply and Erection of Gates

Supply & Erection: The price shall include the supply and erection of Gates for SP/SSP/TSS as per RDSO Drg. No. ETI/C/0186 (SH 1&2) or its latest revision (or) the dimensions of Gate may be decided as per site condition by Railway Engineer In-charge. As per drawing approved by Railway Engineer In-charge, may be executed.

The price shall also include two coats of red oxide zinc chromate primer to IS: 2074 and finished with two coats of aluminium paint.

Item 30(b)(i) - Supply and Erection of Anti-climbing device at TSS/SP/SSP

Supply & Erection: The price shall cover supply and erection of an anti-climbing device consisting of galvanized steel fixtures and barbed wire mounted on the fencing panels as per RDSO Drg. No. ETI/PSI/121 or its latest revision, ETI/PSI/104 or its latest revision & ETI/C/0186 (SH 1&2) or its latest revision.

The price shall be per meter length of the panel.

The price shall also include painting of the fixtures with two coats of red oxide zinc chromate primer and finished with two coats of Aluminium paint as per IS 2074.

Item 30(b)(ii) - Supply and Erection of Anti-climbing device for Auxiliary Transformer.

Supply & Erection: The price shall include the supply and erection of anti-climbing device consisting of galvanized steel fixtures and barbed wire mounted on the AT mast as per RDSO Drg No. ETI/OHE/SK/106 or its latest revision.

The price shall be for each mast provided with the devices.

The price shall also include painting of the fixtures with two coats of red oxide zinc chromate primer and finished with two coats of Aluminium paint as per IS 2074.

Item 31(a) - Transfer of Overhead Equipment from one Mast or Support to another, including removal of Cantilever Assembly from old Mast or Support.

The price shall include the transfer of overhead equipment to a cantilever assembly on a new mast or support. The price shall also include **dismantling of the existing bracket assembly/assemblies** including SPS from the old mast or support.

The dismantled cantilever assembly shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

The foundation, steel work and bracket assembly for the new mast or structure will be paid under appropriate items.

Note: Dismantling of cantilevers (item no. 31(r) of Sch-A1) should not be operated, when this item is operated

Item 31(b) - Erection of additional bracket assemblies on a same mast or support

The price shall include the dismantling of existing bracket assemblies including SPS. The price shall also include the provision of a multiple cantilever cross arm and erection of bracket assembly/assemblies on the multiple cantilever cross arm.

Note: 1.This item is to be operated when conversion of single cantilever to multi cantilevers is planned.

2. The price shall not include the supply cost of multiple cantilever cross arm, which will be paid under item no. 3(cs) of Sch-B1

3. This price shall not include the price for supply of new cantilever assembly/assemblies, which will be paid for under item no. 4(a)(i) of Sch-A1.

Item 31(c) - Dismantling of Overhead Equipment

The price shall include the dismantling of overhead equipment which includes contact wire, catenary wire, jumpers and droppers.

The dismantled materials shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Note: Dismantling of Terminations are to be covered under 31(t)(v) of Sch-A1 for conventional OHE and 31(t)(vi) of Sch-A1 for Tramway OHE.

Item 31(d) - Dismantling of Along Feeder wire (Aluminium or copper feeder wire)

The price shall include the dismantling of Aluminium or Copper Feeder wire.

The dismantled feeder wire shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(e) - Splicing and Extension of Anchored OHE

The price shall include the splicing of terminated overhead equipment for extension, along with the necessary adjustments to the affected equipment. The splicing of contact and catenary wire after dismantling of section insulator shall also be claimed under this item.

The cost of dismantling the overhead equipment will be covered separately under Item 31(c). The extended overhead equipment shall be measured and paid from the center line of the splice to the newly extended section under Item 6(a), 6(b), or 6(c).

If only the catenary or contact wire is spliced and extended, half the rate shall be paid. In the case of anti creep wire splicing and extension is done, half the rate shall also apply. When splicing a catenary wire with a contact wire or an insulated catenary wire using an ending clamp/splice under a Road Over Bridge (ROB), payment shall be made under this item at half the rate per splice.

The dismantled equipment must be properly stacked and transported to the nearest TRD depot, as instructed by the Railway Engineer In-charge.

Note: The price does not include supply of splices and any additional wire pieces (contact and catenary).

Item 31(f) - Dismantling of Section Insulator

The price shall include the dismantling of Section Insulator assembly along with sectioning and 9-ton insulators. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(g) - Slewing and Putting back of OHE in original position

The price shall include the temporary slewing or lowering of OHE to ground for carrying out special works, at the request of the Railway Engineer In-charge and restoration & readjustment of the OHE after completion of special work.

Slewing of OHE shall be paid for the OHE slewed in terms of span and putting back of OHE to normal condition after completion of special works. It is paid in terms of spans and slewing is done including anchoring spans. This is inclusive of and RC wire / earth wire if any in case of 2x25 kV AT system.

Additional components or materials used during such restoration of OHE shall be paid separately under appropriate items.

Item 31(h) - Dismantling of an Isolator

The price shall cover cost of dismantling of single or double pole isolator including post insulators, operating rod insulators, operating rod, earthing heel arrangement and associated small parts steel (SPS) work in isolated cases. The price shall also include the dismantling of busbars.

The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Note: The dismantling of isolator jumpers shall be claimed under item no. 31(t)(iv) of Sch-A1.

Item 31(i) - Dismantling of Post Insulator

The price shall include the complete dismantling of post insulators, along with their associated fittings, that are not covered under any other specified items. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(j)(i) - Dismantling of Suspension Insulator

The price shall include the complete dismantling of suspension insulators, along with their associated fittings, that are not covered under any other specified items. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(j)(ii) - Dismantling of Cut-in Insulator

The price shall include the complete dismantling of cut-in insulators, along with their associated fittings, that are not covered under any other specified items. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(k)(i) - Dismantlement of OHE Mast or structure by cutting

The price shall include the dismantling of existing OHE mast /PSI mast/ structure by cutting just above the foundation level by breaking the muff, if required, without causing any damage to the mast or any adjacent structure. The dismantled OHE mast shall be properly stacked.

Note: The transportation of OHE mast to nearest TRD depot as advised by Railway Engineer In-charge can be claimed under item no. 38 of Sch-A1.

Item 31(k)(ii) - Dismantlement of Upright of TTC/Portal by cutting

The price shall include the dismantling of existing traction Portals/TTC uprights by cutting just above the foundation level by breaking the muff, if required, without causing any damage to the masts/ Portals/ TTC uprights or any adjacent structure. The dismantled OHE Portals/TTC shall be properly stacked.

Note: The transportation of OHE Portals/TTC to nearest TRD depot as advised by Railway Engineer In-charge can be claimed under item no. 38 of Sch-A1.

Item 31(l)(i) - Retrieval of Traction Masts, Main Masts of Switching Station, TTC Uprights etc

The price shall include the excavation of surrounding earth of the existing foundation to the required depth, breaking of foundation block and extracting of mast in full length.

The price shall also cover refilling of excavation pit with surrounding soil and stacking of retrieved mast. No explosives shall be used for this work.

Note: The transportation of retrieved mast to nearest TRD depot as advised by Railway Engineer In-charge can be claimed under item no. 38 of Sch-A1.

Item 31(l)(ii) - Removal of OHE Masts on Bridges

The price covers removal of OHE Masts on bridges by removing the nuts by spanners or by cutting if rusted.

Note: (1) In view of safety involved and site constraints, UTV machine is to be used for removal of OHE Masts on Bridges. In case of UTV machine utilization, proportional deduction of UTV machine utilization charges are to be deducted while paying.

(2) The transportation of retrieved mast to nearest TRD depot as advised by Railway Engineer In-charge can be claimed under item no. 38 of Sch-A1.

Item 31(m) - Releasing of pole mounted LT supply transformer

The price shall include the releasing of pole mounted LT supply transformer including D.O. fuse switch, insulators, jumpers, anti-climbing device, fencing panels, LAs and associated small parts steel work.

The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(n) - Dismantling of Guy Rod

The price is applicable to dismantling/cutting of guy rod assembly not provided for in other items. The price shall cover dismantling of guy rod assembly and associated small parts steel work (excluding components embedded in concrete).

Note: In case of buried anchor loop, cutting of guy rods can be done if dismantling is not possible.

Item 31(o) - Releasing of Multiple Cantilever Cross arm cantilever assemblies where single cantilever assembly is leftover.

The price shall cover dismantling of existing single bracket assembly leftover on multiple cantilevers cross arm assembly, dismantling of multiple cantilever cross arm assemblies, erection of bracket adaptor assemblies if required and erection of dismantled bracket assembly.

Note:

- 1) The price shall not include any consequential adjustment to traction overhead equipment such as re-spacing of droppers, levelling, etc.
- 2) The price shall not include supply of small parts of steel which will be paid for under item 3(c).
- 3) Bracket adaptor erection should not be claimed under 3(b) and MCC dismantling should not be claimed under 31(s).

Item 31(p) - Dismantling of Drop Arms / TTB / Portal Booms/ Temporary Masts

The price shall include the dismantling of drop arms, TTB, Portal booms and temporary masts etc. The dismantled equipment shall be properly stacked.

Note: The transportation of drop arms/booms/temporary masts to nearest TRD depot as advised by Railway Engineer In-charge can be claimed under item no. 38.

Item 31(q) – Splicing and Extension of Feeder conductor

The price shall include the splicing of terminated all aluminium (spider) / copper feeder conductor for extension.

The cost of dismantling of feeder conductor would be paid for under item no. 31(d) for the whole length of the anchoring span irrespective of the physical position of the splices.

The extended feeder conductor (single spider) shall be deemed as starting from the centre line of the structure preceding the old terminating structure and the extended feeder conductor (single spider) shall be paid under item no. 7(a).

The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Note: The price does not include the supply of splices.

Item 31(r) - Dismantling of cantilever assemblies including insulators

The price shall include the dismantling of cantilever assemblies, not provided for in other items. The price includes the dismantling of cantilever assemblies including stay & bracket insulators, excluding small parts steel work. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(s) - Dismantling of Fabricated steel or SPS

The price shall include the dismantling of fabricated steel work or small parts steel (SPS), not provided for in other items. The dismantled equipment is to transported to nearest TRD Depot and to be properly stacked.

Item 31(t)(i) - Dismantling of a regulating equipment (Three pulley type) with counter weight assembly for conventional OHE

The price shall include the dismantling of regulating equipment (3 pulley type) with counter weight assembly for Conventional OHE, excluding small parts steel work. The dismantled equipment shall be transported to nearest TRD depot and properly stacked as advised by Railway Engineer In-charge.

Item 31(t)(ii) - Dismantling of a regulating equipment (three pulley type) with counter weight assembly for Tramway OHE

The price shall include the dismantling of regulating equipment (3 pulley type) with counter weight assembly for tramway OHE, excluding small parts steel work. The dismantled equipment shall be transported to nearest TRD depot and properly stacked as advised by Railway Engineer In-charge.

Item 31(t)(iii) - Dismantling of anti-creep with galvanized Steel wire or copper catenary wire

The price shall include the dismantling of anti-creep galvanized steel wire or copper catenary wire not provided for in other items. The price shall cover cost of dismantling of anti-creep including terminations, excluding small parts steel work (excluding components embedded in concrete). The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(t)(iv) - Dismantling of copper jumper

The price shall include the dismantling of all types of jumpers not accounted for in other items. The price shall cover the cost of dismantling jumpers, along with associated clamps, connectors, and other fittings.

The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(t)(v) - Dismantling of termination for conventional over head equipment conductor

The price shall include the dismantling of termination of conventional overhead equipment conductors for ATD & FTA, not accounted for in other items. The price shall cover cost of dismantling of termination of double overhead equipment conductors, excluding small parts steel work. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(t)(vi) - Dismantling of termination for tramway type OHE or single conductor of overhead equipment

The price shall include the dismantling of termination of tramway OHE for ATD & FTA, not accounted for in other items. The price shall cover cost of dismantling of termination of tramway OHE, excluding small parts steel work.

The price for dismantling of termination on one side of anti-creep can be claimed under this item.

The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(t)(vii) - Dismantling of Termination for Along Feeder (Aluminium or Copper)

The price shall include the dismantling of termination of all aluminium or copper 25 kV feeder conductors not accounted for in other items. The price shall cover cost of dismantling of termination of feeder, excluding small parts steel work.

The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(t)(viii) - Transfer of feeder wire from one mast to another

The price shall include the transfer of feeder to a suspension insulator on a new mast or support, and dismantling of the erected suspension insulator from the old mast or support, excluding the small parts steel work.

The foundation and steel work for the new mast or structure will be paid under appropriate items. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(t)(ix) - Re-adjustment of OHE spans including droppers

The price shall include the readjustment of OHE spans including droppers in a span, setting stagger, associated section insulator droppers and jumpers in a span. The price also includes the dismantling and re-erection of droppers, if required. The dismantled equipment shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Note: Half of the rate to be paid, if less than or equal to 4 droppers adjusted in any span.

Item 31(t)(x) - Dismantling of Structure Bond/Longitudinal Bond/Transverse & Special Bond / Platform Bond

The price shall include the dismantling of structure bond / longitudinal bond / transverse & special bond / platform bond. The dismantled bond shall be properly stacked and transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(i) - Dismantling of 25 kV Potential Transformer (Type I, II)

The price shall include the dismantling of 25 kV Potential Transformer complete with all fittings and accessories including terminal connectors. The process should ensure that no damage occurs to the potential transformer, associated equipment, or surrounding infrastructure. The price shall exclude the small parts steel (SPS).

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(ii) - Dismantling of 25 kV Current Transformer

The price shall include the dismantling of 25 kV Current Transformer complete with all fittings and accessories including terminal connectors. The process should ensure that no damage occurs to the current transformer, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(iii) - Dismantling of 132 kV Current Transformer

The price shall include the dismantling of 132 kV Current Transformer complete with all fittings and accessories including terminal connectors. The process should ensure that no damage occurs to the current transformer, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(iv) - Dismantling of 42 kV Lightning Arrester

The price shall include the dismantling of 42 kV Lightning Arrester complete with all fittings and accessories including terminal connectors. The process should ensure that no damage occurs to the Lightning Arrester, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(v) - Dismantling of 120/198kV Lightning Arrester

The price shall include the dismantling of 120 kV or 198 kV Lightning Arrester complete with all fittings and accessories including terminal connectors. The process should ensure that no damage occurs to the Lightning Arrester, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(vi) - Dismantling of 132 kV Double Pole Isolator

The price shall include the safe dismantling of 132 kV double pole isolators. The price also shall include the disconnection of all electrical connections, removal of mounting hardware, and any associated components. The process should ensure that no damage occurs to the isolator, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot or as advised by Railway Engineer In-charge.

Item 31(u)(vii) - Dismantling of 25 kV Single Pole Isolator 1600 A

The price shall include the safe dismantling of 132 kV/25 kV isolators. The price also shall include the disconnection of all electrical connections, removal of mounting hardware, and any associated components. The process should ensure that no damage occurs to the isolator, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(viii) - Dismantling of 25 kV Double Pole Isolator 1600 A

The price shall include the safe dismantling of 25 kV Double Pole Isolator (1600 A). The price also shall include the disconnection of all electrical connections, removal of mounting hardware, and any associated components. The process should ensure that no damage occurs to the isolator, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(ix) - Dismantling of 132/220 kV CB SF-6 type

The price shall include the safe dismantling of 132/220 kV SF-6 type CB. The price also shall include the disconnection of all electrical connections, removal of mounting hardware, and any associated components. The process should ensure that no damage occurs to the CB, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 31(u)(x) - Dismantling of 25 kV CB Vacuum/SF-6 type

The price shall include the safe dismantling of 25 kV CB. The price also shall include the disconnection of all electrical connections, removal of mounting hardware, and any associated components. The process should ensure that no damage occurs to the CB, associated equipment, or surrounding infrastructure.

The dismantled equipment shall be properly stacked at substation and/or shall be transported to nearest TRD depot as advised by Railway Engineer In-charge.

Item 32 - Extra Rate for Erection under Power Block

The price under this item includes extra charges over and above erection rates of Schedule – A (SOR items), for erection of equipment in the vicinity of energized overhead equipment and feeders or erection of equipment with joints equipment already energized or on energized equipment which calls for a power block (shut off of traction power).

The price payable under this item shall be **100% extra on the erection rates** of the item referred against each item, provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the purchaser from time to time.

Where the prices under this item are applicable, the contractor shall finalize the quantities of various items of work to be done under a power block, jointly with the Railway Engineer In-charge prior to taking the work in hand.

Item 34(a) - Construction of switching station building (super structure portion including plinth beam)

Supply & Erection: The price shall cover the construction of Control room of SP/SSP building above plinth and will include labour and material cost for the following works:

- (i) *RCC work in plinth, lintels, chajja, Roof slab.*
- (ii) *Pre-cast RCC slab, RCC jail.*
- (iii) *Cement concrete in flooring.*
- (iv) *Brick masonry in walls.*
- (v) *Plastering works.*

- (vi) For control room and battery room, Doors, windows grills, water pipeline ventilators and painting are to be provided.
- (vii) For control room, tiles to be provided and for battery room acid resistant tiles to be provided along with acid proof painting for walls in battery room.
- (viii) White washing and colour washing.
- (ix) Spreading of stone metal (ballast).
- (x) Provision of RCC pipe etc.
- (xi) Any other Item of work required to complete the work which has not been mentioned/included above shall also be done by the contractor and nothing extra shall be paid the same.
- (xii) Room size to be decided as per joint inspection at site suitably.

Construction of switching station shall be done strictly as per RDSO's drawing No.ETI/C/0067C (Mod-A) or latest.

The price shall cover the provision of all shuttering, frame works, arrangement of water, all tools and plants are required for the work, consumable materials etc. The materials used for the work such as brick, sand, stone aggregates, steel for door frame, grill, RCC pipe shall be of best quality in accordance with Railways specification.

The price shall also cover the provision of vent suitably on the wall, for installation of Exhaust fan in the battery room as well as control room.

Item 34(c) - RCC work for foundation and plinth in ratio 1:2:4

Supply & Erection: The price shall cover the price of reinforcement concrete work for construction of column including supply of cement, concrete, structuring arrangements and dismantling thereto but excluding cost of steel required for reinforcement which has been covered under appropriate item. The price shall cover cutting, bending and laying of reinforcement in column. The concrete mixture shall also be of 1:2:4 ratio before casting the same in accordance with IS: 456/1978

Item 34(d) – Brick work for foundation plinth

Supply & Erection: The price shall cover all labour and materials including cement and brick. The price covers supply, fixing, erecting, and removal of scaffolding, timber or steel frame work, shuttering, centering etc. The price covers arrangement of water at site, mixing of mortar, soaking bricks and all watering during the work and prescribed period of curing afterwards. The price shall cover the arrangement of all tools and plants required for work. The price shall cover all consumable materials e.g. fuel, oil, string, rope, wedges etc.

Item 34(e) - Construction of retaining wall with stone masonry

Supply & Erection: The price shall include all labour and materials including cement for Construction of retaining wall with Random rubble/stone masonry in cement & sand 1:4. The price shall cover supplying, fixing, erecting, and removal of scaffolding, timber or steel frame work, shuttering, centering etc. The price shall also include watering during the work.

Item 34(f) - Excavation of Earth, filling including compaction in all kinds of soil

The price shall cover the excavation of earth and earth filling at SP/SSP/TSS/OHE foundations. The price covers all labour and materials required including arrangement of necessary tools and plants required for the work. This price includes the transportation cost of earth in case, earth is not

available for filling up the nearby area. The price covers the watering and ramming of levelled / filled earth either manually or by mechanical means. The price shall cover arrangement of necessary water required for the work.

The price also includes the disposal of excavated earth/leveling etc. for foundations, drainage etc

Item 34(h) - Excavation of Pile of 100 mm to 200 mm dia upto 3.5 m

The price shall cover the cost of all labour tools and plants required at site during making of a 100 to 200 mm dia bore hole along-with single under ream up to a depth of 3.50 metre. The excavated earth from the bore hole shall be disposed off and leveled all around. The price shall also cover the cost of all consumable materials and water is required at site during execution of work.

Item 34(i) - Plastering of Retaining wall with 1:4 cement mortar

Supply & Erection: The price shall cover the supply of all materials and labour cost including cement for plastering of Retaining wall either constructed by Rubble masonry work or Brick work. Plastering work shall be done by cement mortar in 1:4 (1 cement and 4 sand). The price shall also cover the cost of arrangement of necessary water is required for the work. The price shall cover the cost of necessary tools and plants required for the work and necessary consumable Items. Nothing extra shall be paid to the contractor for any rehandling of materials from the place of delivery to place of work. The price shall cover the cost of cleaning and wetting the surface of the work. The price shall also cover the cost of curing of the plastered surface as per extent practice.

Item 34(j) - Providing and Laying Pitching with Stone Boulders

Supply & Erection: Providing and laying Pitching with Stone Boulders, weighing approximately 25 kg each with voids filled with cement sand mortar 1:4 on slopes laid over prepared filter media including boulder apron laid dry in front of toe of embankment complete as per Technical Specification. Rate is including the cost of cement.

Item 34(k) - Supply and spreading of 20 mm ballast at TSS/SSP/SP yards

Supply & Erection: The price shall include supply and spreading of uniformly graded 20 mm Ballast stone size in the TSS/SSP/SP yards, duly levelling the area. The Ballast stone shall be of good quality and free from any dust/dirt/muck. Prior approval shall be obtained from the Railway Engineer In-charge for the ballast stone sample. The ballast stones shall be spread out uniformly to a depth of 10 cm to 20 cm as directed by Railway Engineer In-charge.

Item 35 - Internal and External Lighting of Switching (SP/SSP) station building

Supply & Erection: The price shall cover all cost of labour and materials required for the work. Wiring work shall be done in accordance with IE rules, IS-732. The price shall also cover the cost of testing and commissioning of the installations. The various activities involved in the work are as follows:

- *Fixing of MS conduits on wall and drawing of wires for circuit and point wiring.*
- *Provision of C.I. Switch boxes of appropriate size concealed in wall at appropriate height with phenolic laminated (Hylum) sheet for fixing of switches, plugs etc.*
- *Provision of Main Board and Distribution Boards and connection thereof.*
- *Provision of LED light fittings, Exhaust fan, Outdoor LED Light fittings complete with tubes and bulbs respectively as per requirement.*

- *Provision of Earthing station and connection between earthing station to Main Board with the help of 8 SWG GI wire. Earthing work shall be done in accordance with IS: 3043/1987.*
- *Materials such as energy efficient (LED) light fittings, Exhaust fan, switches sockets, Ceiling Rose, Socket outlets all shall be with ISI mark.*
- *Provision of Switches, sockets outlets, Ceiling Roses on respective switch boards and points in appropriate numbers and connection thereof.*
- *Provision of LED Street light fitting (80 Watt or above as per requirement) complete in all respect on the wall of the building facing towards switchyard.*

After completion of wiring work necessary testing of wiring and Earthing station shall be done and results submitted to the site-in-charge duly signed by representatives of both the contractor and purchaser.

Item 36(a) – Unloading of all types of Steel Structures

The price shall cover unloading charges for all type of steel structures (BFB/RSJ, B-series, Special structures, N, O, R type structures, SPS etc.) from trailer/truck.

Item 36(b) – Loading of all types of Steel Structures

The price shall cover loading charges for all type of steel structures (BFB/RSJ, B-series, Special structures, N, O, R type structures, SPS etc.) from trailer/truck.

Item 37(a) – Unloading of all types of Copper and Aluminium Conductors

The price shall cover unloading charges for all type copper conductors (contact wire, catenary wire, Dropper wire, Bridle wire, Jumpers, etc.) and Aluminium conductors (spider conductor etc.) from trailer/truck.

Item 37(b) – Loading of all types of Copper and Aluminium Conductors

The price shall cover loading charges for all type copper conductors (contact wire, catenary wire, Dropper wire, Bridle wire, Jumpers, etc.) and Aluminium conductors (spider conductor etc.) from trailer/truck

Item 38 – Transportation of OHE structures / Materials / Equipments

The price shall include the transportation of new or released OHE structures / Materials / Equipments which are not covered in other items.

Item 39 – Erection of Released Equipment

The price for items 39(a), (b), (c), (d), (f), (g), (h), (i) and (j) shall include the erection of respective dismantled equipment under item no. 31 and taken into account by the Contractor as deemed to be supplied by the Purchaser. The payment for SPS in connection with erection of these items will be as per item no. 3(b) as per procedure as applicable to item 1 to 31.

If dismantled equipment is common to conventional and tramway OHE, same will be erected either for conventional or tramway OHE depending on requirement.

The price against these items shall include transportation of dismantled equipment, which are fit for erection as decided mutually by the Purchaser and the Contractor. The price shall also cover

transport of released material (unused) to handover at nearest Purchaser's depot or any depot nominated by the purchaser.

Item 40(a) – Supply and Erection of Number Plates (Enamel Type)

Supply & Erection: The price shall include the supply and erection of one enamel number plate along with clamps & Fasteners (Bolt, Nut, Locknut, Spring Washer, Lead Washer etc.) on OHE structures (Masts/Portals/Drop Arms etc). The supply and erection of number plate shall conform to Drg No. RE/33/P/7501 (Rev. F) or latest, clamps shall be as per RDSO drawing no. ETI-OHE-G-01701 & ETI-OHE-P-3300 or latest and specification no. ETI/OHE/33 (8/85) or latest.

Item 40(b) – Supply and Erection of Number Plates (Retro-Reflective Type)

Supply & Erection: The price shall include the supply and erection of one retro-reflective number plate along with clamps, Fasteners (Bolt, Nut, Locknut, Spring Washer, Lead Washer etc.) on OHE structures (Masts/Portals/Drop Arms etc). The supply and erection of retro-reflective number plate shall conform to RDSO Drg No. ETI/OHE/P/7503 or latest, clamps shall be as per RDSO drawing no. ETI-OHE-G-01702 & ETI-OHE-P-3330 or latest and specification no. ETI/OHE/33A (12/97) Rev.8 or latest.

Item 41(a) – Supply and Erection of Retro-reflective type DJ ON (CLOSE)/DJ OFF (OPEN)/ 500 m/250 m/Train-18/MEMU Neutral Section Boards

Supply & Erection: The price shall include the supply and erection of Retro- Reflective type 500 m / 250 m warning board for neutral section of size 750 x 450 x 2 mm and DJ ON (Close)/ DJ OFF (Open)/Train-18/MEMU Neutral section boards of size 800 x 400 x 2 mm as per RDSO Specification No. ETI/OHE/33A (12/97) REV-8 or latest. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(b) – Supply and Erection of Enamel type Public Caution board Board with skull and bones symbol

Supply & Erection: The price shall include the supply and erection of Enamel type Public Caution Board / Staff Caution Board along with **skull and bones symbol** (3 Language- Hindi, English, Regional language) of size 700 mm x 400 mm x 2mm as per RDSO Specification No. ETI/OHE/33A (12/97) Rev-8 or latest and similar as per RDSO Drg No.RE/33/P/7551. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(c) – Supply and Erection of Enamel type Staff Caution Board

Supply & Erection: The price shall include the supply and erection of Retro-reflective type Public Caution Board / Staff Caution Board along with **skull and bones symbol** (3 Language- Hindi, English, Regional language) of size 500 mm x 400 mm x 2 mm as per RDSO Specification No. ETI/OHE/33A (12/97) Rev-8 or latest and similar as per RDSO Drg No.RE/33/P/7551. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(d) – Supply and Erection of Retro reflective Type Electric Engine Stop Board/ Caution Unwired Turnout Board

Supply & Erection: The price shall include the supply and erection of Retro-reflective Electric Engine Stop Board/Caution Unwired Turnout Board of size 900 mm x 600 mm x 2mm as per RDSO Specification No. ETI/OHE/33A (12/97) Rev-8 or latest and similar as per RDSO Drg No.RE/33/P/7572 Rev. B or latest. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(e) - Supply and Erection of Retro-Reflective Type Power Block working limit Board

Supply & Erection: The price shall include the supply and erection of Retro-Reflective type Power Block Working Limit Board of size 450 x 450 x 2 mm as per RDSO Specification No. ETI/OHE/33A (12/97) REV-8 or latest and RDSO Drg no. ETI/OHE/P7574 Rev B or latest. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(f) - Supply and Erection of Enamel Caution Clearance to OHE nearby Restricted Board

Supply & Erection: The price shall include the supply and erection of Retro-reflective type Caution board 25 KV (OHE Nearby) of size 400 mm x 270 mm x 2 mm as per RDSO specification No. ETI/OHE/33A (12/97) Rev-8 (latest) and RDSO Drg. no.RE/33/436. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(g) - Supply and Erection of Retro-reflective type Danger Board with skull and bones for Height gauges

Supply & Erection: The price shall include the supply and erection of Retro-reflective type 25 KV Danger board with skull and bones for Height gauge at Level Crossing gate of size 1400 mm x 300mm x 2mm as per RDSO specification No. ETI/OHE/33A (12/97) Rev-8 or latest and RDSO Drg. No. ETI/C/0069 Mod-D (latest). The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(h) - Supply and Erection of Vitreous Enameled 25 kV Danger Board with skull & bones for Over-line Structure (OLS), Auxiliary Transformer

Supply & Erection: The price shall include the supply and erection of 25 kV Danger Board Vitreous Enameled with Skull & Bones of size 250 mm x 200 mm x 1.6 mm for AT & OLS protective screen(3 Language- Hindi, English, Regional language) as per RDSO Specification No. ETI/OHE/33A (12/97) Rev.8 or latest and RDSO Drg. No. ETI/OHE/SK/104 or latest. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(i) - Supply and Erection of Enamel Protected Area Board

Supply & Erection: The price shall include the supply and erection of Protected area-No Admission board with skull and bones(3 Language- Hindi, English, Regional language) of size 1200 mm x 450 mm x 2mm as per RDSO Specification No. ETI/OHE/33A (12/97) Rev.8 or latest. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(j) - Supply and Erection of Retro-Reflective Sigma Board

Supply & Erection: The price shall include the supply and erection of Retro-Reflective sigma sign board of size 450 mm x 600 mm x 2 mm as per RDSO specification No. ETI/OHE/33A/12/97) Rev.8 or latest and RDSO Drg. No. TI/DRG/OHE/PLTBRD/RDSO/0036/12/0 or latest. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(k) - Supply and Erection of Vitreous Enamelled TSS/SP/SSP Name Board

Supply & Erection: The price shall cover supply of TSS/SP/SSP name boards vitreous enamelled (Trilingual: Hindi, English, Telugu) of size 450 mm x 1200 mm x 2mm. Erection of name board at SP/SSP/TSS for provision on fencing panel. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 41(l) - Supply and erection of set of Isolator operation OPEN/CLOSE boards

Supply & Erection: The price shall cover supply of set of isolator operation open/close boards of size 600mmX900mm with thickness 5mm made of colour photo paper printed with chemical lamination. These boards are to be provided at Dy.SS rooms, SP's, SSP's, TSS's and depots. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

Item 42 - Supply and Erection of Shock Treatment Chart

Supply & Erection: The price shall include the supply and erection of shock treatment chart of size 900mmx 600mmx 8mm made of colour photo paper printed with chemical lamination as per relevant specification duly written instruction in English, Hindi and local language with all columns filled in. The price shall also include the supply of the required fixture/ fasteners for mounting on wall at the control cubicle/ station wherever required as directed by the Railway Engineer In-charge of the work. The price shall also include the supply and erection of clamping material (fixing arrangement with anti-corrosive paint) along with Fasteners (GI Bolt, Nut, Washers etc.)

43 - Supply and Erection of Protective Screens at/on ROB/FOBs

Supply & Erection: The price shall include on per track basis on both sides of ROB/FOB, the cost of all material required for fabrication of protective screen including angle, Tee, expanded metal (Jali), GI sheet, paints etc.

The price shall also include the labour cost for fabrication, erection and painting at various locations. The fabrication and erection work shall be done as per RDSO Drg. No. ETI/C/0068 Mod. I or latest. The price shall also include the filling of gap between gangway floor and protective screen with cement to avoid escape of water from floor of FOB while cleaning and fall on OHE to avoid continuous path to fault current.

Item 45(a) - Erection of 25 kV Current Transformer

Erection: The price shall include erection, testing, commissioning, and connecting of a 25 kV Current Transformer of all ratings complete with all fittings and accessories including terminal connectors. It shall also include mounting of the transformer in position.

Item 45(b) - Erection of 132 kV or 220 kV Outdoor Current Transformer

Erection: The price shall include erection, testing, commissioning, and connecting of a 132 kV or 220 kV Current Transformer of all ratings complete with all fittings and accessories including terminal connectors. It shall also include mounting of the transformer in position.

SCHEDULE A2: FOUNDATION ITEMS (SUPPLY & ERECTION)

Item 2(a)(i) - Concrete for foundations and plinth in Hard Soil &

Item 2(a)(ii) - Concrete for foundations and plinth in Rocky Soil

Supply & Erection: The price shall cover excavation, supply & handling of all materials, accessories, temporary arrangements for excavation in hard soil and in concrete/masonry drains/walls requiring use of chisel and hammer under item 2(a)(i) or requiring blasting under item 2(a)(ii), Shoring wherever necessary, casting concrete including frame work wherever necessary, tamping of concrete, grouting of masts and finishing the top of concrete foundation or anchor blocks. The price also includes dismantling of all connected temporary arrangements, back filling with earth and compacting the same to the required height and width as per drawing to ensure safety of foundation, confining the exposed height of foundation block to within 10 cm and removal of soil.

The Purchaser's Engineer shall certify where use of chisel and hammer or blasting has been necessary. The contractor shall arrange for supply of explosives and all tools & plants for blasting operations at his own cost. If half or more of the depth or width of excavation is in hard soil/concrete/masonry drains/walls or in rock, the entire foundations shall be paid for under item 2(a) (i) or 2 (a) (ii) as the case may be. If half of the depth or width of the excavation is in hard soil/concrete/masonry drains/walls and the other half is in rock, the entire foundation shall be paid under item 2 (a) (ii). The price shall include the cost of cement. Proper curing of foundation is to be ensured.

Notes for measurement for items 2(a)(i) and (ii)

- 1. The payable volume of the foundations under item 2(a)(i) and (ii) shall be the designed one as shown in the drawings for which the hole has been blasted, irrespective of the actual configuration assumed by the latter due to the blasting.*
- 2. The depth of the excavation shall be measured from the formation level to the maximum excavated point.*

Item 2(b) - Concrete for foundations and plinth in other than Hard and Rock Soil

Supply & Erection: The price shall include all works mentioned in item 2(a)(i) & 2(a)(ii) in all classes of soil except hard soil, masonry drains, walls and rock. Proper curing of foundation is to be ensured. The price shall also include foundations for AT/BT masts.

Note for item 2(a)(i), 2(a)(ii) & 2(b):

- (a) In coastal area, M15 for foundation and M20 for grouting may be followed
- (b) For remaining areas, M10 for foundation and M15 for grouting may be followed.

Item 2(c)(i) - Reinforced Concrete for foundation, plinth and trench

Supply & Erection: The price shall cover excavation and all reinforced concrete work for foundations including supply of steel for reinforcement & other materials including bending, binding, laying of the reinforcement, shoring wherever necessary, casting concrete including framework wherever necessary, grouting and finishing the tops of foundation blocks. The price shall also include dismantling of all connected temporary arrangements, back filling as required and removal of soil.

The price shall also cover all concrete work for foundation (including that of Height gauge) or anchor blocks on bridge piers, irrespective of whether they are actually reinforced or not, those for cast-in-situ piles foundation and counter weight foundations. Rails and fasteners required for counter weight foundations shall be supplied by the Purchaser free at the Contractor's depot or work spot according to convenience of the Purchaser. The volume of cast-in-situ piles shall be added to the volume of foundation block for the purpose of payment. Dowel bars as may be required for bond with bridge structures shall be supplied and erected free of cost by the Purchaser. Dowel bars will not be considered as reinforcement for the purpose of this item. The price shall also include the cost of cement. Proper curing of foundation is to be ensured.

Item 2(c)(ii) - Reinforced concrete for Cable Trench covers

Supply & Erection: The price shall cover casting of cable trench covers in reinforced concrete as per RDSO Drg. No. ETI/C/0038 MOD-E and SCR/HQ/Elcet/SSP&SP/CABLE TRENCH or as per site requirement with superior quality. The price shall include the supply of steel for reinforcement angle iron for the frame and fabrication of angle iron frame etc. The price shall include positioning and dressing up of trench covers, if required. The price shall include the cost of cement also. Cement will not be supplied by Railways. Proper curing is to be ensured.

Note: *Nominal reinforcement will be necessary in black cotton soil foundations. Such nominally reinforced foundations in black cotton soil will be payable under item 2(b) and not under item 2(c). The steel for nominal reinforcement will be arranged by the Contractor and the concrete mixture, in such a case shall be as for normal foundations 1:3:6.*

Item 2(d)(i) - Reinforcement of Brick Work

Supply & Erection: The price shall cover excavation and construction of reinforced brick work laid in cement mortar 1:3 mix for the baffle wall. The price shall include supply of steel for reinforcement and other materials. The price shall also include bending/binding and laying of reinforcement, shoring, shuttering and scaffolding arrangement, required for the construction of brick wall and its curing.

The price shall also include dismantling of all connected temporary arrangements, back filling required and removal of spoil. The price shall also include the cost of cement. Proper curing is to be ensured.

Item 2(d)(ii) - Plastering of Brick Work

Supply & Erection: The price shall cover supply and handling of all materials, scaffolding arrangements, raking out joints, curing and finishing of plaster (12 mm. thicknesses with cement mortar 1:4 mix.) on the Baffle wall.

The price shall also include dismantling of all connected temporary arrangements and removal of spoil. The price shall also include the cost of cement. Proper curing of is to be ensured.

Item 2(e) - Extra for supply & sinking of concrete shells (M15 grade)

Supply & Erection: The price shall cover on items 2(a), (b) and (c) for supply and sinking of a concrete shell before casting of concrete for traction structure foundations or anchor blocks including pumping of water wherever necessary. Purchaser's Engineer shall decide whether sinking of concrete shells is necessary. Proper curing of is to be ensured.

Item 2(f) - Casting of foundations using mechanised Augur (M15 grade)

Supply & Erection: The price shall cover excavation, supply and handling of all materials including supply and erection of steel for reinforcement, accessories/temporary arrangements and all associated operations for casting of foundations by mechanized Augur in all type of soils except rocks. All machines, tools and equipment needed for the above shall be supplied by the Contractor at his own cost. The price shall include the cost of cement.

NOTE:

- 1. The payable volume of the foundation shall be the designed one as shown in the drawings for which the pit has been excavated irrespective of the actual configuration assumed by the latter after auguring.*
- 2. The depth of the excavation shall be measured from the formation level to the maximum excavated point.*

Item 2(g) - Casting of single under reamed pile foundation (M15 grade)

Supply & Erection: The price shall cover boring of hole for under reamed pile as per RDSO Drg. No.ETI/C/0062 which is having dia. of 300 mm or if any sizes as approved by Purchaser required for cast-in-situ pile foundation including difficult location like low lying areas near river, ponds or at any other location of which foundation is not covered under item No. 2(a) to 2 (f). The price shall also cover the charges of pumping set required for draining of water encountered while boring the holes, cost of compressor or any other machine required for breaking of brick apron or any other hard strata if it is coming in way of boring of holes. The price shall also cover the casting of concreting of ratio 1:2:4 mix 20mm graded stone or downgraded and cost of shuttering and its removal and cost of any other item which is encountering during course of boring and casting of pile. Proper curing of is to be ensured.

The price shall also cover the cost of cutting, bending and laying of reinforcement but excluding the cost of steel required for reinforcement which has been covered under appropriate item. The price shall also cover the cost of all other materials including cement required for the work.

The work shall be executed strictly in accordance with IS-456/2000. The price shall also cover the cost of transportation (to and fro) of all materials, tools and plants required for the work. The price shall cover the cost of compactness the concrete with the help of Electrical/Mechanical vibrator.

The price shall also cover the screening and washing of concrete. The price shall also cover the cost of consumable like fuel, oil, wedges, string rope etc., required for the finishing the work.

The cost of full volume of RCC pile cap and RCC column upto Rail level height more than one meter on top of piles shall be covered under item 2(g)(i), however for heights, less than one meter the rates of item 2(c) shall be applicable.

Item 2(h)(i) - Reinforcement cement concrete, ratio 1:2:4 in columns with 20 mm and downgraded stone aggregate and coarse sand.

Supply & Erection: The price shall cover the cost of reinforcement cement concrete work for construction of column including supply of cement, concreting, shuttering arrangements and dismantling thereto but excluding cost of steel required for reinforcement which has been covered under item 3(g). The price shall cover cutting, bending and lying of reinforcement in column. The concrete mixture shall be of 1:2:4 ratio and casting of the same to be done in accordance with IS: 456/2000.

The item shall cover any requirement of concreting in the special foundation design which has not been covered under item 2(c) or where foundations are required to be projected above ground level

to the extent of more than 1 meter, and shall be operated for the work of foundation or OHE supports only. Proper curing of is to be ensured.

Item 2(h)(ii) - Reinforcement cement concrete, ratio 1:3:6 in pile caps with 20 mm and downgraded stone aggregate and coarse sand.

Supply & Erection: The price shall cover the cost of reinforcement concrete work for construction of pile caps including supply of cement, concreting, shuttering arrangements and dismantling thereto but excluding cost of steel required for reinforcement which has been covered under appropriate item. The price shall cover cutting, bending and laying of reinforcement in column. The concrete mixture shall be of 1:3:6 ratio and casting of the same to be done in accordance with IS:456/1978. Proper curing of is to be ensured.

Item 2(h)(iii) - Mass concrete (PCC), ratio 1:4:8 stone with nominal size stone aggregate 40 mm gauge and ordinary sand in mud mat.

Supply & Erection: The price shall cover the cost of all materials e.g. 40mm graded stone aggregate, sand, cement, arrangement of water and necessary tools and plants. The price shall be inclusive of shuttering arrangement, cutting, levelling, finishing etc. The price shall cover the cost of transportation (to and fro) of all materials, tool and plants etc., and handling/re-handling of materials at the site. The price shall cover the screening and washing of concrete. The price shall also cover the cost of consumable materials like fuel, oil, wedges, string rope etc. required for the work. Proper curing of is to be ensured.

Item 2(i) - Breaking of foundation up to 200 mm below track formation and drain / PF surface etc

Supply & Erection: The price shall include breaking of concrete of OHE foundation / Drain / PF etc up to 200 mm below the formation / ground level using required hand operated electrical / pneumatic hammer / tools and plant including cutting of embedded metallic parts to facilitate the casting of OHE foundations and the installation of earth pits on platforms. It also covers the disposal of debris beyond the station yard limits. After the foundations are cast/earth pits are installed, the flooring must be neatly restored to its original condition. The work shall be carried out as per the instructions of Railway Engineer In-charge.

SCHEDULE B1: STEEL SUPPLY

Item 3(as) - Supply of Rolled or Fabricated and Galvanized Traction Masts, Switching Station Masts, AT Mast, Feeder Mast etc as per latest RDSO and IS Specifications.

Supply: The price shall include the supply of traction masts and main masts including B, K, and S series masts, as well as masts for switching stations, ATs (Auxiliary Transformers), and FPs (Feeder Posts), in accordance with the latest RDSO drawings and IS specifications.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also include the weighing of the aforementioned steel components prior to handing them over to the purchaser for execution of the work.

Item 3(bs) - Supply of Fabricated and Galvanized structures other than masts such as TTC, Portals, as per latest RDSO and IS Specifications.

Supply: The price shall include the supply of fabricated steel structures, excluding masts, such as TTCs and portal sets as required for the work, in accordance with the latest RDSO drawings and relevant IS specifications.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also include the weighing of the aforementioned steel components prior to handing them over to the purchaser for execution of the work.

Item 3(cs) - Supply of Fabricated and Galvanized Small Parts Steel (SPS) other than masts, TTC and Portal as per latest RDSO and IS Specifications.

Supply: The price shall include the supply of all fabricated steel work, including fasteners.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also include the weighing of the aforementioned steel components prior to handing them over to the purchaser for execution of the work.

The cost of erection for this steel work, if undertaken by the contractor, will be paid separately under item 3(b) of Schedule A.

For standard fabricated steelwork for which RDSO's approved drawings are available, the weights of steelwork as specified in RDSO's drawings shall be considered for payment. However, in case the unit sectional weight of any member indicated in RDSO's drawings is not in conformity with the unit sectional weight as per the latest I.S. specification, the weight of the fabricated steel work shall be calculated on the basis of latest I.S. specification and the same will be considered for payment.

For the non-standard fabricated steelwork (like base frame for interrupters/ CB's, plate for boom splicing etc., the calculated weight to be considered for payment under this shall be included in the relevant drawing based on, latest I.S. sectional weight at the time of submitting the designs for approval of the purchaser.

All fabricated steel work shall be galvanized with hot dip galvanization.

Note for 3(cs): For the purpose of payment against 3(c) weight of structures of fabricated steel work will be calculated according to the weight of black steel given in section books for the lengths of various members shown in the approved drawings. There will be no addition for increased weight due to galvanizing or painting or weld materials or reduction for holes or skew cuts.

SCHEDULE B2: COPPER SUPPLY

Item 6(cs) - Supply of 7 mm dia Solid Round Hard Drawn Copper Dropper Wire

Supply: The price shall include the supply of 7 mm dia. Solid Round Hard Drawn Copper Dropper Wire as per IS: 282-1982 Specification with latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper dropper wire before its handover to the purchaser for execution of the work.

Item 6(ds) - Supply of 5 mm dia Solid Round Hard Drawn Copper Dropper Wire

Supply: The price shall include the supply of 5 mm dia. Solid Round Hard Drawn Copper Dropper Wire, as per IS: 282-1982 Specification with latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper dropper wire before its handover to the purchaser for execution of the work.

Item 6(es) - Supply of Cadmium Copper Bridle Wire (7/2.1 mm)

Supply: The price shall include the supply of 20 sq mm cadmium copper bridle wire (7/2.1 mm) as per RDSO Specification TI/SPC/OHE/CAT/Cu-Cd/0971 or latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper bridle wire before its handover to the purchaser for execution of the work.

Item 7(bs) - Supply of 150 sq.mm Hard Drawn Stranded Copper Cross Feeder Wire

Supply: The price shall include the supply of 150 sq. mm hard drawn bare copper cross feeder wire (37/2.25 mm) as per RDSO Specification TI/SPC/OHE/HDCSCF/0031 or latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper cross feeder wire before its handover to the purchaser for execution of the work.

Item 7(cs) - Supply of 130 sq.mm Cadmium Copper Large Span Wire

Supply: The price shall include the supply of 37/2.10 mm cadmium copper large span wire (130 sq.mm), required for the work, as per RDSO's Specification No. ETI/OHE/50(6/97) with latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper large span wire before its handover to the purchaser for execution of the work.

Item 15(as) - Supply of 50 sq.mm Annealed Stranded Copper Jumper Wire

Supply: The price shall include the supply of 50 sq. mm annealed stranded copper conductors (19/1.8) - jumper wire (unit weight of 0.438 kg/m) as per RDSO Specification TI/SPC/OHE/JMP/0941 or latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper jumper wire before its handover to the purchaser for execution of the work.

Item 15(bs) - Supply of 160 sq.mm Annealed Stranded Copper Jumper Wire

Supply: The price shall include the supply of 160 sq. mm annealed stranded copper conductors (19/7/1.25) - jumper wire (unit weight of 1.504 kg/m) as per RDSO Specification TI/SPC/OHE/JMP/0941 or latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper jumper wire before its handover to the purchaser for execution of the work.

Item 15(cs) - Supply of 105 sq.mm Annealed Stranded Copper Jumper Wire

Supply: The price shall include the supply of 105 sq. mm annealed stranded copper conductors (19/7/1.25) – jumper wire (unit weight of 0.9936 kg/m) as per RDSO Specification TI/SPC/OHE/JMP/0941 or latest revision.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover the weighing of the copper jumper wire before its handover to the purchaser for execution of the work.

SCHEDULE B3: INSULATOR SUPPLY**Item 4(ax) – Supply of Porcelain Stay and Bracket Insulators for item no. 4(a)(i)/ 4(a)(iv).**

Supply: The price shall include the supply of one Porcelain Stay Arm Insulator (RI 6000-2) (1050 mm CD) and one Porcelain Bracket Insulator (RI 6030-1) (1050 mm CD) as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or Latest for cantilever assembly covered under item no. 4(a)(i)/ 4(a)(iv).

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(ax)(i) – Supply of Porcelain Stay Insulator for item no. 4(a)(i)/ 4(a)(iv).

Supply: The price shall include the supply of one Porcelain Stay Arm Insulator (RI 6000-2) (1050 mm CD) as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or Latest for cantilever assembly covered under item no. 4(a)(i)/ 4(a)(iv).

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(ax)(ii) – Supply of Porcelain Bracket Insulators for item no. 4(a)(i) / 4(a)(iv).

Supply: The price shall include the supply of one Porcelain Bracket Insulator (RI 6030-1) (1050 mm CD) as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or Latest for cantilever assembly covered under item no. 4(a)(i)/ 4(a)(iv).

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(axx) - Supply of Composite Stay and Bracket Insulators for item no. 4(a)(i) / 4(a)(iv).

Supply: The price shall include the supply of one Composite Stay Arm Insulator (1600 mm CD) and one Bracket Composite Insulator (1600 mm CD) as per RDSO specification TI/SPC/OHE/INSCOM/1072 or Latest for cantilever assembly covered under item no. 4(a)(i)/ 4(a)(iv).

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover

testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(axx)(i) - Supply of Composite Stay Insulator for item no. 4(a)(i) / 4(a)(iv).

Supply: The price shall include the supply of one Composite Stay Arm Insulator (1600 mm CD) as per RDSO specification TI/SPC/OHE/INSCOM/1072 or Latest for cantilever assembly covered under item no. 4(a)(i) / 4(a)(iv).

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(axx)(ii) - Supply of Composite Bracket Insulator for item no. 4(a)(i)/ 4(a)(iv).

Supply: The price shall include the supply of one Composite Bracket Insulator (1600 mm CD) as per RDSO specification TI/SPC/OHE/INSCOM/1072 or Latest for cantilever assembly covered under item no. 4(a)(i)/ 4(a)(iv).

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(bx) - Supply of Porcelain Insulator for item no. 4(b)(i) / 4(b)(ii)

Supply: The price shall include the supply of one Porcelain 9-ton insulator(RI 6020-1) (1050 mm CD)as per RDSO specification TI/SPC/OHE/INS/0071(04/2022) or Latest for pull-off arrangement.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 4(bxx) - Supply of Composite Insulator for item no. 4(b)(i) / 4(b)(ii)

Supply: The price shall include the supply of one Composite 9-ton insulator (1600 mm CD)as per RDSO specification TI/SPC/OHE/INSCOM/1072 or latest for pull-off arrangement.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 8(bx) - Supply of Porcelain 9-ton Insulator for item no. 8(b)(i) / 8(b)(ii)/8(b)(iii)/8(b)(vi)/8(b)(ix), 9(a)/ 9(b)/ 9(c)/ 9(d) and 11(a)(i)/ 11(a)(ii)

Supply: The price shall include the supply of one Porcelain 9-ton insulator(RI 6020-1) (1050 mm CD)as per RDSO specification TI/SPC/OHE/INS/0071(04/2022) or Latest for termination / anti-creep arrangement / cut-in insulator / suspension insulator etc.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover

testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 8(bxx) - Supply of Composite 9-ton Insulator for item no. 8(b)(i) / 8(b)(ii)/8(b)(iii)/8(b)(vi)/8(b)(ix), 9(a)/ 9(b)/ 9(c)/ 9(d) and 11(a)(i)/ 11(a)(ii)

Supply: The price shall include the supply of one Composite 9-ton insulator (1600 mm CD) as per RDSO specification TI/SPC/OHE/INSCOM/1072 or latest for termination / anti-creep arrangement / cut-in insulator / suspension insulator etc.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 11(bx) - Supply of Post Insulator for item no. 11(b)

Supply: The price shall include the supply of one Post Insulator for 25 kV Isolator and Bus bar Assembly (RI No. 6090), as per RDSO specification No. TI/SPC/OHE/INS/0071 and Drawing No. ETI/OHE/P/6090-1 or Latest covered under item no. 11(b) of Sch-A1.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 12(ax) - Supply of Sectioning and 9-ton Insulators for item no. 12(a)

Supply: The price shall include the supply of one 25 kV Sectioning (Core) Insulator (RI No. 6110) (CD 850 mm) and one Porcelain 9-ton insulator (RI 6020-1) (1050 MM CD) as per RDSO specification TI/SPC/OHE/INS/0071(04/2022) or Latest covered under for item no.12(a) of Sch-A1.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 12(bx) - Supply of Sectioning Insulator for item no. 12(b)

Supply: The price shall include the supply of one 25 kV Sectioning (Core) Insulator (RI No. 6110) (CD 850 mm) as per RDSO specification TI/SPC/OHE/INS/0071(04/2022) or Latest covered under item no.12(b) of Sch-A1.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 13(ax) - Supply of Post and Operating Insulators for item no. 13(a)

Supply: The price shall include the supply of two Post Insulators (RI No. 6090) and one Operating Rod Insulator (RI No. 6260) (CD 850 mm) as per RDSO Specification No. TI/SPC/OHE/INS/0071 or Latest covered under item no.13(a) of Sch-A1.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 13(bx) - Supply of Post and Operating Insulators for item no. 13(b)

Supply: The price shall include the supply of four Post Insulators(RI No. 6090) and two Operating Rod Insulator (RI No. 6260) (CD 850 mm) as per RDSO Specification No.TI/SPC/OHE/INS/0071 or Latest covered under item no.13(b) of Sch-A1.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

Item 28(x) - Supply of Post Insulators for item 28

Supply: The price shall include the supply of two Post Insulators as per RDSO specification No.TI/SPC/OHE/INS/0071 and Drawing No. ETI/OHE/P/6090-1 or Latest covered under item no. 28 of Sch-A1.

Delivery shall be made to the OHE depot and subsequently transported to the designated worksite location or as directed by the Railway Engineer In-charge. Additionally, the price shall also cover testing of insulator before installation as per RDSO Specification TI/SPC/OHE/INS/0071(04/2022) or its latest revision.

SCHEDULE B4: GENERAL SUPPLY

Item 7(as) - Supply of All Aluminium 25 kV Feeder conductor (Single Spider 19/3.99 mm)

Supply: The price include supply of 25 kV Aluminium feeder conductor made of all aluminium bare, hard drawn conductor 19/3.99 mm (Single Spider) as per IS:398 (Part-I) 1996 or latest or RDSO latest specification.

Item 12(cs) - Supply of Light Weight Section Insulator

Supply: The price shall include the supply of Light Weight Section Insulator as per RDSO Specification No. TI/SPC/OHE/LWTISI/0060(Rev.1) with A & C Slip no.1 or its latest revision.

Item 14(as) - Supply of PTFE Short Neutral Section Assembly

Supply: The price shall include supply of PTFE Short Neutral Section Assembly Complete (Phase Break) suitable for 107 Sq mm Grooved Copper Contact Wire and 65 Sq mm Cadmium Copper Wire as per RDSO Specification No. TI/SPC/OHE/SNS/0000 Rev-1 with A & C Slip No.1 or latest revision.

Item 18(as) - Supply of 25 kV Vacuum Interrupter (BM)

Supply: The price shall include supply of 25 kV Single Pole Vacuum Interrupter complete with all necessary fittings, terminal connectors, accessories, fasteners etc., as per RDSO Spec. No. TI/SPC/PSI/LVCBIN/0121 (05/23) or latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways.

Item 18(bs) - Supply of 25 kV Vacuum Circuit Breaker (CB)

Supply: The price shall include supply of 25 kV Single Pole Circuit Breaker (CB) complete with all necessary fittings, terminal connectors, accessories, fasteners etc., as per RDSO Spec. No. TI/SPC/PSI/LVCBIN/0121 (05/23) or latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways.

Item 18(cs) - Supply of 132kV Double Pole SF-6 Circuit Breaker

Supply: The price shall include supply of 132 kV Double Pole SF-6 Gas Circuit Breaker, complete with all necessary fittings, terminal connectors, accessories, fasteners etc., as per RDSO Spec. No. TI/SPC/PSI/HVCB/0121 with A&C slip no.1 or latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways.

The price shall also cover supply of terminal connectors, supporting frame and SF6 gas for first filling for commissioning of the Circuit Breaker. The price shall also include interlocking arrangement with the adjacent isolators.

Item 19(as) - Supply of 25 kV Type-I Potential Transformer (PT)

Supply: The price shall include the supply of a 25 kV Potential Transformer Type-I (Indication/Measuring), complete with all necessary fittings, terminal connectors, accessories, fasteners etc., in accordance with RDSO Specification No. TI/SPC/PSI/PT/0120 (06/2021) or the latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways. However, the price shall exclude the cost of any small parts or steelwork.

Item 19(bs) - Supply of 25 kV Type-II Potential Transformer (PT)

Supply: The price shall include the supply of a 25 kV Potential Transformer Type-II (Protection), complete with all necessary fittings, terminal connectors, accessories, fasteners etc., in accordance with RDSO Specification No. TI/SPC/PSI/PT/0120 (06/2021) or the latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways. However, the price shall exclude the cost of any small parts or steelwork.

Item 20(as) - Supply of 42 kV, 10 kA Metal oxide Gapless type lightning arrester

Supply: The price shall include supply of 42 kV, 10 kA rating Metal Oxide Gapless Lightning arrester complete with all necessary fittings, terminal connectors, accessories, fasteners etc., as per TI/SPC/PSI/MOGTLA/0101 (02/2015) at the work-site or at the depot nominated by Railways. However, the price shall exclude the cost of jumper wire and any small parts steel work.

Item 20(bs) - Supply of 120 kV, 10 kA Metal oxide Gapless type lightning arrester

Supply: The price shall include supply of 120 kV, 10 kA rating Metal Oxide Gapless Lightning arrester with surge counters complete with all necessary fittings, terminal connectors, accessories, fasteners etc., as per TI/SPC/PSI/MOGTLA/0101 (02/2015) at the work-site or at the depot nominated by Railways. However, the price shall exclude the cost of jumper wire and any small parts steel work.

Item 20(cs) - Supply of 198 kV, 10 kA Metal oxide Gapless type lightning arrester

Supply: The price shall include supply of 198 kV, 10 kA rating Metal Oxide Gapless Lightning arrester with surge counters complete with all necessary fittings, terminal connectors, accessories, fasteners etc., as per TI/SPC/PSI/MOGTLA/0101 (02/2015) at the work-site or at the depot

nominated by Railways. However, the price shall exclude the cost of jumper wire and any small parts steel work.

Item 23(as) - Supply of 110 V, 40 Ah Low Maintenance Lead Acid Battery

Supply: The price shall cover supply of 110V, 40 Ah low maintenance lead acid battery complete with stand, accessories and a tool board as per RDSO Specification No. RDSO/PE/SPEC/TL/0040(Rev-2)/2021 or latest revision at the site of work or at the depot nominated by railways. The price excludes the cost of connecting cables, the supply and erection of which will be paid for under appropriate Item.

Item 23(bs) - Supply of Battery Charger for 110 V, 40 Ah lead acid battery.

Supply: The price shall cover supply of battery charger for a 110V, 40 Ah lead acid battery complete with connecting lead and plug for connection to 230 V A.C. supply as per RDSO specification No. TI/SPC/PSI/40-150 CHGR/1210 or latest revision at the site of work or at the depot nominated by railways. The price shall not include supply of any cable for connecting the charger to the 110V battery which shall be paid for under appropriate Item.

Item 24(as) - Supply of 110 V, 200 Ah Low Maintenance Lead Acid Battery.

Supply: The price shall cover supply of 110V, 200 Ah low maintenance lead acid battery complete with stand, accessories, and a tool board as per RDSO Specification No. RDSO/PE/SPEC/TL/0040(Rev-2)/2021 or latest revision at the site of work or at the depot nominated by railways. The price excludes the cost of connecting cables, the supply and erection of which will be paid for under appropriate item.

NOTE: One set containing 55 nos. of 2V, 200Ah Lead Acid battery.

Item 24(bs) - Supply of Battery Charger for 110 V, 200 Ah lead acid battery

Supply: The price shall cover supply of battery charger for a 110V, 200 Ah lead acid battery complete with connecting lead and plug for connection to 230 V A.C. supply as per RDSO specification No. TI/SPC/PSI/200-250CHGR/0210 or latest revision at the site of work or at the depot nominated by railways. The price shall not include supply and erection of any cable for connecting the charger to the 110V battery which shall be paid for under appropriate item.

Item 27(as) - Supply of 5 kVA, 25 kV/ 240 V Oil filled Auxiliary Transformer

Supply: The price shall cover supply of Auxiliary Transformer 5 kVA, 25kV/240V, Oil type as per RDSO specification No. ETI/PSI/15(11/92) or latest revision, complete with terminal connectors at the work site or at the depot nominated of railways.

Item 27(bs) - Supply of 10 kVA, 25 kV/ 240 V Oil filled Auxiliary Transformer

Supply: The price shall cover supply of Auxiliary Transformer 10 kVA, 25kV/240V, Oil type as per RDSO specification No. ETI/PSI/15(11/92) or latest revision, complete with terminal connectors at the work site or at the depot nominated of railways.

Item 27(cs) - Supply of 25 kVA, 25 kV/ 240 V Oil filled Auxiliary Transformer

Supply: The price shall cover supply of Auxiliary Transformer 25 kVA, 25kV/240V, Oil type as per RDSO specification No. ETI/PSI/15(11/92) or latest revision, complete with terminal connectors at the work site or at the depot nominated of railways.

Item 45(as) - Supply of 25 kV Current Transformer CT Ratio 1500-750/5A

Supply: The price shall include the supply of a 25 kV Current Transformer CT Ratio 1500-750/5A complete with all necessary fittings, terminal connectors, accessories, fasteners etc., in accordance with RDSO Specification No. TI/SPC/PSI/CT/0210(07/2021) or the latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways. However, the price shall exclude the cost of any small parts or steel work.

Item 45(bs) - Supply of 132 kV oil filled current transformer of ratio 400-200/5A

Supply: The price shall include the supply of a 132 kV Oil filled Current Transformer CT Ratio 400-200/5A complete with all necessary fittings, terminal connectors, accessories, fasteners etc., in accordance with RDSO Specification No. TI/SPC/PSI/CT/0210(07/2021) or the latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways. However, the price shall exclude the cost of any small parts or steel work.

Item 45(cs) - Supply of 220 kV oil filled current transformer of ratio 200-100/1-1 A

Supply: The price shall include the supply of a 220 kV oil filled current transformer of ratio 200-100/1-1 A complete with all necessary fittings, terminal connectors, accessories, fasteners etc., in accordance with RDSO Specification No. TI/SPC/PSI/CT/0210(07/2021) or the latest revision. This is to ensure efficient and trouble-free operation at the designated site of work or the depot nominated by the Railways. However, the price shall exclude the cost of any small parts or steel work.

SCHEDULE C: GENERAL ITEMS

Item 3(z) – Portal Boom Splicing and Extension

Splicing & Extension: The price is applicable to splicing of all types of portal booms for extension of clear span. The price shall cover modification of two end pieces(one existing at one end of boom and the other to be erected) involving cutting, drilling, welding, cold galvanization etc. to suit clear span as per site condition. The price shall also cover erection of modified end piece, splicing including supply and erection of bolts, nuts, washers required for splicing of boom.

The price shall exclude dismantling of upright and supply of end piece, small part steel required for modification of end pieces including splice/covering angle, etc. which will be paid for under items 31(k)(ii) of Sch-A1 & 3(cs) of Sch-B1.

Note: Splicing plates shall be supplied suitably as per requirement. Splicing plates are different for N, O and R type portals

Item 4(z)(i) - Replacement of Stay Insulator under Power Block

Replacement: The Price shall include Dismantling of existing Stay Insulator (Porcelain/Composite) and Erection of new Stay Insulator (Porcelain/Composite) at same location with adjustment of OHE parameters (height, stagger etc.) as per standards/instructions of Railway Engineer In-charge.

The price shall also cover erection of all the associated components/fittings and necessary modification or fabrication required in Stay Tube etc. (New Stay Tube will be provided by Railway if required)

The price shall also cover testing of stay insulator as per RDSO specification TI/SPC/OHE/INTEST/0091 or latest revision.

Dismantled insulators without any fracture/damage in existing condition along with other dismantled material shall be handed over to the Railway Engineer In-charge. The price shall include the transportation of dismantled material to the nearest depot as per the instructions of Railway Engineer In-charge.

Note: (1) Supply of Stay insulators is not included in this item.

(2) In case of operation of above item under Non Power blocks, half the rate is to be paid

Item 4(z)(ii) - Replacement of Bracket Insulator under Power Block

Replacement: The Price shall include Dismantling of existing Bracket Insulator (Porcelain/Composite) and Erection of new Bracket Insulator (Porcelain/Composite) at same location with adjustment of OHE parameters (height, stagger etc.) as per standards/instructions of Railway Engineer In-charge.

The price shall also cover erection of all the associated components/fittings and necessary modification or fabrication required in Bracket Tube etc. (New Bracket Tube will be provided by Railway if required)

The price shall also cover testing of Bracket insulator as per RDSO specification TI/SPC/OHE/INTEST/0091 or latest revision.

Dismantled insulators without any fracture/damage in existing condition along with other dismantled material shall be handed over to the Railway Engineer In-charge. The price shall include the transportation of dismantled material to the nearest depot as per the instructions of Railway Engineer In-charge.

Note: (1) Supply of Bracket insulators is not included in this item.

(2) In case of operation of above item under Non Power block, half the rate is to be paid

Item 4(z)(iii) - Replacement of 9-tonne Insulator under Power Block

Replacement: The Price shall include Dismantling of existing 9-tonne Insulator (Porcelain/Composite) and Erection of new 9-tonne Insulator (Porcelain/Composite) at same location with adjustment of OHE parameters (height, stagger etc.) as per standards/instructions of Railway Engineer In-charge.

The price shall also cover erection of all the associated components/fittings and necessary modification or fabrication required in 9-tonne Tube etc. (New 9-tonne Tube will be provided by Railway if required)

The price shall also cover testing of 9-tonne insulator as per RDSO specification TI/SPC/OHE/INTEST/0091 or latest revision.

Dismantled insulators without any fracture/damage in existing condition along with other dismantled material shall be handed over to the Railway Engineer In-charge. The price shall include the transportation of dismantled material to the nearest depot as per the instructions of Railway Engineer In-charge.

Note: (1) Supply of 9-ton insulators is not included in this item.

(2) In case of operation of above item under Non Power blocks, half the rate is to be paid

Item 6(z)(i) - Re-rolling of Contact wire 107/150 sq.mm into Drums

Re-rolling: The 107 or 150 sq. mm Contact wire shall be wound on the drum provided by Railway and Paper shall be provided between each layer of conductor while winding on the drum and during course of winding the conductor should not deform, bulge or damage in any manner.

Item 6(z)(ii) - Re-rolling of Catenary wire 65 sq.mm into Drums

Re-rolling: The 65 sq. mm catenary wire shall be wound on the drum provided by Railway and Paper shall be provided between each layer of conductor while winding on the drum and during course of winding the conductor should not deform, bulge or damage in any manner.

Item 6(z)(iii) - Supply of reinforced Wooden Drums as per specification for re-rolling of Catenary & Contact wire

Supply: The price shall cover supply of reinforced Wooden Drums shall conform to specification IS:1778-1980 for re-rolling of contact & catenary wire.

Item 16(z) - Disconnection & Reconnection of any type of bond

The price shall cover disconnection and reconnection of Structure Bond/Longitudinal Bond/Transverse & Special Bond as per the instructions of the Railway Engineer In-charge of work or authorized representative. Necessary tools and tackles required shall be arranged by contractor only. It is also ensured that no damage to TRD bonds during Engineering Track Renewal works.

The rate will be per bond. For dismantlement of existing bond alone half the rate will be paid.

Item 17(z)(i)-Transportation & Erection of 9m/13 m long 52/60 KG Released Rail from nominated place to work site

The price shall cover loading, unloading & transportation of released rail of 9meters or 13meters (Railway Supplied) from nearest available location (up to 200 km) to work site for execution. The price shall also cover arrangement of vehicle, manpower, tools & tackles for loading, unloading & transportation of released rails. The price shall cover erection of 13m long 52/60 kg buried rail. The buried rail erection will be followed as requirements vide Drg. No. ETI/PSI/0212-1 or latest and SMI 0032 (Rev-2).

Note: Earth electrodes are to be operated under item 17(a) of Schedule-A1

Item 17(z)(ii) – Supply & Erection of Galvanised Iron Flat 75 x 8 mm

Supply & Erection: The price shall cover supply and erection per meter length of 75x8mm size Galvanized Iron flat (Buried rail to each pit) buried at a depth of 60 cm below the ground level. The price shall also cover connections of the Galvanized Iron flats to the earth electrodes to constitute the main earth ring and to the earthed terminals at SSP/SP as per the site requirement decided by the Railway Engineer In-charge.

The price shall cover supply and installation per meter length of 75x8mm size (Buried rail to track) Galvanized Iron flat, painted all around with two coats of paints to colour grass green shade-218 of IS:5 passing through cable trench of exposed above ground level. The price shall also cover connections of the Galvanized Iron flats to the earth electrodes to constitute the main earth ring and to the earthed terminals of the various equipment at SSP/SP as per the site requirement decided by the Railway Engineer In-charge.

Item 17(z)(iii) – Supply & Erection of High Productivity Fasteners (Rail Contact System) for fixing of Traction Bonds at Buried Rail Earthing Station.

Supply & Erection: The price shall cover supply, erection and installation of RDSO approved high productivity fasteners as per SMI No. TI/SMI/0032 Rev-2, to provide separate earthing stations at TSS/SP/SSPs. The work shall be executed including all fasteners for each buried rail in accordance with RDSO SMI No. TI/SMI/0032 Rev-2 and letter No. TI/PSI/Earthing/Policy/14DT: 26-02-20 or latest revision

Item 17(z)(iv) - Excavation & Refilling of Soil for Buried Rail

The price shall cover excavation to a depth of 1 m, width of 0.6m and length of 15 m for providing buried rail for earthing system and refilling of the same. The soil around buried rail will be treated by providing charcoal & salt. The work shall be executed in accordance with SMI No. TI/SMI/0032 Ref-1.

Item 18(z)(i) - Supply of Paint and Stencilling/Painting of mast location, RL, MRL, EC socket symbols, and implantations on OHE masts / portals using Enamel paint with a Yellow Background and Black Font.

Supply & Erection: The price shall be inclusive of the cost of yellow and black paint conforming to relevant IS standard. The price shall cover stencilling of location number, implantation, rail level, and EMC socket direction etc on OHE structures as per the instructions of the Railway Engineer In-charge of work or his authorised representative. The existing painted portion on OHE structures earmarked for stencilling the parameters on OHE shall be cleaned with good quality sand paper before applying fresh paint. Two coats of yellow enamel paint shall be applied as background and the various parameters shall be stencilled using black enamel paint. ISI marked good quality enamel paint shall be used.

The font size of the various parameters to be stencilled on various types of OHE structures shall be approved by the Railway Engineer In-charge of work before commencing the work in a section. In this connection, a sample to be stencilled and approved by the Railway Engineer In-charge of work.

Item 18(z)(ii) - Supply of Paint and Painting of ATD Counter Weight including Temperature Marking of 'Y' value.

Supply & Erection: The price shall cover cost for Painting of Counter Weight of ATD including marking of 'Y' Value in terms of 10°C, 35°C & 55°C, Half Tension(HTL) length in meters over counter weight. Two coats of aluminium paint are to be painted on that as required by the Railway Engineer In-charge. Paint to be supplied by contractor. ISI marked good quality enamel paint shall be used. It also includes painting of bottom two pieces of counter weight with yellow colour paint.

The cost includes all material, tool & tackles, manpower etc. required for painting of counter weight of ATD with aluminium/yellow paint.

Item 18(z)(iii) - Supply of Paint and Painting of any type of Bond

Supply & Erection: The Price shall include the supply of ISI marked good quality black enamel paint and primary coat of red oxide for painting of Bonds i.e. Structure/ Longitudinal/Transverse & Special bond. Price shall also include the opening and re-fixing of bonds, cleaning / wiping of all the oil, corrosion, dust or dirt if any, a coat of primer i.e. red oxide shall also be applied. The primer coat or first coat of paint when dried, then only the 2nd finishing coat of black bituminous paint shall be applied.

Cost of Materials required for painting work such as brush, Stencil, Kerosene etc. to be incurred in contractor's scope.

Item 18(z)(iv) - White Washing for copping of mast/portal foundations

Supply & Erection: The price shall include cleaning of area around muff of OHE mast/portal by removing the vegetation and condition of structure muff are to be checked and recasting of damaged muff with 2 coats of white wash. The price also includes supply of white wash. Cost of Materials required for painting work such as brush, Stencil, Kerosene etc. to be incurred in contractor's scope.

Item 18(z)(v) - Supply of Paint and Painting of Fencing Panels

Supply & Erection: The price shall cover the cost of supply and painting of PSI assets i.e., fencing panels, fencing uprights, anti-climbing devices of ATs, barbed wire of TSS/SP/SSPs, tubular poles at TSS/SP/SSPs with aluminium paint from any of RDSO approved aluminium paint confirming to IS 2339 or latest.

Item 18(z)(vi) - Supply of Paint and Painting of PSI Equipments

Supply & Erection: The price shall cover the cost of supply & painting of PSI equipment like traction power transformers, CBs, PTs, ATs, & BMs etc., with water proof grey enamel paint from any of RDSO approved paint confirming to IS: 2932 or latest.

Item 19(z) - Trimming/Cutting of Tree Branches including disposal of branches/ bushes outside yard (Note:Girth of more than 20cm will only be considered as tree branch)

The price shall cover cost for trimming/cutting of tree branches of circumference more than 20 cm (Per tree basis). The tree branches / tree in the vicinity of 06 metres shall be cleared off. Necessary men, tools and tackles required shall be arranged by contractor only. Power Block will be arranged by Railway during trimming/cutting of critical tree/tree branches near to OHE / likely to fall near OHE.

SCHEDULE D – 2 x 25 kV Items**Item 7(c) – Supply and Erection of Aerial Earth Conductor (AEC) with necessary accessories, fittings and fasteners on OHE mast/ Portals.**

Supply & Erection: The price shall cover supply of Aerial Earth Conductor (AEC) with necessary accessories, fittings and fasteners on mast/ portals. The AEC scheme should be as per RDSO Technical Instruction No. TI/IN/0042 or any latest guidelines issued by Railway Board/RDSO for High Speed.

The price shall cover cost of supply and erection of 12.24 mm dia ACSR Raccoon with mast fitting as per RDSO Drg. No. TI/DRG/OHE/ ERBOND/ RDSO/00001/11/0. AEC of 12.24 mm dia. ACSR Raccoon conductor should be erected on the back side of the OHE masts/Portals. The cost for connecting the ACSR on back side of OHE/feeder mast is also included in this item. SPS required for ACSR will be paid under separate item.

The price of ACSR conductor jointing, if any, shall be covered under this item, but the anchoring/ termination arrangement as and where required shall be covered under separate item.

Item 7(d) - Supply and Erection of Buried Earth Conductor (BEC) with necessary accessories fittings and fasteners

Supply & Erection: The price shall cover cost of Supply and erection of 20mm dia galvanized steel conductor as per RDSO drawing. BEC of 20 mm dia (cross section 238.64 sq mm),galvanized steel conductor should be laid underground along the UP and DN track separately, 300mm below ground

surface and approximately one meter away (or as per site conditions) from the OHE foundation towards opposite direction of track.

The BEC will be connected to each OHE mast/Portal and Feeder mast by same conductor having Tee Connector & Lug Connector as per Drawing No: TI/DRG/OHE/TC/RDSO/00001/20/0 & TI/DRG/OHE/SC/RDSO/00001/20/0 for BEC end and Lug for connection with mast/portal. The cross bonding of the UP BEC –UP Mast/Portal-UP Traction Rail-DN Traction Rail-DN mast/Portal – DN BEC should be done by 50X6 mm GS flat (Galvanization shall be done as per RDSO specification ETI/OHE/13) at every 450 m. The details of the AEC/BEC and cross bonding scheme are given in drawing No: TI/DRG/OHE/EARTHING/RDSO/00001/20/0.

At stations, BEC conductor should be laid underground for Loop lines & platform also. BEC can be run on the sidewall of Platform (platform coping) with suitable clamp & bolt grouted in the coping. BEC should be connected to Earth Pit as per Drawing No. ETI/OHE/P/7020 Rev. B or latest at every 450m wherever it is exposed above the ground. At Bridges/Platform coping laying arrangement of BEC should be as per RDSO drawing. For three line and four line section, separate BEC should be provided for each line. The above recommendation is as per prevalent practice used in 2 x 25 kV system with 12 kA fault current adopted by other projects in country. However, the adequacy and efficacy of this earthing and bonding system should be verified by the simulation studies/measurements of the touch and step potential of the rail in normal load and short circuit condition for compliance with EN 50122-1 and IEC 62128-1 (2013).

The cost of erection of steel conductor below ground surface, at platform and bridges are inclusive in this item. The cost of supply and erection of suitable clamps and bolts for clamp BEC at Platform and bridges are payable under this item.

Item 7(d)(i) - Supply and Erection of Tee connector for BEC end and lug for connection

Supply & Erection: The price shall cover cost of Supply and Erection of Tee connector for BEC end and lug for connection. The BEC will be connected to each OHE mast/Portal and Feeder mast by same conductor having Tee Connector & Lug Connector as per Drawing No. TI/DRG/OHE/TC/RDSO/00001/20/0 & TI/DRG/OHE/SC/RDSO/00001/20/0 for BEC end and Lug for connection with mast/portal. The cross bonding of the UP BEC –UP Mast/Portal-UP Traction Rail-DN Traction Rail-DN mast/Portal –DN BEC should be done by 50 x 6 mm GS flat at every 450 m. The details of the AEC/BEC and cross bonding scheme are given in drawing no TI/DRG/OHE/EARTHING/RDSO/00001/20/0

Item 8(a)(i) - Supply and Erection of 3:1 type Modified ATD with counter weight assembly for Conventional OHE (regulated) 2400 kgf

Supply & Erection: The price shall cover Supply and Erection of Regulating equipment three-pulley as per RDSO specification no. TI/SPC/OHE/3PHTATD/0150 with A&C Slip No.1 or latest with small parts steel work for 2400 kgf tension. The material to be procured from the RDSO/CORE approved sources. The price shall also cover supply all type of fasteners and fittings.

Item 13(h) - Supply and Erection of DP Isolator complete with SPS, insulators and jumpering arrangement etc suitable for 2x25 kV system.

Supply & Erection: The price shall cover supply and erection of complete 55/66 kV Double pole Isolator type II including insulators, SPS, connectors, Jumpers, bus bars, Integral locks and fasteners etc for its smooth & trouble-free operation. Double pole Isolator should be provided at Insulated Overlap of 1250 Amp rating as per Specification No. ETI/PSI/133. Mounting Arrangement should be

as per Drawing No. ETI/OHE & FEEDER/G/06005 Sh-2 & ETI/OHE & FEEDER/G/06008 for mast and portals respectively. The price shall also include supply & erect the pad lock with three keys to protect the opening by miscreants and keys shall be handed over to depot in-charge or his authorized representative.

In the double pole isolator work, one pole will be for 25 kV OHE and another pole shall be connected with feeder wire. The connection work between feeder and double pole isolator work shall be done by Construction department and connectors, 9 tonne Insulators, jumpers, PG clamps etc. shall be arranged by the Construction department. The connectors supplied along with the double pole isolators for feeder portion terminal shall be supplied to Railway. Double pole isolators are to be erected on separate mast if required after approval of by Sr.DEE/TRD. However, in case, if there is shortage of space, Double pole isolators shall be erected on TTC/Portals after prior approval of Sr.DEE/TRD.

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LIST OF STANDARD DRAWINGS AND SPECIFICATIONS

This Annexure contains reference to drawing numbers, charts, Schedules, specifications and other data referred to in various paragraphs of this Tender Paper.

All references to drawings, charts, schedules or specifications given in this Annexure **shall be taken to be the latest version available as on date of issue of LOA** of such drawings, charts and schedules of specifications as issued by the Purchaser.

(A) LIST OF STANDARD DRAWINGS FOR CONVENTIONAL TYPE OHE (REGULATED)

Sl. No.	SPECIFICATION NO.	LAST REV.	DESCRIPTION	DATE OF ISSUE
1	ET/OHE/3(2/94)	1	Technical specification for Annealed stranded copper conductors for jumper wire for Electric Traction.	Apr.95
2	RE/30/OHE/5 (11/60)	-	Specification for Copper busbar.	Nov.60
3	ET/OHE/11(5/89)	-	Specification for Steel tubes.	May 89
4	ET/OHE/13(4/84)	3	Specification for Hot dip zinc galvanization of steel masts (Rolled & Fabricated), tubes and fittings used on 25kV ac OHE.	Apr.90
5	TI/SPC/OHE/WR/1060(05/06)	2	Specification for Stainless Steel Wire Ropes.	May 07
6	TI/SPC/OHE/INS/0070(04/07) with A & C Slip No.-01 & 02 (10/16)	2	Specification for Solid Core Porcelain Insulators for 25kV AC 50Hz Single phase over head Traction lines.	Oct 16
7	ET/OHE/16(1/94)	2	Specification for 25kV a.c Single Pole and Double Pole isolators for Railway Electrification.	Mar.04
8	TI/SPC/OHE/FASTENERS/0120	5	Specification for Steel fasteners and Stainless Steel Fasteners for 25 kV AC Traction steel Overhead Equipment.	March.13
9	ET/OHE/21(9/74)	-	Aluminum alloy section and tubes for 25kV Traction Over head Equipment.	Sep.74
10	RE/OHE/22(9/61)	-	Specification for Dynamo meters	Sep.61
11	TI/SPC/OHE/LWTSI/0060(Rev.1) with A & C Slip no.1	1	Specification for Light weight Section insulator assembly.	Jul. 16
12	ET/OHE/33(8/85)	-	Specification for Enameled steel plates	Aug.85

13	ET/OHE/33A(12/97)	8	Specification for "Retro-reflective Structure Number Plates."	Nov. 12
14	Ti/SPC/OHE/MCS/0150 with A & C Slip No - 01 (08/15)	-	Performance specification for modular cantilever system for 25 kV ac traction.	Sep. 16
15	ET/OHE/36(12/73)		Specification for Galvanized Steel Wire Rope.	May'98
16	ET/OHE/37(12/73)	-	Specification for Hard drawn Copper catenary.	Dec. 73
17	ET/OHE/48(7/84)	3	Technical specification for Winch type regulating equipment for 25kV a.c. traction.	Dec. 04
18	Ti/SPC/OHE/ATD/0060 Rev.1 with A & C Slip No - 01	3	Specification for Three Pulley/Type Regulating Equipment (3:1Ratio)	Sep. 16
19	ET/SPC/OHE/FITTING GS/0130(10/13)	1	Technical specification for Fittings for 25kV ac OHE.	Oct. 13
20	ET/OHE/50(6/97) with A & C slip No. 1 to 5	5	Technical Specification for cadmium copper conductors for over head Railway traction	Sept. 16
21	Ti/SPC/OHE/HDC/CF/0030(06/03)	-	Technical Specification for 37/2.25mm Hard Drawn Stranded copper conductor	Jun. 03
22	ET/OHE/51(9/87)	1	Specification for Discharge/ earthing pole assembly for 25kV ac traction.	Oct. 92
23	ET/OHE/52(10/84)	-	Specification for Inter locks for a.c traction switch gears	Oct. 84
24	ET/OHE/53(6/88)	5	Principles for OHE Layout Plans and Sectioning Diagrams for 25 kV a.c. traction.	Nov. 06
25	ET/OHE/54(2/85)	2	Specification for 19x2.79 mm all aluminum alloy, stranded catenary wire.	Oct. 92
26	ET/OHE/55(4/90)	-	Specification for Bimetallic (aluminum-copper) strip.	Apr. 90
27	Ti/SPC/OHE/4WDHTV/0070(06/07)	0	Technical specification for 4wheeler over head equipment inspection car 1676mm Gauge.	Jun. 07
28	ET/OHE/56/1(1/95)	-	Specification for hand operated lifting and salvaging platform.	Jan. 95
29	Ti/SPC/OHE/8WDHTW/0070(06/07)	1	Technical specification for 8-wheeler Diesel Hydraulic OHE inspection car 1676mm gauge.	Jun. 07
30	Ti/SPC/OHE/SNS/0000 (Rev.1)with A & C slips 1.	1	Specification for Short Neutral Section Assembly (Phase Break)	Jan. 16
31	ET/OHE/55(8/87) with A & C slip No. 1 to 5	5	Specification for continuous cast copper wire rods.	July. 18

32	ETVOHE/71(11/90)	2	Code of bonding and earthing for 25kv a.c 50Hz single phase traction system.	Mar.93
33	ETVOHE/72(11/91)	-	Specification for 4 axle car for winding and/or unwinding of contact wire and catenary wire.	Nov.91
34	ETVOHE/76(6/97) with A & C slip No. 1,3,4,5,6, 7,8& 9. (Slip No. 2 is in abeyance)	8	Technical Specification for hard drawn grooved contact wire for electric traction (drawn out of continuous cast copper (cc) wire rods).	Nov. 2016
35	TVSPC/OHE/TOOLP L/0990(11/99)	-	Gear less hand operated pulling and lifting machines (TIRFOR)	Nov. 99
36	TVSPC/OHE/TOOLP L/1990(11/99)	-	Ratchet lever Hoist (Pull-lifts)	Nov.99
37	Ti/SPC/OHE/INSCAT /0000with A & C slip No.1&2	2	Specification for Insulated Cadmium Copper Catenary 19/2.10 mm diameter for provision under over line structures in the 25kV a.c. Electric traction.	Sept, 16
38	Ti/SPC/OHE/TIPS/0 010(03/01)	-	Technical specification for infra red imaging system for hand held application	Mar 01
39	Ti/SPC/OHE/TIPS/10 31	-	Technical specification for infra red imaging system for stationary Installation	Dec.13
40	Ti/SPC/OHE/TIPS/2 030(08/03)	-	Specification for Locomounted current collection checking and analysis system	Aug 03
41	Ti/SPC/OHE/GALST B/0040 with A & C slip No. 1 & 2	1	Technical specification for galvanized steel stranded wire for traction bonds for 25kV ac Electric traction system	Aug 05
42	Ti/SPC/OHE/INSCOM /1071, Rev-01 (12/16)	1	Technical specification for Silicone Composite Insulators for 25 kVA. C. 50 Hz Single Phase Over head Traction Equipment.	Dec. 2016

43	TI/SPC/OHE/CWRIG /0990(09/99)	-	Technical specification of Test Ring for wear of contact wire	Sep.99
44	TI/SPC/OHE/FRPN P/0060	-	Specification for Retro-Reflective structure number plate on FRP base.	Jun.08
45	TI/SPC/OHE/CW/WE AR/0080(02/80)	-	Technical specification for On-Board Equipment for On-line scanning for thickness of contact wire used in 25kVac traction.	Feb.08
46	TI/SPC/OHE/GATD/0 080(9/08)	-	Technical specification for Gas Auto tensioning device.	Sep.08
47	TI/SPC/OHE/INSTES T/0090(02/09), Rev '0' with A & C Slip No-01 (10/16)	1	Specification for Testing load testing Machine for 25kV Porcelain & Composite Insulators before installation.	Oct.16
48	TI/SPC/OHE/POST/0 100(01/10) with A & C Slip No-01 (10/16)	1	Specification for Solid core Porcelain cylindrical Post Insulators for system with nominal Voltage of 66kV, 110 kV, 132kV & 220 kV.	Oct. 16
49	TI/SPC/OHE/OLIVIR0 051(01/2015)	1	Technical specification for over head line inspection with video recording system for current collection test.	Jan.15
50	TI/SPC/OHE/AUGER/ 0090(02/09)	-	Technical specification for Self-propelled Auger vehicle for digging of foundations of over-head lines	Feb.09
51	TI/SPC/OHE/RRV/0 090(05/09)	-	Technical specification for Self-propelled road Rail vehicle for maintenance of over-headlines	May09
52	TI/SPC/OHE/MEMV/0 090(03/09)	-	Technical specification for Self Propelled Mast Erection Machine Vehicle for running on (1676mm) Routes of Indian railways.	Mar.09
53	TI/SPC/OHE/GSSW /0090(10/2009) with A&C Slip no.1&2	-	Technical specification for galvanized steel stranded wire for traction mast	Sep. 2016
54	TI/SPC/OHE/SPMUV/ 0090 (01/2017)	0	Technical specification for Self Propelled Multipurpose Utility Vehicle for hauling stringing vehicle and other electrification vehicle.	Jan 2017
55	TI/SPC/OHE/MRV/014 0(03/16)	-	Technical specification for Measuring and Recording Instrumentation for Retro fitment on 8-Wheeler Tower	March'16
56	TI/SPC/OHE/SPOLT0 140	-	Technical specification for Self Propelled Overhead Equipment Laying Train.	June'16

57	TI/SPC/OHE/NETRA/0140	-	Technical specification for Self Propelled OHE Recording cum test Car (NETRA)	March'16
58	TI/SPC/OHE/WIRING/0091	1	Technical specification for self-propelled wiring train for paying of contact & catenary wire of over headlines on BG (1676mm) Routes of IRS.	Feb.13
59	TI/SPC/OHE/SPRINGATD/0110(03/12)	-	Technical specification for Spring Auto Tensioning Device.	Jan'16
60	TI/SPC/OHE/SPATD/0130		Technical specification for 5 pulley Auto Tensioning Device for 25kV a.c. traction.	Oct'15
61	TI/SPC/OHE/3PHTATD/0150		Technical specification for 3pulley Auto Tensioning Device with 2400 kgf Tension for 25kV a.c. traction.	Sep 16
62	TI/SPC/OHE/8WDETC/0092 with A& C Slip No. 1	1	Technical Specification for 8-Wheeler Diesel Electric Inspection & maintenance OHE Car under slung type for operation on Broad gauge (1676mm)	Oct, 16
63	ETI/OHE/27 (8/84) with A & C slips 1 & 2.	-	Specification for Section Insulator Assembly without Sectioning Insulator	Aug.84

1.0 POWER SUPPLY INSTALLATION

S/N o.	SPECIFICATIONNO.	LAST REV.	DESCRIPTION	DATEOFI SSUE
1.	ETI/PSI/1(6/81)	-	Battery charger for 110volt battery,40Ah.	Jun. 81
2.	ETI/PSI/14(01/86)	1	25kV Drop out fuse switch.	Apr. 87
3.	ETI/PSI/15(08/2003)	-	25kV/240V Auxiliary transformer, 5KVA, 10kVA, 25kVA & 50kVA	Aug 03
4.	ETI/PSI/15A(7/82)	1	25kV/240VAuxiliary transformers, 100kVA.	Sep.89
5.	ETI/PSI/24(6/81)	-	Battery charger for 110 V. battery 200 Ah.	Jun 81
6.	ETI/PSI/29 (12/79)	1	Low Tension Distribution Panels of Railway a. c. Traction Substations	Feb.93
7.	ETI/PSI/31(5/76)	-	Standards for drawings for power supply installation.	May.76

8.	ET/PSI/38(5/75)	-	Current transformer 132kV(type-II)	May 75
9.	TI/SPC/PSI/CLS/0 020(12/02) with A&C slip no. 1,2,3&4	4	Control & distribution panel for colour light signaling supply in 25kVac traction systems.	July 10
10.	ET/PSI/44(12/73)	-	Standards for electrical distribution system in stations & yards where 25kVa.c traction is to be introduced.	Dec.73
11.	TI/SPC/PSI/PROTCT/ 6071 with A&C slip no 1	1	Control and Relay panel for 25kV acts including specification for numerical type protection relays for traction transformer, 25kV shunt capacitor bank and transmission line for 25kVAC TSS on Indian Railways.	Oct. 16
12.	ET/PSI/FC & SR/0100(01/10)	1	Shunt capacitor equipment for Railway traction sub-stations	Oct. 16
13.	ET/PSI/70 (11/84)	-	Hollow porcelain insulators & Bushing.	Nov.84
14.	ET/PSI/MOGTLA/010 1(02/15)	-	Metal oxide gap less type lightning arrestor for use on Railway traction substations and switching stations.	Feb.15
15.	ET/PSI/72(9/85)	-	Electric power connectors for AC Traction power system.	Sep.85
16.	ET/PSI/75(10/97)	-	25 kV, 50 Hz single phase series Compensation Equipment.	Oct.97
17.	ET/PSI/90(6/95)	0	25kV ac 50Hz single phase oil filled current transformers with ratio of(i) 1000-500/5A, (for general purposes, (ii)1500-750/5(for heavy duty)	June 18
18.	ET/PSI/98(8/92)	3	100KVA and 150KVA,25kVsingle phase 50Hz,oil filled booster transformer.	Jun.94
19.	ET/PSI/99(4/89)	-	Tri-Vector Meter and Maximum Demand Indicator for Railway a.c.Traction.	Apr. 89
20.	TI/SPC/PSI/SOLTR /1060(08/06)/Wen A & C Slip No.2	2	Specification for 25kV, AC Single pole and Double pole Motorized Isolators for Railway Electric traction.	Oct. 16
21.	TI/SPC/PSI/DRPC/00 50(08/05)	1	Dynamic reactive power compensation equipment for Railway traction sub-stations (for development of prototype only).	Oct. 16

22.	ET/PSI/105(7/93)	-	Gas Chromatograph for use in analysis of dissolved gases of transformer oil.	Jul.93
23.	ET/PSI/106(10/87)	-	Capacitance bridge and dissipation factor bridge for the measurement of solid insulation of insulating oil.	Oct.87
24.	ET/PSI/117(7/88)	9	Current transformer (i) 220kV,200-100/5(ii) 132kV,400- 200/5(iii)110kV,400- 200/5(iv)66kV,800-400/5	Jul. 08
25.	ET/PSI/118(10/93)	11	Power transformer 21.6MVA, single phase 50Hz, 220/132/110/66/27kV for traction substation.	Oct. 16
26.	ET/PSI/120(2/91)	1	Code of practice for earthing of power supply installation for 25kV AC, 50Hz single phase traction system.	Oct.93

27.	ET/PSI/122(3/89)	1	Specification for 245/145/123/72.5kV double pole and triple pole isolators.	Apr.90
28.	ET/PSI/123(9/93)	2	21.6MVA,220/132/110/66kV/2x 27kV, single phase,50Hz Traction power transformer for 'AT' feeding system.	Oct. 16
29.	ET/PSI/124(7/95)	1	54MVA, 220/2x27kV Scott-connected power transformer for 2x27kV 'AT' feeding system.	Oct. 16
30.	ET/PSI/125(7/97)	1	8 or 5 MVA, 2x27kV 50Hz, autotransformer for 2x27kV 'AT' feeding system.	Oct. 16
31.	ET/PSI/126(8/89)	3	25kV shunt capacitor equipment for 2x25kV 'AT' feeding system.	Oct. 16
32.	ET/PSI/127(8/89)	3	Series capacitor equipment for 2x25kV 'AT' feeding system.	Oct. 16
33.	ET/PSI/128(8/89)	3	Resonance suppressing C-R device for 2x25KV 'at' feeding system.	Sep.90

34.	TI/SPC/PSI/PROTCT/7100(07/2012) with A&C Slip no.1	1	Control & Relay panel including Numerical type protection relays for Scott- connected / single phase traction transformer, OHE protection & shunt capacitor bank protection for 2 X 25 kV traction sub-station.	Oct. 16
35.	ET/PSI/133(8/89)	2	25 kV ac double pole isolators for 2x25kV 'AT' feeding system.	Oct.91
36.	ET/PSI/135(8/89)	1	AT Boost up current ratio type fault locator for OHE for 2x25 kV , AT feeding system.	Jan.90
37.	ET/PSI/137(8/89)	7	Metal oxide gap less type lightning arresters for use of 220/132/110/66kV side of railway ac traction substation.	Jul.07
38.	TI/SPC/PSI/LCMLA/0030Rev.1(07/10)	1	Technical specification for leakage current monitor for lightning arrester.	Jul.10
39.	TI/SPC/PSI/PROTCT/5070(Rev.1) with A&C Slip no.1	1	Technical specification for Microprocessor based Numerical Integrated feeder Protection Module Comprising DPR, INST. OCR, PTFF& Auto Re-closure Relay for 25kV AC single phase 50Hz traction Sub-Station.	Oct. 16
40.	ET/PSI/145(3/92)	1	Specification for 11kV current transformer with ratio 500/5 for 2x25kV 'AT' feeding system.	Sep.92
41.	ET/PSI/147(3/92)	1	Specification for 25kV current transformer with CT ratio 100-50/5 for shunt capacitor banks in 2x25kV 'AT' feeding system.	Nov.92
42.	ET/PSI/148(4/92)	-	Specification for SF-6 Gas leakage detector.	Apr.92
43.	ET/PSI/163(4/97)	4	21.6MVA,100/27kVOR22/27kV Single phase, 50Hz ,ONAN traction power transformer.	Oct. 16
44.	TI/SPC/PSI/PROTCT/1982(12/03)with A&C Slip no.1&2	2	Specification for Delta-I type High Resistive fault selective relay for 25kV ac Single phase 50 Hz traction systems.	Oct. 16

45.	TI/SPC/PSI/PROTCT/2983(09/01)with A&C Slip no.1	1	Specification for Panto Flashover Protection relay for 25kV a.c Single phase 50 Hz traction system.	Oct. 16
46.	TI/SPC/PSI/PROTCT/4050(11/05) with A&C Slip no.1	1	Control & Relay Panel for protection system of Mumbai Sub-urban area for 50Hz AC Traction power supply system including parallel operation on 25kV Side.	Oct. 16
47.	TI/SPC/PSI/PTS/0990(09/99)	5	Specification for 220kV or 132kV or 110kV or 66kV or 25kV Potential transformer	April 09
48.	TI/SPC/PSI/LVCBIN/0120 Rev.0(Dec-2013)with A&C slip no.1	1	25 kV Single pole, Double Pole, Pole mounted, out door Vacuum circuit breaker (VCB) and vacuum Interrupter (BM) for Indian Railway.	Oct. 16
49.	TI/SPC/PSI/HVCBIN/0120 Rev.0(June-2014) with A & C slip No.2	2	220kV/132kV/110kV/66kV Double/Triple pole outdoor SF6 circuit breaker for Indian Railways.	Oct. 16
50.	TI/SPC/PSI/30TRN/0030(06/03)	-	30MVA, 22/27kV Single Phase Traction Power Transformer.	Jun03
51.	TI/SPC/PSI/30TRN/1050(12/05) With A & C Slip No. 2	2	30/42MVA, 220/27kV or 132/27kV or 110/27kV or 100/27kV Single phase traction Power transformer with on load tap changer (for use in Mumbai Sub-Urban Area)	Jan. 18
52.	TI/SPC/PSI/30TRN/2070(10/07)	1	30MVA, 220/27kV, 110/27kV & 66/27kV Single phase traction Power transformer ONAN/ONAF with on load tap changer (for use in TSSs other than Mumbai area).	Oct. 16
53.	TI/SPC/PSI/OFC/0050(10/05)	-	25 Core Armoured Optic Fibre Cable for use in Indian Railway straction installation systems	Oct.05
54.	TI/SPC/PSI/PQAR/0080(09/08)	-	Technical specification for power quality analyzer and Recorder with Remote display.	Sep.08
55.	TI/SPC/RCC/SCADA/0130(Rev.2) With A&C slip No.1	1	Technical specification for Supervisory Control and Data Acquisition System for 25kV single phase 50Hz ac Traction Power supply.	Oct. 16
56.	TI/SPC/PSI/CABLE/0090(02/09)	-	Manufacture and supply of 132Kv XLPE underground cable and accessories.	Feb.09

57.	TI/SPC/PSI/AUTOTR/0090(02/09)	-	Technical specification for 50/75/150 MVA ONAN/ONAF/OFAR 220/ 132 kV, 3-Phase Oil Immersed Type Auto Transformer.	Jul'11
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3.0 CIVIL SPECIFICATION

S. No.	SPECIFICATION NO.	LAST REV.	DESCRIPTION	DATE OF ISSUE
1	ETVC/2/(8/94)	-	Technical specification for spunpre-stressed cement concrete (PSC) OHE traction mast.	Aug.94
2	ETVC/3(5/83)	-	Indian Railway standard specification for spraying zinc coating on the OHE mast.	May.83
3	ETVC/4(8/90)	-	Draft Indian Railway Standard specification for cold roll formed mast for Railway electrification.	Aug.90
4	ETVC/5(5/88)	1	Specification for Flo-Coat Tube	May01
5	TI/SPC/CIV/POR/0080(08/2008)	-	Corrosion Resistant Paint System for outdoor structures of Traction Distribution and Traction Rolling Stock.	Aug08

1.0 Amendment History:

S. No.	Amendment Date	Version	Reasons for Amendment
1.0	12.09.2018	1.0	First issue under new documentation system for ISO 9001:2015.

1. GENERAL ARRANGEMENT FOR CONVENTIONAL OHE

1	ETI/OHE/G/00111 Sh.1	C	Extra allowance for setting of structures on curves (broad gauge)	20.10. 05
2	RE/33/G/00111 Sh.2	-	Extra allowance for setting of structures on curves (metre gauge)	17.05. 62
3	ETI/OHE/G/00112	D	Standard setting of structures in the vicinity of signals (broad gauge)	20.10. 05
4	ETI/OHE/G/00131	-	Typical design of side bearing foundation	21.08. 71
5	ETI/OHE/G/00144 Sh.3	C	Standard drilling schedule of OHE mast 9.5 m long (RSJ and BFB)	24.12. 97
6	ETI/OHE/G/00158 Sh-1	-	Employment schedule of bracket tubes regulated conventional OHE (Cd Cu catenary and Cu contact wire 1000 kgf. tension each for wind pressure 75kgf / m ²)	28.06. 84
7	ETI/OHE/G/00158 Sh-2	-	Employment schedule of bracket tubes regulated conventional OHE (Cd Cu catenary and Cu contact wire 1000 kgf tension each) for wind pressure 112.5kgf /sq.m.	28.06. 84
8	ETI/OHE/G/00158 Sh- 3	-	Employment schedule of bracket tubes regulated conventional OHE (Cd Cu catenary and cu contact wire 1000 kgf tension each) for wind pressure 150 kgf / sq.m.	28.06. 84
9	ETI/OHE/G/00159 Sh-1	-	Employment schedule of bracket tubes unregulated conventional OHE (Cd Cu catenary and Cu contact wire 1000 kgf tension each for wind pressure 75kgf /sq.m.	28.06. 84
10	ETI/OHE/G/00159 Sh-2	-	Employment schedule of bracket tubes unregulated conventional OHE (Cd Cu catenary and Cu contact wire 1000 kgf tension each) for wind pressure 112.5kgf /sq.m.	28.06. 84
11	ETI/OHE/G/00159 Sh- 3	-	Employment schedule of bracket tubes unregulated conventional OHE (Cd Cu catenary and Cu contact wire 1000 kgf tension each) for wind pressure 150 kgf /sq.m.	28.06. 84
12	ETI/OHE/G/00161	-	General distribution of droppers.	28.04. 72
13	ETI/OHE/G/00166	A	Dropper schedule for unregulated OHE with equal encumbrance (1.40/1.40).	02.08. 74
14	ETI/OHE/G/00167	A	Dropper schedule for unregulated OHE with unequal encumbrance (1.40/0.90).	02.08. 74
15	ETI/OHE/G/00168	A	Dropper schedule for unregulated OHE with unequal encumbrance (1.40/0.75).	02.08. 74
16	ETI/OHE/G/00169	A	Dropper schedule for uninsulated overlap span.	01.12. 94
17	ETI/OHE/G/00170	A	Dropper schedule for insulated overlap span.	02.08. 74

18	ETI/OHE/G/00173	B	Dropper schedule for compensated OHE with equal encumbrance (1.40/1.40) for speed upto 160km/h.	02.08. 74
19	ETI/OHE/G/00173-1	-	Dropper schedule for regulated OHE in worn out condition of 107 sqmm contact wire (9.75mm thickness)	09.10. 95
20	ETI/OHE/G/00174	B	Dropper schedule for compensated OHE with unequal encumbrance (1.40/0.90) for speed upto 160km/h	03.04. 80
21	ETI/OHE/G/00175	A	Dropper schedule for compensated OHE with unequal encumbrance (1.40/0.75) for speed upto 160km/h	02.08. 74
22	ETI/OHE/G/00176	D	Dropper schedule for compensated OHE with unequal encumbrance (1.75/1.40) for speed upto 160km/h	02.08. 74
23	ETI/OHE/G/00177	A	Dropper schedule for conventional regulated OHE with zero presage (1400/1400)	05.09. 94
24	RE/33/G/00181	A	Outline of pantograph (BG & MG)	05.03. 62
25	RE/33/G/00182	C	Arrangement of pantograph multiple headed train BG	04.08. 66
26	RE/33/G/00183 Sh. 1	B	General clearance diagram on BG tracks (tangent and flat curves)	09.08. 67
27	RE/33/G/00183 Sh. 2	-	General clearance diagram on MG tracks (tangent and flat curves)	06.06. 62
28	RE/33/G/00184 Sh. 1	A	General clearance diagram on BG tracks (sharp curves)	10.04. 62
29	RE/33/G/00184 Sh. 2	-	General clearance diagram on MG tracks (sharp curves)	06.06. 62
30	RE/33/G/00185 Sh. 1	A	Restricted clearance diagram on tangent tracks BG	16.04. 64
31	RE/33/G/00185 Sh. 2	-	Restricted clearance diagram on MG tracks (tangent and flat curves)	06.06. 62
32	ETI/OHE/G/00186 Sh. 1	-	Restricted clearance diagram on curved track on BG	14.01. 83
33	RE/33/G/00186 Sh. 2	-	Restricted clearance diagram on MG tracks (sharp curves)	06.06. 82
34	ETI/OHE/G/00187	A	Chart showing the blow off, push up and oscillations of the standard a.c. OHE	25.08. 76
35	RE/33/G/00193	-	Adjustment chart of regulating equipment winch type & pulley block type	27.01. 67
36	ETI/OHE/G/00195	A	Adjustment chart of regulating equipment three pulley type 3:1 ratio	28.06. 94
37	RE/33/G/00197	A	Cantilever adjustment chart at mean temperature 35 ^o C	31.01. 61
38	ETI/OHE/G/00202	-	Span and stagger chart (conventional OHE Cd copper catenary and Cu contact wire) for wind	27.03. 85

			pressure 75,112.5 & 150 kgf/sq. m		
39	ETL/OHE/G/00222 Sh-1	-	Sag and tension chart for loaded catenary	11.09.72	FOLDER 4
40	RE/33/G/01101 Sh-1	A	General formation of single track in embankments and cuttings BG	07.06.62	FOLDER 5
41	RE/33/G/01101 Sh-2	-	General formation of single track in embankments and cuttings MG	06.04.62	FOLDER 5
42	RE/33/G/01102 Sh-1	A	General formation of double track in embankments and cuttings BG	07.04.62	FOLDER 5
43	RE/33/G/01102 Sh-2	-	General formation of double track in embankments and cuttings MG	06.04.62	FOLDER 5
44	RE/33/G/01103 Sh-1	A	General formation of multiple tracks BG	07.04.62	FOLDER 5
45	RE/33/G/01103 Sh-2	-	General formation of multiple tracks MG	06.04.62	FOLDER 5
46	RE/33/G/01104 Sh-1	-	Leading dimensions of turnouts BG	20.04.62	FOLDER 5
47	RE/33/G/01104 Sh-2	-	Leading dimensions of turnouts MG	17.05.62	FOLDER 5
48	RE/33/G/01105 Sh-1	A	Leading dimensions of crossing BG	20.04.62	FOLDER 5
49	RE/33/G/01105 Sh-2	-	Leading dimensions of diamond crossing MG	17.05.62	FOLDER 5
50	RE/33/G/01112 Sh-2	-	Normal profile of maximum moving dimensions MG	23.05.62	FOLDER 5
51	RE/33/G/01401	E	Standard anchor arrangement	06.08.62	FOLDER 5
52	ETL/OHE/G/01402	B	Anchor arrangement with dwarf mast	25.09.72	FOLDER 5
53	ETL/OHE/G/01403 Sh-1	D	Schedule of anchor block for BG Tracks	13.08.99	FOLDER 5
54	ETL/OHE/G/01403 Sh-2	C	Double guy rod arrangement with anchor block BG track	13.08.99	FOLDER 5
55	ETL/OHE/G/01403 Sh-3	B	Schedule of anchor blocks for BG tracks (black cotton soil)	29.05.79	FOLDER 5
56	ETL/OHE/G/01502	-	Trapezoidal counter weight arrangement on OHE structures	04.02.72	FOLDER 6
57	ETL/OHE/G/01503 Sh-1	B	Cement concrete counter weight arrangements on OHE structures for winch type regulating equipment	30.04.91	FOLDER 4
58	ETL/OHE/G/01503 Sh-2	A	Cement concrete counter weight arrangement on N, O & R type portal upright	30.04.91	FOLDER 6
59	ETL/OHE/G/01505	-	Standard guide tube arrangement on a mast and structures	19.11.87	FOLDER 6
60	ETL/OHE/G/01601	-	Arrangement of 3kV and 25kV pedestal insulator supports on OHE masts and portals	03.02.72	FOLDER 6

61	ETI/OHE/G/021701	A	Standard arrangements for mounting of number plate on OHE structures	23.03. 85
62	ETI/OHE/G/021702	-	Standard arrangement for mounting of number plate (Retro-reflective type) on OHE structures	23.02. 98
63	ETI/OHE/G/02101	A	Schematic arrangement of regulated OHE	04.07. 94
64	ETI/OHE/G/02102	-	Typical arrangement of OHE on cantilever mast for double track section	22.06. 81
65	ETI/OHE/G/02102 Sh-3	-	Typical arrangement for fixing of bracket assembly on 9.5 m mast and structure to suit raising of track in future	05.01. 77
66	ETI/OHE/G/02103	-	General arrangement of OHE with stitch wire on catenary	06.05. 72
67	ETI/OHE/G/02104 Sh-1	A	Mast on platforms BG	20.01. 73
68	RE/33/G/02104 Sh-2	A	Mast on platforms MG	25.06. 62
69	ETI/OHE/G/02106 Sh-1	A	Details of bracket arrangement on tangent and curved tracks	25.08. 72
70	ETI/OHE/G/02106 Sh-3	C	Details of bracket arrangement for OHE high speed	04.07. 94
71	RE/33/G/02107	D	Single bracket assembly on structures and dropped arms	25.07. 84
72	ETI/OHE/G/02108	A	Box type cantilever arrangement	09.01. 97
73	ETI/OHE/G/02111	A	Arrangement of anticreep	04.07. 94
74	ETI/OHE/G/02113	-	Standard cantilever arrangement for boom anchor anticreep location	27.01. 69
75	ETI/OHE/G/02121 Sh-1	F	Schematic arrangement of uninsulated overlap (Type I) (3 and 4 span overlaps)	20.05. 74
76	ETI/OHE/G/02121 Sh-4	A	Schematic arrangement of uninsulated overlap (3 & 4 span overlaps)	04.07. 94
77	ETI/OHE/G/02131 Sh-1	-	Schematic arrangement of Insulated Overlap	25.09. 87
78	ETI/OHE/G/02131 Sh-3	A	Schematic arrangement of insulated overlap	04.07. 94
79	ETI/OHE/G/02141	C	General arrangement of regulated OHE at turn outs (overlap and crossed type)	25.09. 87
80	ETI/OHE/G/02151	-	General arrangement of regulated OHE at cross over (Overlap and crossed type)	13.02. 98
81	ETI/OHE/G/02161 Sh-1	C	Arrangement of neutral section	14.06. 85
82	ETI/OHE/G/02161 Sh-2	-	Arrangement of short neutral section	15.11. 84

83	ETI/OHE/G/03162	-	Arrangement of neutral section assembly (PTFE type) at switching station	01.12. 86
84	ETI/OHE/G/03101	-	Schematic arrangement of unregulated OHE	22.06. 81
85	ETI/OHE/G/03121	E	Standard termination of OHE (regulated and unregulated)	11.03. 03
86	ETI/OHE/G/03151	-	General arrangement of unregulated OHE at turnout (crossed and overlap type)	16.10. 82
87	ETI/OHE/G/03152 Sh-1	-	General arrangement of unregulated OHE at cross over and diamond crossings (crossed and overlap type)	16.10. 82
88	ETI/OHE/G/03152 Sh-2	-	General arrangement of unregulated OHE at diamond crossings	16.10. 82
89	ETI/OHE/G/03201	-	General arrangement of head span	03.02. 72
90	ETI/OHE/G/03301	A	General arrangement of pull off	06.08. 74
91	ETI/OHE/G/04201	-	Span and stagger chart for tramway type OHE (regulated)	18.06. 81
92	ETI/OHE/G/04202 Sh-1	C	Drilling schedule of OHE mast 8.5m long RSJ and BFB for tramway type OHE (regulated)	22.01. 98
93	ETI/OHE/G/04202 Sh-2	C	Drilling schedule of OHE mast 9.0m long RSJ and BFB for tramway type OHE (regulated)	22.01. 98
94	ETI/OHE/G/04203	C	Schematic arrangement of tramway type OHE (regulated)	04.07. 94
95	ETI/OHE/G/04204	B	Arrangement of bracket assembly for tramway type OHE (regulated)	21.06. 85
96	ETI/OHE/G/04205	B	Arrangement of anticroep for tramway type OHE (regulated)	04.07. 94
97	ETI/OHE/G/04206	B	Arrangement of anticroep for tramway type OHE (regulated) (alternative arrangement)	04.07. 94
98	ETI/OHE/G/04207 Sh-1	B	Arrangement of section insulator for tramway type OHE (regulated)	21.06. 85
99	ETI/OHE/G/04207 Sh-2	B	Small parts steel for supporting section insulator assembly. (for regulated tramway type OHE)	26.08. 96
100	ETI/OHE/G/04208	-	General arrangement of turnout for tramway type OHE (regulated)	18.06. 81
101	ETI/OHE/G/04209	-	Adjustment chart for tramway type OHE (regulated)	25.09. 81
102	ETI/OHE/G/04212	B	Standard termination of tramway type OHE (regulated with pulley type regulating equipment) (3:1 ratio)	22.04. 94
103	ETI/OHE/G/04213	-	General arrangement of connections at switching stations and BT locations for tramway type OHE.	22.04. 94
104	ETI/OHE/G/05101	-	In span jumper connection between catenary	15.01.

			and contact wire.	72
105	ETI/OHE/G/05102	C	Continuity jumper connection at un-insulated overlap.	10.07.01
106	ETI/OHE/G/05103	B	Connection at turnouts.	25.07.84
107	ETI/OHE/G/05104	-	Potential equalizer connection at insulated overlap and neutral section.	15.01.72
108	ETI/OHE/G/05106	A	Connection at diamond crossing.	12.01.83
109	ETI/OHE/G/05107	A	Anticraft jumper.	28.10.94
110	ETI/OHE/G/05121 Sh-1	C	General arrangement of connection to OHE by copper cross feeder (150)	30.09.93
111	ETI/OHE/G/05122 Sh-1	C	General arrangement of connection at switching station on double track section by copper cross feeder (150)	30.09.93
112	ETI/OHE/G/05123 Sh-1	C	General arrangement of connection at switching station on multiple track section by copper cross feeder (150)	30.09.93
113	ETI/OHE/G/05143	B	Suspension of 25 kV feeders (spider) on OHE masts.	14.06.85
114	RE/33/G/05145-1	A	Termination of feeder, return conductor and return feeder (copper and aluminium)	04.04.03
115	RE/33/G/05152	C	Arrangement of suspension of double spider 25 kV feeder and return feeder between sub-station and feeding station	13.05.86
116	RE/33/G/05181	C	Assembly of section insulator	24.05.94
117	ETI/OHE/G/05201	A	General arrangement of earth wire on OHE mast.	31.03.79
118	ETI/OHE/G/05201-1	-	General arrangement of earth wire on OHE mast.	04.07.94
119	ETI/OHE/G/05251	A	Arrangement of transverse bonds.	14.01.83
120	ETI/OHE/G/05306	F	Connection of RC to track.	14.09.94
121	ETI/OHE/G/05307	B	Suspension arrangement of aluminium return conductor (spider) on traction structures.	30.10.92
122	ETI/OHE/G/05311	D	Suspension of RC (spider) from boom of structures.	02.11.92
123	ETI/OHE/G/05312	A	Suspension of RC (spider) from boom of structures with clevis type disc insulator.	02.11.92
124	ETI/OHE/G/05413	B	Connection between OHE and aluminium RC at booster station.	14.06.85
125	ETI/OHE/G/05513	A	Mounting of 25 kV insulators on	07.02.

	Sh-1		OHE structures (general arrangement).	72
126	ETI/OHE/G/05513 Sh-2	A	Details of small parts steel work for supporting 25 kV Isolator on new TTC boom.	07.02. 72
127	ETI/OHE/G/05518	A	Connection from Isolator to OHE.	30.09. 93
128	ETI/OHE/G/05600	A	Characteristics of conductor/bus bar for 25 kV ac traction.	04.02. 77
129	ETI/OHE/G/06000	B	Suspension arrangement of AT feeder on traction mast (for 2x25 kV).	03.01. 92
130	ETI/OHE/G/06001	A	Suspension arrangement of AT feeder on portals (For 2x25 kV).	03.01. 92
131	ETI/OHE/G/06002	-	Suspension arrangement of 25kv feeder at Switching station/Feeding post (for 2x25 kV).	23.10. 89
132	ETI/OHE/G/06003	-	Termination arrangement for AT feeder.	23.10. 89
133	ETI/OHE/G/06004	B	Arrangement of sectioning of AT feeder (for 2x25kV)	17.02. 92
134	ETI/OHE/G/06005 Sh-1	-	General arrangement of connections at an elementary sectioning point on double track section (for 2x25kV)	28.11. 91
135	ETI/OHE/G/06005 Sh-2	-	Mounting details of double pole Isolator on mast (for 2x25kV)	28.11. 91
136	ETI/OHE/G/06006	-	Suspension of AT feeder (spider) from boom of portals (for 2x25kV AT system)	28.09. 93
137	ETI/OHE/G/06008	-	Mounting details of double pole Isolator on portals (for 2x25kV)	13.10. 92
138	ETI/OHE/SK/124	B	Span and stagger chart.	01.12. 94
139	ETI/OHE/SK/148	-	Dropper schedule for insulated overlap span (for higher section of OHE).	22.11. 94
140	ETI/OHE/SK/149	A	Dropper schedule for uninsulated overlap span (for higher section of OHE).	01.12. 94
141	ETI/OHE/SK/467		Arrangement for endurance and proof load test of regulating equipment (winch type.)	06-06- 84
142	ETI/OHE/SK/473 Sh.1	-	Bracket arrangement on tangent track inside tunnel.	05.09. 85
143	ETI/OHE/SK/473 Sh.2	-	Bracket arrangement on curved track inside tunnel.	05.09. 85
144	ETI/OHE/SK/473 Sh.3	-	Detail of bracket arrangement inside tunnel.	05.09. 85
145	ETI/OHE/SK/481	A	Insulated Tee junction	26-09-

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146	ETI/OHE/SK/482	A	Earthing clamp assembly	26.09-96
147	ETI/OHE/SK/521-1		Dropper schedule for regulated OHE in worn out condition of 107 mm ² contact wire (10 mm thickness)	25.09.95
148	ETI/OHE/SK/522	-	Dropper schedule for over lap's spans.	05.02.88
149	ETI/OHE/SK/523	-	Dropper schedule for anchor spans.	05.02.88
150	ETI/OHE/SK/524	A	Counter weight assembly (1200/1200)	26.08.96
151	ETI/OHE/SK/544	-	Typical Sectioning diagram at station with Isolators. (Fo2x25 kV).	26.09.89
152	ETI/OHE/SK/551	-	Arrangement of neutral section for conversion with short neutral section.	24.01.90
153	ETI/OHE/SK/552	-	Arrangement of short neutral section at existing feeding post.	24.01.90
154	ETI/OHE/SK/581	-	Sag and tension chart for catenary (65mm ² and contact wire (107mm ²) for 1200kgf/1200kgf tension.	02.02.94
155	ETI/OHE/SK/582	-	Schematic arrangement of unined overlap.	02.02.94
156	ETI/OHE/SK/583	-	Schematic arrangement of insulated overlap.	02.02.94
157	ETI/OHE/SK/584	-	Dropper schedule for regulated OHE (1200 kgf/1200 kgf tension)	02.02.94
158	ETI/OHE/SK/585	-	Dropper schedule for uninsulated overlap spans (1200kgf / 1200kgf tension)	02.02.94
159	ETI/OHE/SK/586	A	Dropper schedule for insulated overlap spans (1200kgf / 1200kgf tension)	26.06.95
160	ETI/OHE/SK/587	A	Counter weight assembly.	26.08.96
161	ETI/OHE/SK/588	-	Counter weight eye rod.	02.02.94
162	ETI/OHE/SK/597	-	Typical pneumatic circuit for raising/lowering of pantograph from cab of OHE recording cum test car.	11.02.94
163	ETI/OHE/SK/603	-	Schematic arrangement of uninsulated overlap (Three spans and four spans).	15.12.94
164	ETI/OHE/SK/604	-	Schematic arrangement of insulated overlap (Three spans and four spans).	15.12.94
165	ETI/OHE/ SK/605	-	Sag and tension chart (higher section of OHE)	01.12.94

166	ETL/OHE/ SK/606	-	Dropper schedule for regulated OHE (for higher section of OHE)	01.12.94
167	ETL/OHE/ SK/607	-	Schematic arrangement of uninsulated over lap (Three spans and four spans) for higher section of OHE	01.12.94
168	ETL/OHE/ SK/608	-	Schematic arrangement of insulated over lap (Three spans and four spans) for higher section of OHE	01.12.94
169	ETL/OHE/ SK/609	-	Schematic arrangement of uninsulated over lap (Three spans and four spans)	01.12.94
170	ETL/OHE/ SK/610	-	Schematic arrangement of insulated over lap (Three spans and four spans)	01.12.94
171	TI/DRG/OHE/GENI/ RDSO/00001/16/0	0	Arrangement at Anticreep for 125/150 OHE	06.04.2018
172	TI/DRG/OHE/DROP/0 0001/10/3	3	Dropper schedule encumbrance 1.4m/1.4m tension 1000/1000 for 25 kV AC regulated 65/107 sq mm OHE	07.06.2018
173	TI/DRG/OHE/DROP/0 0002/10/3	3	Dropper schedule encumbrance 1.4m/0.9m tension 1000/1000 for 25 kV AC regulated 65/107 sq mm OHE	07.06.2018

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Chapter - 1 - OVERHEAD EQUIPMENT

1. COMPONENTS, FITTINGS, EQUIPMENTS AND SMALL PART STEEL WORKS (SPS)

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Document title Master List of Drawings of equipments and materials for Traction Installation

1	ET1/OHE/P/150	-	High tensile rustles 'U' bolt 10 mm dia.	19.09. 74
2	RE/33/P/160	A	High tensile rustles pin bolt 10 mm dia.	01.06. 65
3	RE/33/P/250	B	Steel 'U' bolt and nuts dia 14 mm	03.08. 74
4	RE/33/P/260	C	Snap head pin dia 20 mm	30.06. 95
5	RE/33/P/500	-	Rail jumper assembly	01.09. 59
6	RE/33/P/501	B	Rail jumper clamp body grip screw and ferrule nut	14.02. 61
7	RE/33/P/504	A	Rail jumper ferrule	14.02. 61
8	RE/33/P/509	-	Rail jumper extension	06.05. 60
9	RE/33/P/510	A	Earthing rods	11.01. 61
10	RE/33/P/511	-	Earthing rods	06.05. 60
11	RE/33/P/520	A	Earthing rod hook assembly	24.01. 61
12	RE/33/P/521	-	Earthing rod head	24.01. 61
13	RE/33/P/522	-	Earthing rod tongue	24.01. 61
14	RE/33/P/523	-	Earthing rod hook pin and other small parts	24.01. 61
15	RE/33/P/530	-	Insulated Tee junction	22.03. 60
16	RE/33/P/550	-	Automatic come-along clamp (for contact wire)	22.01. 62
17	RE/33/P/560	-	Automatic come- along clamp	25.06. 65
18	ET1/OHE/P/580	-	Contact wire straightener assembly,	11.03. 70
19	ET1/OHE/P/581-599	-	Details of contact wire straightener.	11.03. 70
20	ET1/OHE/P/1009	A	Terminal connector (19mm) multiple holes (bolted type)	10.03. 05
21	ET1/OHE/P/1010	A	Terminal connector (15mm) multiple holes (bolted type)	10.03. 05
22	ET1/OHE/P/1030-2	D	Contact wire parallel clamp large	17.07. 91
23	ET1/OHE/P/1030-3	A	Parallel Clamp (157-65/ 107/150) for WKRE	23.08. 91
24	ET1/OHE/P/1031-2	C	Contact wire parallel clamp part large	24.01.

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25	ETI/OHE/P/1040-2	E	Contact wire parallel clamp part small	17.07. 91
26	ETI/OHE/P/1040-3	B	Parallel Clamp (90/50)	19.06. 01
27	ETI/OHE/P/1041-2	C	Contact wire parallel clamp part small	19.06. 01
28	ETI/OHE/P/1050-2	D	Parallel Clamp (150/105-150) for WKRE	23.08. 91
29	ETI/OHE/P/1050-3	A	Parallel Clamp (150/160) for WKRE	19.06. 01
30	ETI/OHE/P/1051-2	C	Parallel Clamp part (150/105-150)	19.06. 01
31	ETI/OHE/P/1070-1	B	Bridle wire Clamp (6mm) with two bolts	09.06. 95
32	ETI/OHE/P/1080	A	Contact wire splice (107)	01.06. 88
33	ETI/OHE/P/1080-1	B	Contact wire splice (toothed type)	01.06. 88
34	ETI/OHE/P/1081-1	C	Contact wire splice part	17.11. 87
35	ETI/OHE/P/1081-2	A	Contact wire splice part	19.01. 87
36	ETI/OHE/P/1090	-	Catenary splice (65)	29.06. 71
37	ETI/OHE/P/1091	-	Catenary splice sleeve	29.06. 71
38	ETI/OHE/P/1092	-	Catenary joint socket	29.06. 71
39	ETI/OHE/P/1093	-	Catenary joint socket left	29.06. 71
40	ETI/OHE/P/1094	A	Catenary joint cone	08.10. 64
41	ETI/OHE/P/1102	-	Feeder joint socket	03.10. 72
42	ETI/OHE/P/1104	-	Feeder joint cone	02.08. 96
43	ETI/OHE/P/1110-2	D	Contact wire ending clamp (107)	01.06. 88
44	ETI/OHE/P/1120	B	Catenary ending clamp (65)	01.06. 88
45	ETI/OHE/P/1120-1	A	Catenary ending clamp (65) wedge type	07.12. 93
46	ETI/OHE/P/1121	-	Catenary ending clamp body	20.06. 71
47	ETI/OHE/P/1130	-	Feeder ending clamp (150)	25.09. 87

48	ETI/OHE/P/1131	-	Feeder ending clamp body	19.08. 71
49	ETI/OHE/P/1140	B	Large span wire ending clamp (130)	01.06. 88
50	ETI/OHE/P/1143	B	Large span wire joint cone.	20.10. 00
51	RE/33/P/1160	J	Suspension clamp	01.06. 88
52	RE/33/P/1161	E	Suspension clamp body	03.09. 84
53	RE/33/P/1163	D	Suspension clamp lock plate	13.09. 65
54	RE/33/P/1170	K	Double suspension clamp	01.06. 88
55	RE/33/P/1171	F	Double suspension clamp body	03.09. 84
56	RE/33/P/1172	C	Double suspension lock plate	04.02. 78
57	RE/33/P/1174	B	Packing saddle	08.01. 87
58	RE/33/P/1180	F	Contact wire dropper clip (107)	18.01. 94
59	RE/33/P/1181	G	Contact wire dropper clip part	18.01. 94
60	RE/33/P/1182	C	Locking wire	06.11. 69
61	ETI/OHE/P/1190	B	Catenary dropper assembly.	01.06. 88
62	ETI/OHE/P/1191	-	Catenary dropper link.	08.11. 85
63	ETI/OHE/P/1192	C	Catenary dropper clip.	01.06. 88
64	ETI/OHE/P/1193	-	Dropper.	08.11. 85
65	ETI/OHE/P/1194	A	Bridge wire dropper clip.	01.06. 88
66	ETI/OHE/P/1210-2	C	Knuckle assembly.	03.06. 88
67	ETI/OHE/P/1216	D	Knuckle tube clamp.	03.06. 88
68	RE/33/P/1220	E	Contact wire swivel clip	06.11. 69
69	RE/33/P/1221	D	Contact wire swivel clip part	27.04. 74
70	RE/33/P/1222	C	Contact wire swivel clip pin	06.11. 69
71	ETI/OHE/P/1230	-	Standard contact wire crossing assembly.	01.11. 74

72	ETI/OHE/P/1233	-	Contact wire crossing bar.	01.11. 74
73	RE/33/P/1250	D	Double contact wire swivel clip	06.11. 69
74	RE/33/P/1251	A	Double contact wire swivel clip part	16.07. 65
75	ETI/OHE/P/1260-1	A	Strain clamp link assembly	11.03. 96
76	ETI/OHE/P/1263	-	Strain clamp link.	09.08. 74
77	RE/33/P/1270-1	F	Suspension device assembly (18 mm)	03.06. 88
78	RE/33/P/1280	C	Double contact wire splice	03.06. 88
79	ETI/OHE/P/1310	-	Pull off Clamp assembly.	12.12. 72
80	ETI/OHE/P/1320	B	'U Clamp (50/50)	03.06. 88
81	ETI/OHE/P/1330	B	'U Clamp (50)	03.06. 88
82	ETI/OHE/P/1350	-	Thimble (10mm)	01.01. 73
83	ETI/OHE/P/1360	B	Steel wire Ending Clamp (90)	03.06. 88
84	ETI/OHE/P/1361	A	Steel wire joint socket.	18.02. 74
85	ETI/OHE/P/1362	B	Steel wire joint cone.	09.10. 84
86	ETI/OHE/P/1370-1	F	Raised register arm clamp.	08.05. 00
87	ETI/OHE/P/1370-2	-	Raised register arm Clamp (150 FB).	01.12. 94
88	ETI/OHE/P/1390-1	D	Crossing clamp.	26.09. 88
89	ETI/OHE/P/1391-1	B	Crossing clamp piece.	01.05. 79
90	ETI/OHE/P/1400	C	Short dropper assembly.	10.01. 89
91	ETI/OHE/P/1410	B	Special dropper assembly.	25.05. 88
92	ETI/OHE/P/1530-1	C	Parallel clamp (105/240) for dc OHE.	19.06. 01
93	ETI/OHE/P/1540	D	Bi-metallic parallel clamp (10/20).	10.01. 89
94	ETI/OHE/P/1550	E	Parallel clamp (20/20).	10.01.

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95	ETI/OHE/P/1560	D	Bimetallic parallel clamp (15/20).	10.01. 89
96	ETI/OHE/P/1580 Sh.1	F	Large suspension clamp 20mm.	10.03. 92
97	ETI/OHE/P/1580 Sh.2	-	Large suspension clamp 20mm (with armour rod).	02.11. 92
98	ETI/OHE/P/1600	C	Screw clamp 20 mm.	07.07. 88
99	ETI/OHE/P/1610-1	-	Compression joint.	06.08. 82
100	ETI/OHE/P/1611	B	Compression joint (spider).	01.11. 74
101	ETI/OHE/P/1640	-	Repair sleeves (compression type).	01.11. 74
102	ETI/OHE/P/1790	C	Contact wire ending clamp (150) (for WKRE/d; OHE).	01.12. 94
103	RE/33/P/2041	D	Standard bracket tube Dia. 30/38	22.02. 84
104	ETI/OHE/P/2060	-	Tube cap.	21.11. 85
105	ETI/OHE/P/2064-1	A	Tube cap 30mm.	10.01. 89
106	RE/33/P/2081	E	Large bracket tube Dia 40/49 mm	25.02. 84
107	RE/33/P/2086	C	Large bracket sleeve	25.02. 84
108	ETI/OHE/P/2104-1	A	Tube cap 40mm.	10.01. 89
109	ETI/OHE/P/2110	B	Standard catenary suspension bracket.	03.06. 88
110	ETI/OHE/P/2110-1	D	Standard catenary suspension bracket.	03.06. 88
111	ETI/OHE/P/2111	B	Standard catenary suspension bracket bottom.	22.11. 85
112	ETI/OHE/P/2112	A	Standard catenary suspension bracket top	05.09. 84
113	ETI/OHE/P/2120	B	Standard catenary direct clamp	03.06. 88
114	ETI/OHE/P/2121	A	Standard catenary direct clamp top	04.09. 84
115	ETI/OHE/P/2122	A	Standard catenary direct clamp bottom	04.09. 84
116	ETI/OHE/P/2123	C	Direct catenary clamp grip.	22.11. 85
117	ETI/OHE/P/2124	B	Direct catenary clamp stud	03.06. 88

118	ETL/OHE/P/2125	B	Bridle wire sleeve.	01.12. 88
119	ETL/OHE/P/2130	B	Large catenary suspension bracket.	03.06. 88
120	ETL/OHE/P/2130-1	C	Large catenary suspension bracket.	03.06. 88
121	ETL/OHE/P/2131	B	Large catenary suspension bracket top.	22.11. 85
122	ETL/OHE/P/2132	B	Large catenary suspension bracket bottom.	22.11. 85
123	ETL/OHE/P/2140	C	Catenary direct clamp (large)	03.06. 88
124	ETL/OHE/P/2141	B	Large catenary direct clamp top.	05.09. 84
125	ETL/OHE/P/2142	B	Large catenary direct clamp bottom	22.11. 85
126	ETL/OHE/P/2150-1	E	Standard register arm hook	03.06. 88
127	ETL/OHE/P/2151-1	C	Register arm hook top	02.05. 79
128	ETL/OHE/P/2152-1	C	Register arm hook bottom	02.05. 79
129	ETL/OHE/P/2160-1	E	Large register arm hook	03.06. 88
130	ETL/OHE/P/2161-1	C	Large register arm hook top	02.05. 79
131	ETL/OHE/P/2162-1	C	Large register arm hook bottom	02.05. 79
132	ETL/OHE/P/2270-4	E	38mm register arm dropper assembly	07.07. 88
133	ETL/OHE/P/2270-5	E	49mm register arm dropper assembly	07.07. 88
134	ETL/OHE/P/2274-1	D	Dropper clip (38mm) for standard bracket tube	07.07. 88
135	ETL/OHE/P/2277	D	Dropper clip (49mm) for large bracket tube	07.07. 88
136	ETL/OHE/P/2340	C	Steady rod	11.03. 96
137	ETL/OHE/P/2341	B	Steady rod piece.	11.03. 96
138	ETL/OHE/P/2345	-	Steady rod eye piece	03.10. 72
139	ETL/OHE/P/2345-1	-	Double Vee suspension top eye piece	18.02. 66
140	ETL/OHE/P/2352	A	Bent steady arm swivel	11.03. 96
141	ETL/OHE/P/2360	L	25mm drop bracket assembly	19.07.

142	ETI/OHE/P/2380	C	Hook bracket	88 19.07. 88
143	ETI/OHE/P/2390	B	BFB steady arm assembly.	09.05. 79
144	ETI/OHE/P/2391	G	Steady arm hook (BFB)	19.11. 99
145	TI/DRG/OHE/FTGFE /RDSO/000003/00/0	-	Steady arm hook BFB (Forged)	29.09. 00
146	ETI/OHE/P/2392	C	BFB steady arm swivel.	04.04. 90
147	RE/33/P/2400	E	Tubular stay arm	19.08. 66
148	RE/33/P/2401	C	Stay tube (25 mm)	18.06. 66
149	ETI/OHE/P/2402	A	Tubular stay adjuster.	25.09. 72
150	ETI/OHE/P/2402-1	B	Tubular stay adjuster (large)	04.04. 90
151	ETI/OHE/P/2403-1	C	Tubular stay sleeve.	04.03. 05
152	TI/DRG/OHE/FTGFE /RDSO/000004/03/0	-	Tubular stay sleeve (Forged).	17.11. 03
153	ETI/OHE/P/2404	C	Stud bolt (10mm)	08.02. 77
154	ETI/OHE/P/2410	-	25mm register arm dropper assembly.	04.07. 94
155	ETI/OHE/P/2420-1	A	Register arm assembly for mast on platforms.	14.06. 85
156	RE/33/P/2421	C	Register arm tube 25mm	25.02. 84
157	RE/33/P/2422-1	B	Register arm eye piece 25mm	26.08. 88
158	TI/DRG/OHE/FTGFE /RDSO/000002/00/0	-	Register arm eye piece 25mm(Forged)	27.07. 00
159	ETI/OHE/P/2423-1	A	Tube cap 25mm.	10.01. 89
160	RE/33/P/2431	D	Raised register arm tube 25 mm	25.02. 84
161	RE/33/P/2432	E	Raised register arm adjuster 25 mm	11.03. 96
162	ETI/OHE/P/2440	-	38mm register arm dropper assembly	04.07. 94
163	ETI/OHE/P/2450	-	49mm register arm dropper assembly	04.07. 94

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164	ETI/OHE/P/2460	E	25mm register arm dropper assembly.	07.07. 88
165	ETI/OHE/P/2461-1	F	Dropper clip (34mm) for register arm tube.	07.07. 88
166	ETI/OHE/P/2462-1	A	Register arm dropper	19.09. 85
167	ETI/OHE/P/2463	A	Register arm dropper loop.	19.09. 85
168	ETI/OHE/P/2464	-	Register arm dropper loop (short)	18.03. 71
169	ETI/OHE/P/2465	B	Register arm dropper loop.	19.09. 85
170	ETI/OHE/P/2470	E	Raised register arm dropper assembly.	07.07. 88
171	ETI/OHE/P/2471-1	E	Dropper clip (25) for raised register arm.	07.07. 88
172	ETI/OHE/P/2472-1	B	Raised register arm dropper	19.09. 85
173	ETI/OHE/P/2480	-	Raised register arm dropper assembly	04.07. 94
174	ETI/OHE/P/2490-2	E	25mm steady arm clamp	07.07. 88
175	ETI/OHE/P/2520	B	Normal bent steady arm.	11.03. 96
176	ETI/OHE/P/2522	B	Normal bent steady arm eye piece.	06.05. 86
177	ETI/OHE/P/2523	B	Normal bent steady arm hook.	14.10. 92
178	ETI/OHE/P/2540	B	BFB steady arm assembly.	19.08. 70
179	ETI/OHE/P/2540-1	-	BFB steady arm assembly for tramway OHE (regulated).	09.06. 81
180	ETI/OHE/P/2541	E	BFB steady arm eye piece.	14.10. 92
181	ETI/OHE/P/2542	C	BFB steady arm swivel	04.04. 90
182	ETI/OHE/P/2550-1/2	L	Standard antiwind clamp.	11.03. 96
183	ETI/OHE/P/2550-3	E	Antiwind clamp for tramway type OHE(regulated)	11.03. 96
184	RE/33/P/2700	E	Vee suspension assembly	18.09. 84
185	RE/33/P/2701	C	Tramway Vee clamp swivel	18.09. 84
186	ETI/OHE/P/2710	-	Unequal Vee suspension assembly	04.12. 74

187	RE/33/P/2720	B	Double Vee suspension assembly	04.02. 66
188	RE/33/P/2721	C	Double Vee suspension top	18.09. 84
189	ETI/OHE/P/2730	A	Section insulator support clamp.	18.09. 84
190	ETI/OHE/P/2731	A	Section insulator support clamp part.	18.09. 84
191	RE/33/P/2750	A	Double 'Vee' adjuster clamp assembly	09.06. 66
192	ETI/OHE/P/3010	C	Double clevis assembly.	19.07. 88
193	ETI/OHE/P/3021	C	Mast fitting for hook insulator.	04.03. 05
194	TI/DRG/OHE/FTGFE / RDSO/00005/04/0	-	Mast fitting for hook insulator(Forged)	12.08. 04
195	TI/DRG/OHE/FTGFE / RDSO/00006/05/0	-	Modified BFB Steady arm assembly with 25 mm Drop bracket (ID-2306).	23.12. 05
196	ETI/OHE/P/3050	B	Stay arm/bracket chair.	11.03. 96
197	RE/33/P/3070	J	Mast bracket fitting assembly	11.03. 96
198	RE/33/P/3070-1	H	Mast bracket fitting assembly (150)	19.07. 88
199	RE/33/P/3070-2	D	Mast bracket fitting assembly (200)	19.07. 88
200	RE/33/P/3071	F	Mast bracket clevis	02.05. 79
201	RE/33/P/3071-1	B	Mast bracket clevis (forged)	17.03. 64
202	ETI/OHE/P/3072	A	Mast bracket clevis pin.	19.07. 88
203	RE/33/P/3073	D	Mast bracket swivel (150)	02.05. 79
204	RE/33/P/3074	E	Mast bracket swivel (200)	02.05. 79
205	ETI/OHE/P/3076	C	Standard backing angle.	11.3.9 6
206	RE/33/P/3100	G	Multiple cantilever extension	11.03. 96
207	ETI/OHE/P/3110	C	Register arm extension frame.	11.03. 96
208	RE/33/P/3120	H	Multiple cantilever cross arm assembly	11.03. 96
209	ETI/OHE/P/3121	A	Multiple cantilever cross arm.	01.04.

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210	ETI/OHE/P/3122	A	Multiple cantilevers cross arm clamp (200).	11.03. 96
211	ETI/OHE/P/3123	A	Multiple cantilevers cross arm clamp (280).	11.03. 96
212	ETI/OHE/P/3124	A	Multiple cantilevers cross arm clamp (300).	11.03. 96
213	ETI/OHE/P/3131	A	Adopter for single bracket on structures and dropped arm.	11.03. 96
214	ETI/OHE/P/3230	C	Anchor fitting assembly on rolled section.	11.03. 96
215	ETI/OHE/P/3231	C	Mast anchor fitting (welded).	11.03. 96
216	ETI/OHE/P/3231-2	C	Mast anchor fitting (welded) for cement concrete counter weight.	11.03. 96
217	ETI/OHE/P/3232	C	Mast guy rod fitting welded.	11.03. 96
218	ETI/OHE/P/3233	B	Mast anchor fitting (200)	11.03. 96
219	ETI/OHE/P/3234/5	B	Mast guy rod fitting (200)	11.03. 96
220	ETI/OHE/P/3236/7	B	Anchor backing angle and spacer	11.03. 96
221	ETI/OHE/P/3240	D	Anchor fitting assembly on 'K' series mast, TTC mast 'P' type portal upright	11.03. 96
222	ETI/OHE/P/3241-2	B	Anchor fitting assembly on 'K' series mast, TTC mast 'P' type portal upright (for cement concrete counter weight)	11.03. 96
223	ETI/OHE/P/3250	D	Anchor assembly on 'N' & 'O' type portal uprights.	11.03. 96
224	ETI/OHE/P/3250-A	-	Anchor assembly on 'N' & 'O' type portal uprights with (ISA 150x115x12)	24.05. 95
225	ETI/OHE/P/3260	G	Boom anchor assembly on 'N' & 'O' type portals	11.03. 96
226	ETI/OHE/P/3270	A	Anchor assembly on BFB portal upright	28.09. 88
227	ETI/OHE/P/3280	A	Anchor assembly on G Type portal upright	28.09. 88
228	ETI/OHE/P/3290	A	Anchor assembly on R Type portal upright	28.09. 88
229	ETI/OHE/P/3300	A	Clamps and plates for mounting of number plate on OHE structures.	18.03. 86
230	ETI/OHE/P/3310	-	Anchor fitting assembly on 'K' series, TTC masts & P type portal uprights (with ISA 150x115x12).	24.09. 93

231	ETI/OHE/P/3320	-	Anchor fitting assembly on TM series masts (with ISA 150x115x12)	10.11.94
232	ETI/OHE/P/3330	-	Clamp and plates for Mounting of number plates (retro- reflective type) on OHE structures.	10.03.98
233	TI/DRG/OHE/FTGNF / RDSO/00001/02/1	-	Terminal clamp (15 mm) compression type.	04.03.05
234	TI/DRG/OHE/FTGNF / RDSO/00002/02/1	-	Terminal clamp (19 mm) compression type.	04.03.05
235	TI/DRG/OHE/FTGNF / RDSO/00003/03/0	-	Feeder splice (150)	25.03.03
236	TI/DRG/OHE/FTGNF / RDSO/00004/03/0	-	Feeder splice sleeve.	25.03.03
237	TI/DRG/OHE/FTGNF / RDSO/00005/03/0	-	Feeder joint socket left.	25.03.03
238	TI/DRG/OHE/FTGNF / RDSO/00006/03/0	-	18mm Bus terminal clamp (Compression type).	27.11.03
239	TI/DRG/OHE/FTGNF / RDSO/00007/06/0	-	Parallel clamp (Dia 20 mm/18.75mm).	01.02.06
240	ETI/OHE/P/4001	A	Span wire clip (65)	10.03.92
241	ETI/OHE/P/4002	A	Span wire clip (130)	10.03.92
242	RE/33/P/4010-1	H	Cross span suspension clamp	28.09.98
243	RE/33/P/4011-1	E	Cross span suspension clamp clevis	01.05.79
244	RE/33/P/4012-1	D	Cross span suspension clamp part	01.05.79
245	RE/33/P/4013-1	C	Cross span suspension clamp crank	16.08.74
246	RE/33/P/4030	E	Steady wire clamp	28.09.88
247	RE/33/P/4031	C	Steady wire clamp part	19.09.84
248	ETI/OHE/P/4036	-	'U' bolt saddle.	30.01.73
249	RE/33/P/4080	D	Head span mast fitting assembly (200 mm)	13.08.74
250	RE/33/P/4090	C	Head span mast fitting assembly (250 mm)	13.08.74

251	RE/33/P/4100	E	Head span mast fitting assembly (300 mm)	28.09.88
252	ETI/OHE/P/4110	C	Head span mast fitting assembly (450 mm)	28.09.88
253	ETI/OHE/P/5000	B	Guy rod assembly	17.05.96
254	ETI/OHE/P/5001/5001-1	D	Anchor bolt	17.05.96
255	ETI/OHE/P/5001-3	C	Anchor bolt	17.05.96
256	ETI/OHE/P/5002	B	Guy rod stirrup.	4.04.90
257	ETI/OHE/P/5004/5/6-1	G	Guy rod dia 25mm.	17.05.96
258	ETI/OHE/P/5007-1	B	Anchor "V" bolt.	17.05.96
259	ETI/OHE/P/5008	B	Anchor loop.	17.05.96
260	ETI/OHE/P/5011	A	5 tonne buckle	19.09.85
261	ETI/OHE/P/5012	B	5 tonne eye bolt right.	11.04.89
262	ETI/OHE/P/5013	B	5 tonne eye bolt left.	11.04.89
263	ETI/OHE/P/5020	B	9 tonne adjuster	11.04.89
264	ETI/OHE/P/5020-1	-	9 tonne adjuster (eye and clevis type)	09.04.92
265	ETI/OHE/P/5020-2	-	9 tonne adjuster (double clevis type)	24.08.92
266	ETI/OHE/P/5021	A	9 tonne turn buckle.	19.09.85
267	ETI/OHE/P/5022	B	9 tonne eye bolt left	11.04.89
268	ETI/OHE/P/5023	B	9 tonne eye bolt right.	11.04.89
269	ETI/OHE/P/5024	-	9 tonne clevis bolt - Left.	09.04.92
270	ETI/OHE/P/5025	-	9 tonne clevis bolt - Right	24.08.92
271	ETI/OHE/P/5030	C	Anchor double strap assembly.	11.04.89
272	ETI/OHE/P/5040	B	18mm single clevis assembly	11.04.89
273	TI/DRG/OHE/FTGFE / RDSO/00001/00/0	-	18mm single clevis assembly modified	20.07.00

274	ETI/OHE/P/5060-2	C	Standard guide tube assembly.	17.05. 96
275	ETI/OHE/P/5064/65 /66	B	Details of guide tube attachment for trapezoidal counter weight.	17.05. 96
276	ETI/OHE/P/5064- 1/64-2	A	Guide tube bracket angle (welded) for attachment on BFB mast and portal (for trapezoidal counter weight).	17.05. 96
277	ETI/OHE/P/5090	C	Counter weight assembly.	24.08. 00
278	ETI/OHE/P/5090-1	D	Trapezoidal counter weight assembly.	24.08. 00
279	ETI/OHE/P/5090-3	F	Counter weight assembly (light).	24.08. 00
280	ETI/OHE/P/5090-4	F	Cement concrete counter weight assembly.	17.05. 96
281	ETI/OHE/P/5090-5	B	Counter weight assembly for regulating equipment (3:1)	24.08. 00
282	ETI/OHE/P/5090-6	B	Counter weight assembly (for tramway type OHE) (1250 kgf)	24.08. 00
283	ETI/OHE/P/5091	B	Cast iron base weight.	24.08. 00
284	ETI/OHE/P/5092/93	B	Counter weight piece.	24.08. 00
285	ETI/OHE/P/5094/95	F	Counter weight piece eye rod	04.04. 90
286	ETI/OHE/P/5128	A	Regulating rope and fitting.	10.04. 89
287	ETI/OHE/P/5163	C	Double eye distance rod (dia 20mm)	04.04. 90
288	ETI/OHE/P/5190-1	C	Compensating plate assembly.	22.07. 96
289	ETI/OHE/P/5190-2	C	Equalizing plate assembly.	22.07. 96
290	ETI/OHE/P/5191	B	Compensating plate.	22.07. 96
291	ETI/OHE/P/5191- 1/2	D	Compensating plate.	01.12. 94
292	ETI/OHE/P/5192	B	Equalizing plate.	22.07. 96
293	ETI/OHE/P/5192- 1/2	C	Equalizing plate (for WKRE)	01.12. 94
294	ETI/OHE/P/5193	B	Short equalizing plate.	22.07. 96
295	ETI/OHE/P/5194-1	-	Compensating plate assembly	01.12. 94
296	ETI/OHE/P/5195-2	A	Equalizing plate assembly	26.08.

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297	ETI/OHE/P/5220	F	Guy rod double strap assembly.	04.04. 90
298	ETI/OHE/P/5221/2	D	Guy rod double strap	04.04. 90
299	ETI/OHE/P/5300	H	Regulating equipment (winch type) 5:1 ratio.	26.06. 99
300	ETI/OHE/P/5311	B	Drum	25.06. 87
301	ETI/OHE/P/5312/15 / 21/31	D	Part detail of regulating equipment (winch type).	22.07. 96
302	ETI/OHE/P/5314/16 -1/17-1/23/24/33- 36	B	Part detail of regulating equipment (winch type.)	22.07. 96
303	ETI/OHE/P/5313/32	A	Axles	05.11. 84
304	ETI/OHE/P/5318	A	Drum anchor fitting	05.11. 84
305	ETI/OHE/P/5319-1	B	Arm anchor fitting	29.11. 84
306	ETI/OHE/P/5322	A	Clevis and eye	29.11. 84
307	ETI/OHE/P/5341	A	Stainless steel rope end fitting.	05.11. 84
308	ETI/OHE/P/5350-1	C	Limiting device for winch type regulating equipment (modified)	26.06. 98
309	ETI/OHE/P/5500- 1Sh.1	X	Regulating equipment three pulley type (3:1 ratio)	22.07. 96
310	ETI/OHE/P/5500- 1Sh.2	C	Details of regulating equipment (3:1 ratio)	22.07. 96
311	ETI/OHE/P/6000	C	Standard stay arm insulator for clean areas.	28.07. 04
312	ETI/OHE/P/6000-2	C	Stay arm insulator (for polluted zone).	28.07. 04
313	ETI/OHE/P/6001	A	Stay arm insulator tube cap.	28.07. 04
314	ETI/OHE/P/6002	-	Stay arm insulator hook cap.	17.12. 79
315	ETI/OHE/P/6003	-	Stay arm insulator hook.	17.12. 79
316	ETI/OHE/P/6020	A	Standard 9 tonne insulator for clean areas.	27.05. 86
317	ETI/OHE/P/6020-1	C	9 tonne insulator (for polluted zones).	27.05. 86
318	ETI/OHE/P/6021	-	9 tonne insulator cap.	17.12. 79

319	ETI/OHE/P/6030	B	Standard bracket insulator for clean areas.	27.05. 86
320	ETI/OHE/P/6030-1	C	Bracket insulator (for polluted zone).	27.05. 86
321	ETI/OHE/P/6031	-	Bracket insulator tube cap.	17.12. 79
322	ETI/OHE/P/6032	-	Bracket insulator standard cap.	17.12. 79
323	ETI/OHE/P/6060-1	A	Disc insulator assembly (socket type)	03.05. 79
324	ETI/OHE/P/6061-3	A	Disc insulator (255mm) (Ball and socket type).	02.06. 79
325	ETI/OHE/P/6061-3	A	Disc insulator (255mm) (clevis type)	09.05. 79
326	ETI/OHE/P/6068	B	Ball eye.	11.12. 92
327	ETI/OHE/P/6069	A	Socket eye	02.05. 79
328	ETI/OHE/P/6070	H	3 kV post insulator assembly.	17.05. 96
329	ETI/OHE/P/6070-1	-	11 kV post insulator.	22.07. 83
330	ETI/OHE/P/6075/6076	C	3Kv pedestal insulator cap clamp.	17.05. 96
331	ETI/OHE/P/6090	D	Post insulator assembly (with clamps)	17.05. 96
332	ETI/OHE/P/6090-1	C	Standard post insulator for clean areas.	27.05. 86
333	ETI/OHE/P/6094	B	Post insulator jumper clamp.	17.05. 96
334	ETI/OHE/P/6094-1	A	Post insulator jumper clamp (30mm) for 220 kV traction substations.	17.05. 96
335	ETI/OHE/P/6095	B	Post insulator bus bar clamp.	17.05. 96
336	ETI/OHE/P/6095-1	A	Post insulator bus bar clamp (50mm) for 220 kV traction substations.	17.05. 96
337	ETI/OHE/P/6100	B	Section insulator assembly.	24.05. 94
338	ETI/OHE/P/6110	A	Standard sectioning insulator for clean areas.	27.05. 86
339	ETI/OHE/P/6120	B	Contact wire end link assembly.	24.05. 94
340	ETI/OHE/P/6121	A	Contact wire end link body.	24.05. 94
341	ETI/OHE/P/6122-6125	B	Fasteners for section insulator assembly.	24.05. 94
342	ETI/OHE/P/6130	A	Section insulator cross beam assembly.	24.05. 94

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343	ETL/OHE/P/6131	A	Cross beam.	24.05. 94
344	ETL/OHE/P/6132/33	A	Fasteners for section insulator assembly.	24.05. 94
345	ETL/OHE/P/6140	A	Runner assembly.	24.05. 94
346	ETL/OHE/P/6141	A	Runner bracket.	24.05. 94
347	ETL/OHE/P/6142	A	Runner left.	24.05. 94
348	ETL/OHE/P/6143	A	Runner right.	24.05. 94
349	ETL/OHE/P/6150	A	Runner end contact wire ending clamp.	24.05. 94
350	ETL/OHE/P/6151	A	Runner end contact wire ending clamp part.	24.05. 94
351	ETL/OHE/P/6160	A	Insulator end contact wire ending clamp part.	24.05. 94
352	ETL/OHE/P/6161	A	Ending clamp part left (107).	24.05. 94
353	ETL/OHE/P/6162	A	Ending clamp part right (107)	24.05. 94
354	ETL/OHE/P/6170	C	Parallel clamp double contact wire.	24.05. 94
355	ETL/OHE/P/6180-1	A	Section insulator dropper assembly (without double strap).	24.05. 94
356	ETL/OHE/P/6180-2	A	Section insulator dropper assembly (with double strap).	24.05. 94
357	ETL/OHE/P/6181-1	D	Section insulator double strap assembly.	24.05. 94
358	ETL/OHE/P/6260	A	Standard operating rod insulator for clean areas.	27.05. 86
359	ETL/OHE/P/6310-1	B	(18mm) bus terminal (multiple bolt)	24.03. 05
360	ETL/OHE/P/6311-1	B	Bus terminal piece (multiple holes).	23.01. 87
361	ETL/OHE/P/6313	-	Bus terminal cone.	18.05. 77
362	ETL/OHE/P/6312/6314	A	Bus terminal cone socket and check nut.	23.01. 87
363	ETL/OHE/P/6320	A	18mm bus splice.	19.09. 84
364	ETL/OHE/P/6321	B	Bus splices body.	23.01. 87
365	RE/33/P/6330	C	18 mm bus tee joint.	23.01. 87

366	RE/33/P/6331	D	Bus tee body	23.01. 87
367	RE/33/P/6350	B	18 mm bus terminating tee	24.08. 74
368	RE/33/P/6351	B	Bus terminating tee body	26.03. 74
369	RE/33/P/6600	B	Double wire section insulator	27.02. 74
370	ETU/OHE/P/7000	E	Structure bonds.	04.10. 91
371	ETU/OHE/P/7011	-	Copper rivet dia 20x30.	04.01. 71
372	ETU/OHE/P/7020	B	Earthing station.	06.01. 76
373	ETU/OHE/P/7021	A	Earth electrode.	17.05. 96
374	ETU/OHE/P/7030	F	Longitudinal rail bond.	25.10. 89
375	RE/33/P/7040	E	Earth wire mast clamp	17.05. 96
376	RE/33/P/7050	O	Earth wire strain clamp	17.04. 89
377	RE/33/P/7501	F	Typical structure number plate (100 mm size)	19.04. 89
378	RE/33/P/7502	C	Typical structure number plate (75 mm size)	19.04. 89
379	ETU/OHE/P/7503	E	Typical structure number plate (retro reflective type) 125 mm sizes.	02.03. 06
380	ETU/OHE/P/7504	-	Typical structure number plate (125mm size).	25.01. 05
381	RE/33/P/7511	B	Typical isolator number plate	01.06. 79
382	ETU/OHE/P/7531	C	Caution plate 25000 volts ac.	25.05. 88
383	ETU/OHE/P/7541	A	Warning board (caution live wire)	27.02. 84
384	RE/33/P/7551	C	General caution notice at entrance to Railway station (Hindi and English)	10.12. 84
385	RE/33/P/7561	B	General caution notice for staff (Hindi and English)	27.02. 84
386	ETU/OHE/P/7572	B	Dead section caution board (electric engine stop).	17.04. 89
387	ETU/OHE/P/7573	A	Dead section caution board (caution unwired turnouts)	27.02. 84
388	ETU/OHE/P/7574	B	Dead section caution board (power block working limit).	10.12. 84
389	ETU/OHE/P/7575	A	Dead section caution board (danger).	27.02.

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390	ETI/OHE/P/7581	A	Caution for running staff (lowering panto)	27.02.84
391	ETI/OHE/P/7582	A	Caution board for running staff (raising panto)	27.02.84
392	ETI/OHE/P/8060	C	Medium super mast assembly.	20.04.79
393	ETI/OHE/P/8061	C	Medium super mast channel.	22.07.96
394	RE/33/P/8081	B	Pedestal insulator support clamp.	22.07.96
395	RE/33/P/8082	C	Pedestal insulator base support	22.07.96
396	ETI/OHE/P/8083/3-1	B	Post insulator base support on portal booms	22.07.96
397	ETI/OHE/P/8083-2	A	Post insulator base support on TTC booms.	22.07.96
398	ETI/OHE/P/8084/85/86	A	Small parts steel works for mounting of 3kV 11kV/ 25kV post insulator.	22.07.96
399	ETI/OHE/P/8087	A	Insulator mounting channel for connection of RC to track.	22.07.96
400	ETI/OHE/P/8091	A	Clamping plate and channel for connection of RC to rail.	22.07.96
401	ETI/OHE/P/8094/96	A	Supporting plate and wooden block for connection of RC to rail	22.07.96
402	ETI/OHE/P/9031/45	A	Mounting of 25 kV isolator on OHE structures (steel work details)	26.06.69
403	ETI/OHE/P/9047	A	bracket angle for attachment on fabricated mast K150, K175, K200, K225, TTC and P Type portal (for trapezoidal counter wt.).	22.07.96
404	ETI/OHE/P/9048	A	Guide tube bracket angle for attachment on G type portal (for trapezoidal counter wt.).	22.07.96
405	ETI/OHE/P/9049	A	Guide tube bracket angle for attachment on 6" x 6" BFB mast and BFB portal (for trapezoidal counter wt.).	22.07.96
406	ETI/OHE/P/9050/51	A	Guide tube bracket angle for attachment on fabricated mast K150, K175, K200, K225, TTC, P type and G type portal	22.07.96
407	ETI/OHE/P/9052/3/4/5	A	Guide tube support angle for attachment on fabricated mast K150, K175, K200, K225, TTC and on P and G type portal.	22.07.96
408	ETI/OHE/P/9070/1	B	Guy rod 20 mm	13.05.96

409	RE/33/302	B	Gilt sans medium letter and figure 3 inch	13.03.62
410	RE/33/347	B	Warning for neutral section	25.02.84
411	RE/33/348	B	Signals at neutral section for electric engines to switch off power	25.02.84
412	RE/33/349	B	Signals at neutral section for electric engines to switch on power	25.02.84
413	TI/DRG/OHE/NS/RD 50/00001/00/01	A	Signals at neutral section.	17.04.02
414	RE/33/350	B	Arrangement for fixing of danger board for limit of carriage wafering under OHE	16.10.59
415	RE/33/355	B	Warning for neutral section	25.02.84
416	RE/33/371	-	Men -working board for equipment	23.11.59
417	RE/33/411	-	Caution board for gang men	27.04.60
418	RE/33/436	C	Caution board for special locations	06.12.89
419	RE/33/493	-	General caution notice for staff (English and Oriya)	29.09.69
420	RE/33/527	A	Gillsons letters and figures	02.06.64
421	ETI/OHE/SK/22	-	Profile of grooved contact wire (107 mm ²).	25.06.72
422	ETI/OHE/SK/97	-	Suspension clamp for wolf conductor (without armour rod).	16.06.72
423	ETI/OHE/SK/99	-	Socket Eye.	16.06.72
424	ETI/OHE/SK/101	-	Bird guard.	09.08.72
425	ETI/OHE/SK/102	-	Number plate.	09.08.72
426	ETI/OHE/SK/103	-	Phase plate.	09.08.72
427	ETI/OHE/SK/104	-	Danger notice plate.	09.08.72
428	ETI/OHE/SK/105	-	Circuit plate.	09.08.72
429	ETI/OHE/SK/106	-	Anti climbing device.	09.08.72
430	ETI/OHE/SK/107	-	Earthing detail.	09.08.72
431	ETI/OHE/SK/534	C	Parallel clamp (large) compression type.	05.07.93
432	ETI/OHE/SK/535	B	Jumper clamp (large) compression type.	30.06.

433	ETU/OHE/SK/570	-	Typical arrangement of OHE with insulated copper catenary under over line structures.	93
434	ETU/OHE/SK/575	A	Parallel clamp (small) compression type.	18.09.91
435	ETU/OHE/SK/576	B	Jumper clamp (small) compression type.	05.07.93
436	TI/DRG/OHE/GUYR OD/RDSO/00001/0 7/0	-	Schedule Anchor Block for B.G. Tracks.	05.07.00
437	TI/DRG/OHE/GUYR OD/RDSO/00002/0 7/0	-	Double Guy Rod arrangement with Anchor block for B.G. track.	19.11.07
438	TI/DRG/OHE/GUYR OD/RDSO/00003/0 7/0	-	Schedule of Anchor Block for B.G. track block cotton soil.	19.11.07
439	TI/DRG/OHE/GUYR OD/RDSO/00004/0 7/0	-	Guy rod dia 25mm.	19.11.07
440	TI/DRG/OHE/FTGEE /RDSO/00007/1010	-	Standard Register Arm hook (O.D.38 mm)	01-01-10
441	TI/DRG/OHE/FTGFE /RDSO/00008/1010	-	Register Arm hook top	01-01-10
442	TI/DRG/OHE/FTGEE /RDSO/00009/1010	-	Register Arm hook bottom	01-01-10
443	TI/DRG/OHE/FTGEE /RDSO/00010/1010	-	Register Arm hook (O.D.49 mm)	01-01-10
444	TI/DRG/OHE/FTGEE /RDSO/00011/1010	-	Register Arm hook top	01-01-10
445	TI/DRG/OHE/FTGEE /RDSO/00012/1010	-	Register Arm hook bottom	01-01-10
446	TI/DRG/OHE/FTGEE /RDSO/00013/1010	-	Mast Bracket swivel (150)	01-01-10
447	TI/DRG/OHE/FTGEE /RDSO/00014/1010	-	Mast Bracket swivel (200)	01-01-10
448	TI/DRG/OHE/FTGEE /RDSO/00015/1010	-	25 mm steady Arm clamp	01-01-10
449	TI/DRG/OHE/FTGEE /RDSO/00016/1010	-	25 mm drop bracket assembly	01-01-10

Chapter - 1 – OVERHEAD EQUIPMENT

4. GENERAL ARRANGEMENT AND FITTINGS FOR COMPOSITE OHE (ALUMINIUM ALLOY CATENARY AND COPPER CONTACT WIRE)

1	ETU/OHE/G/02121 SH3	-	Schematic arrangement of uninsulated overlap for composite OHE	19.05.79	FOLDE 63
2	ETU/OHE/G/02121	-	Schematic arrangement of uninsulated	04.07.94	FOLDE

	SH5		overlap for composite OHE (Aluminium alloy catenary and copper contact wire)	
3	ETI/OHE/G/02131 SH2	A	Schematic arrangement of insulated overlap for composite OHE	25.09.87
4	ETI/OHE/G/02131 SH4	-	Schematic arrangement of insulated overlap for composite OHE (Aluminium alloy catenary and copper contact wire)	04.07.94
5	ETI/OHE/G/02141 SH2	-	General arrangement of regulated composite OHE at turnouts (overlap and crossed type)	19.05.79
6	ETI/OHE/G/03121 SH2	B	Standard termination of regulated composite OHE to suit different tension of conductor	29.03.84
7	ETI/OHE/G/03121 SH3	A	Standard termination of regulated composite OHE with equal tension (116 mm ² AAA catenary and 107 mm ² HDGC contact wire)	01.08.97
8	ETI/OHE/G/05101 SH2	B	In span jumper connection between A1 alloy catenary and copper contact wire	02.06.86
9	ETI/OHE/G/05102 SH2	B	Continuity jumper connection at uninsulated overlap for composite OHE	02.06.86
10	ETI/OHE/G/05103 SH2	B	Connections at turnouts for composite OHE	02.06.86
11	ETI/OHE/G/05104 SH2	B	Potential signaling connection at insulated overlap and neutral section for composite OHE	02.06.86
12	ETI/OHE/G/05106 SH2	C	Connections at diamond crossing for composite OHE	02.06.86
13	ETI/OHE/G/05121 SH3	-	General arrangement of connection to composite OHE by copper cross feeder.	22.04.94
14	ETI/OHE/G/05122 SH3	-	General arrangement of connection at switching station on double track section for composite OHE by copper cross feeder.	22.04.94
15	ETI/OHE/G/05123 SH3	-	General arrangement of connection at switching station on multiple track section (for composite OHE) by copper cross feeder.	22.04.94
16	ETI/OHE/G/05181 SH2	B	Assembly of section insulator for composite OHE.	24.05.94
17	ETI/OHE/G/00194	-	Adjustment chart for winch type regulating equipment for composite OHE.	27.10.87
18	ETI/OHE/P/1171-1	A	Double suspension clamp body for	26.03.84

			aluminium alloy catenary,	
19	ETI/OHE/P/1770	C	Raised register arm clamp(MCI)	16.02.88
20	ETI/OHE/SK/123	D	Parallel grooved clamp (14/9)	17.02.88
21	ETI/OHE/SK/130	D	Aluminium alloy catenary dropper clip (for all aluminium OHE)	15.06.89
22	ETI/OHE/SK/134	D	Catenary splice (cone type) Al. alloy catenary.	28.07.86
23	ETI/OHE/SK/176	D	Suspension clamp (MCI) for Al. alloy catenary	26.03.84
24	ETI/OHE/SK/205	B	Double suspension lock plate (MCI)	26.03.84
25	ETI/OHE/SK/231	C	Parallel groove clamp (18/14)	10.04.85
26	ETI/OHE/SK/285	C	Crimp type repair sleeve for AAA stranded catenary wire.	01.09.89
27	ETI/OHE/SK/333	D	Catenary dropper Clip assembly ignaling washer	15-06-89
28	ETI/OHE/SK/375	A	Span and stagger chart for composite OHE. (for 75 & 112.5 kgf wind pressure)	05.05.84
29	ETI/OHE/SK/436	B	Envelope type end fitting assembly for All Aluminium alloy stranded catenary wire (size 19/2.79 mm)	04.05.92
30	ETI/OHE/SK/449	-	Dropper schedule for regulated composite OHE equal encumbrances (1400/1400) for 1000/1000 kgf tension.	07.05.84
31	ETI/OHE/SK/450	-	Dropper schedule for uninsulated overlap spans of composite OHE.	07.05.84
32	ETI/OHE/SK/451	-	Dropper schedule for insulated overlap spans of composite OHE	07.05.84
33	ETI/OHE/SK/468	A	Aluminium catenary suspension clamp assembly (MCI)	10.04.85
34	ETI/OHE/SK/469	A	Double suspension clamp assembly (MCI) for Al. alloy catenary.	10.04.85
35	ETI/OHE/SK/479	-	Dropper schedule for compensated with unequal Encumbrance (1.4/0.9) for composite OHE	12.02.87
36	ETI/OHE/SK/480	-	Dropper schedule for compensated OHE with unequal encumbrance (1.4/0.75) for composite OHE	12.02.87
37	ETI/OHE/SK/591	-	Parallel groove clamp (19/14)	23-03-94

5. GENERAL ARRANGEMENT FOR LOADING MECHANISM

1	TI/DRG/OHE/COLLAP/ RDSO/0001/99/0	-	Special bracket for collapsible OHE.	23
2	TI/DRG/OHE/COLLAP/ RDSO/0002/99/0	-	General arrangement of fixing the special bracket assembly & suspension of contact wire.	23
3	TI/DRG/OHE/COLLAP/ RDSO/0003/99/0	-	General arrangement of suspension of contact wire (S) from existing bracket assembly of tram-way OHE.	24
4	TI/DRG/OHE/SWL/ RDSO/0004/08/0	-	Motorsised arrangement for collapsing the OHE.	03
5	TI/DRG/OHE/COLLAP/ RDSO/0005/99/0	-	General arrangement for collapsing the OHE.	25
6	TI/DRG/OHE/COLLAP/ RDSO/0006/99/0	-	General arrangement of fixing of conduit pipe on special bracket assembly & connection of wire rope.	26
7	TI/DRG/OHE/SWL/ RDSO/0007/08/0	-	General arrangement of Isolator connection to collapsible OHE.	03
8	TI/DRG/OHE/COLLAP/ RDSO/0008/99/0	-	Special stay arm insulator for collapsible OHE.	30
9	TI/DRG/OHE/COLLAP/ RDSO/0009/99/0	-	Special jumper clamp.	30
10	TI/DRG/OHE/SWL/ RDSO/00010/08/0	-	General arrangement (lay out plan) for the swiveling OHE.	03

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1. GENERAL ARRANGEMENT OF SUBSTATION, LAYOUT, SWITCHING STATION, BY, REMOTE CONTROL AND EARTHING ARRANGEMENT

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2	ETL/PS1/004	F	Typical General Arrangement of a three interrupter switching station	31.05 02
3	ETL/PS1/004-1	A	Simplified typical general arrangement of a three interrupter switching station by eliminating double pole isolator.	16.03 98

4	ETI/PSI/005	F	Typical location plan and general arrangement for sectioning and paralleling station.	21.05.02
5	ETI/PSI/005-1	A	Simplified location plan and general arrangement for sectioning and paralleling station by eliminating DP isolator.	16.03.98
6	ETI/PSI/006	E	Typical location plan and general arrangement for a feeding station	03.08.01
7	ETI/PSI/008	A	Outrigger arrangement	08.02.80
8	ETI/PSI/009	A	Typical location plan and general arrangement of a single interrupter switching station.	27.02.75
9	ETI/PSI/009-1	-	Simplified typical general arrangement of single interrupters switching station.	21.03.94
10	ETI/PSI/0010	E	Typical layout of remote control cubical at a switching station.	16.11.88
11	ETI/PSI/0011	-	Typical location plan and general arrangement of a single interrupter feeding station.	24.08.73
12	ETI/PSI/0012	-	Layout and general arrangement of sectioning and paralleling station at Baranagar (Sealdah Divn E Rly)	08.08.75
13	ETI/PSI/0016	A	General arrangement and terminal connection of 25kv PT type-1 at switching station	10.07.81
14	ETI/PSI/0018	-	Typical location plan and general arrangement for a feeding station.	19.03.84
15	ETI/PSI/0019	-	Typical general arrangement of a four interrupter switching station.	21.03.84
16	ETI/PSI/011	C	Typical general arrangement at a booster transformer station (without cross feeder), Type - I	07.09.80
17	ETI/PSI/011-I	A	Typical general arrangement at a booster transformer station (without cross feeder).	08.01.98
18	ETI/PSI/012	-	Typical general arrangement at a booster transformer station (without cross feeder) Type-II	24.12.70
19	ETI/PSI/013	B	Typical general arrangement at a booster transformer station (with 4- cross feeder), Type-III	30.05.81
20	ETI/PSI/013-I	A	Typical general arrangement at a booster transformer station (with cross feeder).	08.01.98
21	ETI/PSI/014	C	Typical general arrangement at a booster transformer station (with SP isolator and 4-cross feeder), Type-IV	26.05.81
22	ETI/PSI/015	-	Typical general arrangement at a booster transformer station (with 4 cross feeder), Type-V	21.07.75
23	ETI/PSI/016	A	Typical general arrangement at a booster	19.06.

			transformer station (without cross feeder and 42 kV lightning arrester) - Type - VI	86
24	ETI/PSI/017	-	280 kVA Booster transformer station Type - VII	27.11.87
25	ETI/PSI/018	A	General arrangement of 280 KVA Booster transformer station (Type III) with four cross feeder.	18.03.88
26	ETI/PSI/019	-	Typical general arrangement at a booster transformer station (for tramway type OHE)	12.04.94
27	TI/DRG/PSI/TSSLO/RDSO/00001/01/0	-	Typical layout of 132/27 kV traction substation (Type-I). (Letter dated 16.07.2014)	16.07.01
28	TI/DRG/PSI/TSSLO/RDSO/00002/01/0	-	Typical layout of 132/27 kV traction substation (Type - II).	16.01.02
29	TI/DRG/PSI/TSSLO/RDSO/00003/02/0	-	Typical layout of 132/27 kV traction substation (Type-III).	22.02.02
30	TI/DRG/PSI/TSSLO/RDSO/00004/02/0	-	Typical layout of 132/27 kV traction substation (Type-IV) with outgoing feeders and metering facilities.	17.05.02
31	TI/DRG/PSI/TSSLO/RDSO/00005/02/0	-	Typical layout of 132/27 kV traction substation (Type-V).	13.06.02
32	TI/DRG/PSI/TSSLO/RDSO/00006/02/0	-	Typical layout of 132/27 kV traction substation (Type-VI).	09.07.02
33	TI/DRG/PSI/TSSLO/RDSO/00007/02/0	-	Typical layout of 132/27 kV traction substation (Type - VII).	28.08.02
34	TI/DRG/PSI/TSSLO/RDSO/00008/02/0	-	Typical layout of 132/27 kV traction substation (Type-VIII).	27.11.02
35	TI/DRG/PSI/TSSLO/RDSO/00009/02/0	A	Typical layout of 132/27 kV traction substation with single transformer (Type IX).	16.12.02
36	TI/DRG/PSI/TSSLO/RDSO/00010/02/0	G	Typical layout of 132/25 kV traction substation with 132 kV switching station (Type - X).	30.12.02
37	ETI/PSI/022-1	B	Typical layout of 132/25 kV traction substation (Type-II).	23.03.94
38	TI/DRG/PSI/CROOM/RDSO/00001/01/0	-	Typical layout of control room at traction substation.	20.05.01
39	ETI/PSI/0212-1	-	Typical return current connection to buried rail at 132/25 kV traction substation	26.10.98
40	ETI/PSI/0213	A	General arrangement for 132 kV Railway switching station at Aligarh.	20.03.74
41	ETI/PSI/0215	B	Schematic layouts for different types of 132/25 kV traction substation.	21.09.83
42	ETI/PSI/0216	B	Arrangement for typical outdoor illumination of 132/25 kV traction substation.	12.08.83
43	ETI/PSI/0217	B	Typical arrangement of connection for 25 kV potential transformer with 36 mm O/D aluminium Bus bar.	22.12.79

44	ETI/PSI/0225	C	Typical general arrangement of earth screen wire termination at traction substation.	July 00
45	ETI/PSI/0226	B	Typical terminal arrangement for strung bus "SPIDER" (AAC) conductor at traction substation.	18.03.94
46	ETI/PSI/0226-1	A	Typical terminal arrangement for strung bus at traction substation with ZEBRA conductor.	18.03.94
47	ETI/PSI/0227	A	General arrangement and terminal connection for 25 kV PT (Type-II) at traction substation.	10.07.81
48	ETI/PSI/0227-1	-	General arrangement and terminal connection for 25 kV PT type-II (protection type) at 220 kV traction substation.	10.06.87
49	ETI/PSI/0233	-	Typical layout of 132/25kv traction substation showing 25kv feeder for yard / electric locomotive supply.	21.03.84
50	ETI/PSI/0235	A	Typical layout of 132/25kv Traction substation (with three transformer) Type-1	09.03.90
51	ETI/PSI/0237	-	Typical layout of 132/25kv Traction substation (with three transformers) Type-111.	30.05.86
52	ETI/PSI/0239	-	Typical layout of 132/25kv Traction substation (with three transformers) Type -v	05.06.86
53	ETI/PSI/0240	-	Typical layout of 220/25 kV traction substation Type-1	10.06.87
54	ETI/PSI/0240-1	-	Typical layout of 220/27kV traction substation type-1	
55	ETI/PSI/0242	A	Typical return current connection to buried rail at 220/25Kv traction substation.	15.11.87
56	ETI/PSI/0243	A	Typical termination arrangement for strung bus (ZEBRA, ACSR) conductor at 220 kV traction substation	18.03.94
57	ETI/PSI/0244	-	Typical general arrangement of earth screen wire termination at 220Kv traction substation	10.06.87
58	ETI/PSI/032	D	25kv drop out fuse assembly.	28.01.86
59	ETI/PSI/035	B	4 Pole 5 way rotary switches for colour light signaling and emergency load.	13.08.91
60	TI/DRG/PSI/AY/RSO/00001/02/1	-	Arrangement of Mounting 25Kv/240V, 50 kV LT Supply transformer.	18.01.05
61	ETI/PSI/037	C	Structural details for LT supply transformer T-150	30.09.86
62	ETI/PSI/038	C	25Kv dropout fuses switch details.	29.08.89
63	ETI/PSI/039	B	Operating pole for 25Kv dropout fuse switch.	28.01.86
64	ETI/PSI/0310	-	LV Box assembly for LT supplies transformer	08.05.

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65	ETI/PSI/0312	B	Mounting Arrangement of 100 KVA, 25 kV/240 V LT supply transformer at traction substation.	22.09.89.
66	ETI/PSI/101	B	Structural assembly for a feeding station.	15.02.85
67	ETI/PSI/102	B	Structural assembly for a sectioning and paralleling station.	15.02.85
68	ETI/PSI/103	B	Structural assembly for a three interrupter switching station.	15.02.85
69	ETI/PSI/104	E	Typical fencing and anticlimbing arrangement at switching station.	18.12.84
70	ETI/PSI/105	-	Structural assembly for feeding station (for five cross feeders)	21.03.84
71	ETI/PSI/106	A	Structural assembly for a four interrupter switching station.	21.03.84
72	ETI/PSI/111	A	Structural assembly for standard booster transformer station (without cross feeder - Type-I)	11.04.75
73	ETI/PSI/112	B	Structural assembly for a standard booster transformer station (without cross feeder type-II)	02.06.86
74	ETI/PSI/113	A	Structural assembly for a standard booster transformer station (with four cross feeder type-III)	02.06.86
76	ETI/PSI/115	-	Structural assembly for a standard booster transformer station (without cross feeder and 42 kV lightning arrester type - VI)	12.04.84.
77	ETI/PSI/121	F	Typical fencing layout at traction substation (details of fencing panel door and climbing device etc.)	05.03.91
78	ETI/PSU/201	B	Typical earthing layout of sub sectioning and paralleling station.	28.12.71
79	ETI/PSU/201-I		Typical earthing layout of 25 kV a.c. sub sectioning and paralleling station.	26-10-98
80	ETI/PSU/202	B	Typical earthing layout at a sectioning and paralleling station.	20.12.71
81	ETI/PSU/202-I		Typical earthing layout of 25 kV a.c. sub sectioning and paralleling station.	26-10-98
82	ETI/PSU/203	B	Typical earthing layout of a feeding station.	25.11.71
83	ETI/PSU/204	C	Earthing details for interrupter, LT supply transformer 25kV lightning arrester, PT type-1, S-100 mast, S-101 mast, fencing upright and main mast.	08.07.80
84	ETI/PSU/211-1	A	Typical earthing layout of a booster transformer station.	26.10.98

85	ETI/PSI/212	B	Typical earthing layout at a booster transformer station (with four cross feeder for type -111,1V and V)	21.01.75
86	ETI/PSI/222	A	Typical arrangement of an earth electrode at traction substation.	11.07.75
87	ETI/PSI/222-1		Typical arrangement of an earth electrode	26-10-98
88	ETI/PSI/224	E	Typical earthing, cable trench and foundation layout of 132/25kV traction substation.	01.03.85
89	ETI/PSI/228	A	Typical earthing arrangement for equipments and structures at traction substation.	30.09.62
89	ETI/PSI/229	-	Typical earthing cable trench & foundation layout of 132/25kV traction substation with shunt capacitor bay.	15.12.84
90	ETI/PSI/301	C	Typical cable run layout of a sub sectioning and paralleling station.	18.12.84
91	ETI/PSI/302	C	Typical cable run layout of a sub sectioning and paralleling station.	18.12.84
92	ETI/PSI/303	B	Typical cable run layout of a feeding station.	30.10.80
93	ETI/PSI/323	E	Typical details of cable run at a two transformer traction substation.	21.03.89
94	ETI/PSI/501	C	Typical drawing for a terminal board.	19.02.75
95	ETI/PSI/512	-	HV Bushing 38kV, 630 A with adjustable arcing horn	13.02.79
96	ETI/PSI/513	-	LV Bushing 3.6 kV, 630A.	13.02.79
97	ETI/PSI/514	-	Name, rating and terminal marking plate.	03.02.79
98	ETI/PSI/516	-	Details of transformer bushing/porcelain housing for BTs, PTs, ATs, CTs and Ls.	29.10.84
99	ETI/PSI/521	-	Typical general arrangement of 132kV double pole double break isolator with earthing blade assembly	30.05.79
100	ETI/PSI/5211	A	Cast ell type mechanical integral / interlock for 132kV isolator	09.07.81
101	ETI/PSI/5212	B	Scheme of locking /interlocking arrangement of 132kV isolator at traction substation.	17.03.87
102	ETI/PSI/5213	A	General arrangement of 25kv outdoor type CT.	04.02.81
103	ETI/PSI/5214	B	Scheme of interlocking arrangement for 25 kv circuit breakers at traction substations.	03.10.86
104	ETI/PSI/5215	-	Scheme of interlocking arrangement for 25 kv circuitbreaker at three transformer substation.	02.06.86

10 5	ETI/PSI/611	A	Existing and proposed arrangement for provision of rail links between RC and rail.	11.12. 85
10 6	ETI/PSI/623	B	Typical control desk.	12.08. 80
10 7	ETI/PSI/624	A	Schematic diagram of 132/25 kV traction substation showing scheme of interlocking of circuit breaker and isolators.	24.02. 84
10 8	ETI/PSI/628	A	Typical layout of zonal repair shop for PSI equipment.	17.06. 87
10 9	ETI/PSI/642	A	Miniature lamp 25V, 1W for use in discrepancy switch on the mimic diagram board in remote control center.	16.05. 85
11 0	ETI/PSI/651	-	Layout of 25 kV/415V emergency power supply equipment.	21.04. 82
11 1	ETI/PSI/704-I	-	Traction power supply arrangement for yard/electric loco shed.	17.04. 90
11 2	ETI/PSI/709	A	General scheme of supply for 25 kV ac traction system in Mumbai area after conversion from dc to ac.	10.10. 01
11 3	ETI/PSI/708	-	Typical earthing arrangement of an auxiliary transformer.	31.01. 94
11 4	ETI/PSI/SK/544	-	Castel and bolted type lock with common key for 25 kV ac single pole CB/interrupters.	18.03. 94
11 6	T1/GRG/PSI/MOTIS D/ 00002/06/0	-	Typical assembly of 25kV single and double pole Motorized Isolator.	18.08. 06
11 7	T1/GRG/PSI/ INTERLOCK/RDSO/ 00001/06/0	-	Scheme of interlocking arrangement of 25 kV circuit breaker at traction substation for MRVC.	07.08. 06

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2. GENERAL ARRANGEMENT OF SUBSTATION LAYOUT, SWITCHING STATION, BT, REMOTE CONTROL AND EARTHING ARRANGEMENT FOR 2 X 25KV 'AT' SYSTEM.

1	ETI/PSI/AT/0201	B	Typical layout of 220/2x 25 kV traction substations with scot-connected transformers (for double line section).	18.09.91	FOLDE 21
2	ETI/PSI/AT/0202	-	Typical layout of 132/2x25 traction sub-station with three single phase transformers for single line section (V connection type).	27.10.89	FOLDE 21
3	ETI/PSI/AT/0203	-	Typical layout of 132/2x25 kV traction sub-station with single phase transformer (for single line section).	27.10.89	FOLDE 21

4	ETI/PSI/AT/00101	A	Typical layout for sub-sectioning and paralleling post (SSP) in 2x25 kV 'AT' system (on double track section).	18.09.91
5	ETI/PSI/AT/00102	C	Typical layout for sectioning and paralleling post (SP) in 2x25 kV 'AT' system (on double track section).	17.02.92
6	ETI/PSI/AT/00103	A	Typical layout for sub-sectioning post in 2x25 kV 'AT' system (on single track section).	18.09.91
7	ETI/PSI/AT/00104	B	Typical layout for sectioning post in 2x25 kV 'AT' system (on single track section).	18.09.91
8	ETI/PSI/AT/00105	-	Typical layout for a Auto transformer post (on double track section)	23.10.90

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3. PROTECTION FOR 2 X 25 kV 'AT' SYSTEM

1.	ETI/PSI/AT/0204 SH-1/4	B	Protection scheme for scot connected transformer (2x 25 kV system).	29.09.93.
2.	ETI/PSI/AT/0204 SH-2/4	B	Differential protection for scot connected transformer (2 x 25 kV system).	29.09.93.
3.	ETI/PSI/AT/0204 SH-3/4	B	Protection scheme for single-phase transformer (2x 25 kV system).	29.09.93.
4.	ETI/PSI/AT/0204 SH-4/4	B	Protection scheme for 2x 25 kV OHE AT TSS.	29.09.93

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4.SHUNT CAPACITORS AND PROTECTION FOR 25 Kv ac TRACTION SYSTEM

1	ETI/PSI/024-1	-	Typical schematic diagram of protection for double transformer traction sub-station.	22.04.94.
2	ETI/PSI/0223	E	Typical layout for 25 kV shunt capacitor unit to be installed at 132/25kV traction substation type-I	23.12.97
3	ETI/PSI/0228-1	-	Typical schematic diagram of protection for single transformer traction substation	22.04.94
4	ETI/PSI/0231-1	A	High speed auto-reclosing scheme for feeder circuit breaker at 25 kV traction substation.	18.03.94.
5	ETI/PSI/0232	-	Schematic diagram of remote	25.07.83.

			controlled flasher arrangement at TSS and OHE masts opposite feeding post.	
6	ETI/PSI/034	A	Schematic power supply diagram for colour light signaling and other loads from 10kVA, 25 kV/240 V LT supply transformer.	04.05.73.
7	ETI/PSI/035-4	-	Out line general arrangement for control & distribution panel for colour light signaling with automatic change over facility (3 sources) for 25 kV ac traction system.	21.03.07
8	ETI/PSI/325	-	Typical details of cable run at a two transformer traction substation with shunt capacitor.	15.12.84
9	ETI/PSI/326	-	Typical details of cable run at a two transformer traction substation with shunt capacitor (220 kV)	10.06.87
10	ETI/PSI/642	A	Miniature lamp 25 kV, 1W for use in discrepancy switch on the mimic diagram board in remote control centre.	16.05.85
11	ETI/PSI/644	C	Schematic interconnection diagram for remote control of power gear and supervision of equipment at traction substation.	21.08.89.
12	ETI/PSI/645	C	Schematic interconnection diagram for remote control of power gear and supervision of equipments at controlled station. (SP and SSP).	21.08.89.
13	ETI/PSI/646	A	Miniature lamp 30 V, 40 Ma for use in discrepancy switch of telefonbau make on the mimic diagram board in remote control center.	16.05.81.
14	ETI/PSI/647	-	Control and relay panel for ac traction substation.	20.07.84.
15	ETI/PSI/648	A	Typical layout of remote control center.	30.04.85.
16	ETI/PSI/652	-	Typical layout of remote control center for computer based SCADA system.	06.09.90
17	ETI/PSI/SK/343	-	Typical schematic protection arrangement of shunt capacitor bank at traction substation.	17.02.94.
18	ETI/PSI/702-1	D	General Scheme of supply for 25 kV, 50 Hz, 1 phases traction system.	18.12.97
19	TI/ORG/PSI/RCC/00001/07/0	-	Fixing arrangement of mast Anchor fitting for Antifouling device in three pulleys (MOD) ATO.	

1.	ETL/PSI/P/6480	C	36 mm Aluminium bus terminal.	10.09. 86.
2.	ETL/PSI/P/6480-1	A	Expansion type terminal connector suitable for 36 mm aluminum tubular bus bar to suit 25 kV isolator terminal pad.	7.08.8 6.
3.	ETL/PSI/P/6480-2	-	50 mm Aluminium bus terminal.	04.06. 87.
4.	ETL/PSI/P/6480-3	A	Expansion type terminal connector suitable for 50 mm aluminum tubular bus bar to suit 25 kV isolator terminal pad.	26.04. 88.
5.	ETL/PSI/P/6481	C	36 mm Aluminium bus terminal.	10.09. 86.
6.	ETL/PSI/P/6482	C	Clamping piece.	10.09. 86.
7.	ETL/PSI/P/6482-1	C	Clamping piece for 36 mm flexible bus splice.	14.11. 86.
8.	ETL/PSI/P/6490	C	36 mm Aluminium bus splice.	10.09. 86.
9.	ETL/PSI/P/6490-1.	-	50 mm Aluminium bus splice.	04.06. 87.
10.	ETL/PSI/P/6491.	B	36 mm Aluminium bus splice body.	07.08. 86.
11.	ETL/PSI/P/6500.	C	36 mm Aluminium bus Tee connector.	14.12. 88.
12.	ETL/PSI/P/6500-1.	-	50 mm Aluminium bus tee connector.	04.06. 87.
13.	ETL/PSI/P/6501	B	36 mm Aluminium bus tee connector body.	10.09. 86.
14.	ETL/PSI/P/6510	D	36 mm Aluminium tee terminal.	10.09. 86.
15.	ETL/PSI/P/6510-1	-	50 mm Aluminium tee terminal.	10.06. 87.
16.	ETL/PSI/P/6511	C	36 mm Aluminium tee terminal body.	07.08. 86.
17.	ETL/PSI/P/6520	B	36/15 mm taps connector.	07.08. 86.
18.	ETL/PSI/P/6521.	B	36/15 mm taps connector body.	07.08. 86.
19.	ETL/PSI/P/6523	B	Clamping piece (small).	10.09. 86.
20.	ETL/PSI/P/6530	C	36/20 mm terminal connector.	07.08. 86.
21.	ETL/PSI/P/6531	D	36/20 mm terminal connector body.	13.01.

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22.	ETI/PSI/P/6540	A	Terminal connector for 25 kV PT with 36 mm Aluminium bus bar.	07.02.79
23.	ETI/PSI/P/6541	B	36 mm Aluminium bus bar connector body.	
24.	ETI/PSI/P/6550	B	36 mm Aluminium flexible bus splice.	13.11.86
25.	ETI/PSI/P/6550-1	-	50 mm Aluminium flexible bus splice.	22.05.87
26.	ETI/PSI/P/6551	C	36 mm Aluminium bus junction connector body.	13.11.86
27.	ETI/PSI/P/6552	C	36 mm Aluminium bus double sliding body.	13.11.86
28.	ETI/PSI/P/6553	C	Flexible joint.	13.11.86
29.	ETI/PSI/P/6560	B	36 mm Aluminium bus splice cum tee connector.	10.09.86
30.	ETI/PSI/P/6561	B	36 mm Aluminium bus splice cum tee connector body.	10.09.86
31.	ETI/PSI/P/6570	F	Flexible connector for 25 kV circuit breaker, 25 kV interrupter and 25 kV side of 13.5/20 MVA traction transformer.	18.11.86
32.	ETI/PSI/P/6580	B	36/20 mm taps connector.	07.08.86
33.	ETI/PSI/P/6580-1	-	50/20 mm taps connector.	04.06.87
34.	ETI/PSI/P/6581	B	36/20 mm taps connector body.	07.08.86
35.	ETI/PSI/P/6590	B	20 mm Aluminium bus bar tee connector.	07.08.86
36.	ETI/PSI/P/6591	B	20 mm Aluminium bus bar tee connector body.	07.08.86
37.	ETI/PSI/P/6592	D	Clamping piece for 20 mm spider connector.	10.09.86
38.	ETI/PSI/P/6800	F	Bimetallic terminal connector for 30 mm copper terminal stud and 20 mm spider AAC (RIGID TYPE).	10.09.86
39.	ETI/PSI/P/6830	F	Terminal connector suitable 20 mm spider "AAC" with terminal pad of 132 kV of isolator and 132 kV MOCB.	07.08.86
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42.	ETI/PSI/P/6831	D	Connector body for 20 mm "AAC" spider conductor.	10.09.86

43.	ETI/PSI/P/6841	D	Connector body for 30 mm copper terminal stud.	12.09.86
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45.	ETI/PSI/P/6850	D	Flexible bimetallic terminal connector assembly for 25 kV/100 KVA booster transformer.	10.09.86
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7	ETI/PSI/P/11070	B	Details of rigid type bimetallic terminal connector suitable for 50 dia aluminum tubular bus bar to suit 30 dia copper stud of 25 kV current transformers.	03.02.89
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9	ETI/PSI/P/11090	C	Rigid type bimetallic connector suitable for 50 dia aluminum tubular bus bar to terminal pad of 25 kV isolator/CT.	03.02.89
10	ETI/PSI/P/11100	E	Details of expansion type bimetallic terminal connector suitable for 50 dia aluminum tubular bus bar to suit 30 dia copper studs of 25 kV CT/BT/Traction power transformer.	04.10.90
11	ETI/PSI/P/11110	C	Rigid through connector to suit 50 dia aluminum tubular bus bar and	04.10.90

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13	ETI/PSI/P/11130	B	Inter connector suitable for 50 O/D aluminum tube and "SPIDER" AAC conductor (for 25 kV PT type-I).	03.02.89
16	ETI/PSI/P/11160	B	Tee connector to suit 50 O/D aluminum tube to 36 O/D aluminum tube (for 25 kV systems).	03.02.89
17	ETI/PSI/P/11170	C	Tee connector to suit 50 O/D aluminum bus bar and 15 O/D cadmium catenary (for 25 kV systems).	03.02.89
18	ETI/PSI/P/11180	B	Rigid bus splices connector to 50 O/D aluminum tube on both ways (for 25 kV systems).	03.02.89
19	ETI/PSI/P/11190	C	Sliding clamp for 50 mm O/D aluminum bus bar (For 25 kV systems).	03.02.89
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21	ETI/PSI/P/11210	D	Expansion bus coupler on S.I. to 50 O/D aluminum tube (for 25 kV systems).	04.10.90
22	ETI/PSI/P/11220	D	Expansion type terminal connector for 25 kV, 60 mm dia. Terminal stud for traction power transformer.	12.09.91
23	ETI/PSI/P/11230	C	Expansion type terminal connector for 25 kV, 30 mm dia. Terminal for traction power transformer.	04.10.90
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30.	ETI/C/0017 SH4	B	Detail of central piece of top boom (length 1.5, 3.0,4.5, 6.0, 7.5 & 9.0 m) standard 'O' type portal (rod laced)	4.03.91
31.	ETI/C/0017 SH5	C	Details of splicing and cover angles standard 'O' type Portal (rod laced)	4.03.91
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33.	ETI/C/0019/70 SH1	A	Three legged 'N' type portal (rod laced), general arrangement	6.08.88
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39.	ETI/C/0027 SH-1	B	Three legged 'BFB' portal, General arrangement	4.08.90
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51.	ETI/C/0077 SH-5	A	Two track cantilever structure (TTC-17), SPS details	4.03.91
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3. STRUCTURAL LAYOUT, STRUCTURES AND FOUNDATIONS FOR TRACTION SUB STATION.

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4.	ETI/C/0202	H	Details of tower T1.	15.05.01	FOLDED
5.	ETI/C/0203	G	Details of tower T2.	06.03.91	FOLDED
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19.	ETI/C/0217 SH-4	A	Lifting frame for 13.5 MVA transformer core in traction substation. Details of pavement and drains.	19.11.84
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21.	ETI/C/0220	-	Part layout of foundation and cable trench for shunt capacitor bay.	29.04.86
22.	ETI/C/0222	-	Line diagram of structural layout of 220/25 kV traction substation.	18.06.87
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			traction substation.	
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28.	ETI/C/0225 SH-2/2	-	Control room for traction substation RCC Details.	04.08.88
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30.	ETI/C/0227	-	Foundation for towers T2 and T2 Extension for 132/25 kV traction substation (For ZEBRA conductor).	01.08.88
31.	ETI/C/0228	-	Foundation for towers T1 Extension and T2 Extension for 132/25 kV (type VI substation for ZEBRA conductor).	01.08.88
32.	ETI/C/0300	E	Details of structure for 132 kV potential transformers.	06.03.91
33.	ETI/C/0310	G	Details of structure for 132 kV double poles Isolator.	05.03.91
34.	ETI/C/0320	E	Details of structure for 132 kV support insulator.	05.03.91
35.	ETI/C/0330	F	Details of structure for 132 kV current transformers.	05.03.91
36.	ETI/C/0340	F	Details of structure for 120 kV lightning arrester.	06.03.91
37.	ETI/C/0350	E	Details of structure for 132 kV triple pole Isolator	06.03.91
38.	ETI/C/0360	F	Details Of structure for 25 kV current transformer	06.03.91
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43.	ETI/C/0400	G	Details of structure for 132 kV double and triple poles MOCB.	05.03.91
44.	ETI/C/0410	B	Details of structure for 3000 kVA shunt capacitors.	06.03.91
45.	ETI/C/0420	B	Details of mounting structure for 25 kV single phases MOCB type TRE 36.12.	06.03.91
46.	ETI/C/0430	A	Structural details for mounting of 7.5 kV/132 V double pole RVT.	06.03.91

47.	ETI/C/0440	A	Foundation and details of structure for mounting of 100 kVA, 25 kV/230 V LT supply transformer at traction substation.	04.03.91
48.	ETI/SK/C/179	A	Details of structure for 66 kV DP Isolator.	05.12.88
49.	ETI/SK/C/180	C	Details of structure and foundation for 25 kV DP Isolator at traction substation.	04.03.91
50.	ETI/SK/C/183	A	Details of structure strengthening for 132 kV CT, LA and PT.	06.03.91
51.	ETI/SK/C/188	A	Strengthening of mounting structure for 132 kV CT, LA and PT.	05.03.91

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2	ETI/C/0031	D	Drilling schedule for S2 mast,	14.08.98
3	ETI/C/0033	D	Details of anchor beam for SP, SSP & FP.	05.03.91
4	ETI/C/0034 SH-1	K	Details of SPS for switching station	04.03.91
5	ETI/C/0034 SH-2	B	Details of bracing for switching and BT mast.	04.03.91
6	ETI/C/0034 SH-3	A	Details of SPS for switching station.	04.03.91
7	ETI/C/0036	E	Drilling schedule for 8"x 6"x 35 lbs RSJ masts 8.0 m long for BT station type 24.	14.08.98
8	ETI/C/0037	C	Details of SPS of outrigger for Switching station and BT stations.	05.03.91
9	ETI/C/0038	E	Details of precast cable trench for SWS station.	04.08.88
10	ETI/C/0040	E	Details of SPS for BT station.	04.03.91
11	ETI/C/0042	E	Drilling schedule for S-5 mast (11.4 m long).	14.08.98
12	ETI/C/0043	B	S-100 fabricated mast for Mounting LT supply transformer and dropout fuse switch at Switching station	04.03.91
13	ETI/C/0044	A	S-101 details of mast for Supporting Isolator inside Switching station.	04.03.91
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			(foundation, RCC slab, building plan and steel door).	
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5. ONE SUPER MAST AND SPS

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23.	ETI/C/0702 SH-3	B	Employment schedule for cantilever mast regulated OHE caty. 65/cu, cont.107/cu (WP 75 kgf/m ²). EW+ RC.	20.09.05
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92.	ETU/C/0743 SH-2	- Employment schedule for OHE Mast (9.5 m) for 2 X 25 kV composite OHE with (1000+1000) tension, wind pressure 112.5 Kg/m ² . (OHE+AT feeder), without EW and with extra setting.	07.02. 90
93.	ETU/C/0743 SH-3	- Employment schedule for OHE Mast (9.5 m) for 2 X 25 kV composite OHE with (1000+1000) tension, wind pressure 112.5 Kg/m ² .	07.02. 90

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94.	ETI/C/0743 SH-4	-	Employment schedule for OHE Mast (9.5 m) for 2 X 25 kV composite OHE with (1000+1000) tension, wind pressure 112.5 kgf/m ² . (OHE+AT feeder +EW) and with extra setting.	07.02.90
95.	ETI/C/0747 SH-1	-	Employment schedule for OHE mast (9.5 m), W.P 112.5 kgf/m ² copper OHE (cat. 65 mm ² , cont.150 mm ² F.B.) (1200 + 1200 with 3:1 regulating equipment), OHE only.	22.04.93
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97.	ETI/C/0747 SH-3	-	Employment schedule for OHE mast (9.5 m), W.P 112.5 kgf/m ² copper OHE (cat. 65 mm ² , cont.150 mm ² F.B.) (1200 + 1200 with 3:1 regulating equipment), OHE + RC.	22.04.93
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99.	ETI/C/0748	-	Employment schedule for OHE mast (9.5 m) WP 112.5 kgf/m ² copper OHE (caty. 65 mm ² , cont.150 mm ² F.B.) with (1200 + 1200) (overlap central location with higher setting).	22.04.93
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103	ETI/C/0755 SH-2	-	Employment Schedule for OHE mast (9.5 m) wind - 150 kgf/m ² cat- 65cu, cont-150 cu (FB) with (800+1200) kgf tension. OHE + EW.	24.03.95
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105	ETI/C/0755 SH-4	-	Employment Schedule for OHE mast (9.5 m) wind - 150 kgf/m ² cat- 65cu, cont-150 cu (FB) with (800+1200) kgf tension. OHE + EW + RC.	24.03.95
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107	ETI/C/0756 SH-2	-	with (800+1200) kgf tension. OHE only. Employment Schedule for OHE mast (9.5 m) wind - 75 kgf/m ² cat- 65cu, cont-150 cu FB with (800+1200) kgf tension. OHE + EW.	24.03. 95
108	ETI/C/0756 SH-3	-	Employment Schedule for OHE mast (9.5 m) wind - 75 kgf/m ² cat- 65cu, cont-150 cu FB with (800+1200) kgf tension. OHE + RC.	24.03. 95
109	ETI/C/0756 SH-4	-	Employment Schedule for OHE mast (9.5 m) wind - 75 kgf/m ² cat- 65 cu, cont-150 cu FB with (800+1200) kgf tension. OHE + EW + RC.	24.03. 95
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112	ETI/C/0757 SH-3	-	Employment Schedule for OHE mast (9.5 m) wind - 112.5kgf/m ² cat- 65 cu, cont-150 cu FB with (800+1200) kgf tension. OHE + RC.	24.03. 95
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16	14/07/2022	Specification No. TI/SPC/OHE/ POST/0101	Specification of Solid Core Porcelain Cylindrical Post Insulators for systems with nominal voltage of 66 kV, 110 kV, 132kV & 220kV	Specifications	
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34	27/06/2022	ETI/C/0184MOD-D	DrillingscheduleforS-9 mast(Length-9.4m)	Drawings	MOD-D
35	27/06/2022	ETI/C/0043MOD-C	S-100 Fabricated mastfor Mounting L.T. supply transformer and dropout fuse switch as switching station	Drawings	MOD-C
36	27/06/2022	ETI/C/0044MOD-B	S-101Detailsofmastfor supporting Isolators inside switching stations	Drawings	MOD-B
37	10/06/2022	ETI/C/0008 (Sheet-2) MOD-C	N-Type Portal RodLaced Details of Upright PART-A	Drawings	MOD-C
38	10/06/2022	ETI/C/0008 (Sheet-3) MOD-D	N-Type Rod Laced Portal Details of end Piece of top Boom PART-B (Nominal Lengths5380)	Drawings	MOD-D
39	10/06/2022	ETI/C/0008 (Sheet-3A) MOD-C	N-Type Rod Laced Portal Detail of end Piece of top Boom PART-B (Nominal Lengths5880)	Drawings	MOD-C
40	10/06/2022	ETI/C/0008 (Sheet-4) MOD-C	N-Type Portal Rod Laced details of Standard Central Pieces of top Boom (Nominal Length 1.5, 3.0, 4.5,6.0,7.5,9.0)	Drawings	MOD-C
41	10/06/2022	ETI/C/0008 (Sheet-5) MOD-D	N-TypePortaldetailsof Splicing & CoverAngles PART-D	Drawings	MOD-D

42	10/06/2022	ETI/C/0008 (Sheet-6) MOD-B	N-Type Portal Rod Laced Details of knee Bracing PART-E	Drawings	MOD-B
43	10/06/2022	ETI/C/0009/69 (Sheet-2) MOD-D	Two Track Cantilever structures (Details of Upright)	Drawings	MOD-D
44	10/06/2022	ETI/C/0009/69 (Sheet-3) MOD-C	Two Track Cantilever structures (Details of Knee Plate)	Drawings	MOD-C
45	10/06/2022	ETI/C/0009/69 (Sheet-4) MOD-D	Two Track Cantilever structures (Details of 5.5m Boom)	Drawings	MOD-D
46	10/06/2022	ETI/C/0009/69 (Sheet-5) MOD-D	Two Track Cantilever structures (Details of 8m Boom)	Drawings	MOD-D
47	02/06/2022	ETI/C/0011/69 (Sheet-2) MOD-D	Standard R-Type Portal Rod Laced Details of Upright PART-A	Drawings	MOD-D
48	02/06/2022	ETI/C/0011/69 (Sheet-3) MOD-E	Standard R-Type Portal Rod Laced Details of end Piece of top Boom PART-B Nominal Lengths 11.6m & 12.1m	Drawings	MOD-E
49	02/06/2022	ETI/C/0011/69 (Sheet-4) MOD-D	Standard R-Type Portal Rod Laced details of Central Piece of top boom PART-C Nominal Length 7.5m, 9.0m, 10.5m, 12.0m, 13.0m	Drawings	MOD-D
50	02/06/2022	ETI/C/0011/69 (Sheet-5) MOD-C	Standard R-Type Portal Rod Laced details of Splicing & Cover Angle PART-D	Drawings	MOD-C
51	02/06/2022	ETI/C/0011/69 (Sheet-6) MOD-D	Standard R-Type Portal Rod Laced Details of knee Bracing PART-E	Drawings	MOD-D
52	20/05/2022	ETI/C/0017/70 (Sheet-2) MOD-C	O Type Portal Rod Laced Details of Upright PART-A	Drawings	MOD-C
53	20/05/2022	ETI/C/0017/70 (Sheet-3) MOD-C	O Type Portal Rod Laced with 1 in 50 Camber (Detail of end Piece of top Boom) PART-B Nominal	Drawings	MOD-C

			Lengths(11048&10548).		
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54	20/05/2022	ETI/C/0017/70 (Sheet-4) MOD-C	O-Type Rod Laced Portal details of Central Piece of top boom PART-C (Nominal Length 1.5, 3.0, 4.5, 6.0, 7.5 & 9.0m).	Drawings	MOD-C
55	20/05/2022	ETI/C/0017/70 (Sheet-5) MOD-D	O-Type Portal details of Splicing & Cover Angle PART-D	Drawings	MOD-D
56	20/05/2022	ETI/C/0017/70 (Sheet-6) MOD-B	O-Type Portal Rod Laced with 1 in 50 Camber Details of knee Bracing PART-E	Drawings	MOD-B
57	27/04/2022	TI/SPC/OHE/ INS/0071	Technical Specification for Solid Core Porcelain Insulators for 25 KV A.C. 50Hz Single Phase Overhead Traction Lines	Specifications	
58	08/04/2022	ETI/C/0005/68 MOD-A	Chart for portal foundations	Drawings	MOD-A
59	08/04/2022	ETI/C/0063 MOD-C	Chart for portal foundations in dry black cotton soil (Safe bearing capacity 16500 kgf/m ²)	Drawings	MOD-C
60	29/03/2022	TI/SPC/OHE/ NETRA/0143	Broad Gauge OHE parameters recording cum test car (NETRA) at 160 Km/h for Electric Traction	Specifications	Revision-3 of NETRA Specification
61	17/03/2022	RDSO-TIOLKO (PSI)/53/2020	Ah capacity of battery bank for SSP/SP equipped with more than 8 numbers of interrupters/CB in 25KV ac traction	Instructions / SMIs	Ah capacity of battery at SSP/SP equipped with more than 8 numbers of interrupters/CBs
62	08/03/2022	ETI/OHE/G/01403 SHEET-1 (MOD-G)	SCHEDULE OF ANCHOR BLOCK FOR B.G. TRACKS	Drawings	MOD-G
63	08/03/2022	ETI/OHE/G/0014 4 (Sheet-3) (MOD-D)	Standard Drilling Schedule of OHE Masts 9.5m long RSJs and BFBs	Drawings	MOD-D
64	08/03/2022	ETI/C/0018- 2 MOD-F	9.5m Standard Traction Masts (Fabricated as per series)	Drawings	MOD-F

65	08/03/2022	ETI/C/0071MOD-F	9.5m Long Standard Traction Mast (fabricated with batten plates) â€”Bâ series	Drawings	MOD-F
66	08/03/2022	ETI/C/0076MOD-D	StandardArrangement of Supporting Cantilever on the Boom of Portals and TTC (to avoid Bird Nesting)	Drawings	MOD-F
67	08/03/2022	ETI/C/0056MOD-D	G-TypePortalSpecial UprightandEndPiece	Drawings	MOD-D
68	28/02/2022	TI/SPC/OHE/TOOLPL/0992	Specification for Gearless Hand Operated Pulling and Lifting Machine	Specifica- tions	Specificationfor TOOLPL
69	28/02/2022	TI/STR/007,Rev-02	STR for Gearless Hand Operated Pulling and Lifting Machine and Ratchet Lever Hoist (Pull-Lift)	Specifica- tions	STR for Gearless Hand Operated PullingandLifting Machine andRatchet LeverHoist (Pull-Lift)
70	07/02/2022	RDSO-TI0LKO (OHE)/25/2020-O/o PED/TI/RDSO	Review of periodicity of POH of Tower Wagon		rdsoletter
71	28/01/2022	RDSO-TI0LKO (OHE)/25/2020-O/o PED/TI/RDSO	Review of periodicity of POH of Tower Wagon	Instructions/SMIs	Review of periodicity of POH of Tower Wagon
72	14/01/2022	TI/DRG/PSI/AT/RDSO/00009/20/1 ModC	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (ForDoubleLinesection) withparalleltotrack.	Drawings	Mod.C
73	27/12/2021	TI/DRG/PSI/AT/RDSO/00051/21/0 MODA	TYPICALSYSTEMATIC DIAGRAM OF PROTECTION FOR 132/2*25 kV TRACTION SUB-STATION WITH SCOTT CONNECTED TRANSFORMERS	Drawings	

74	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00054/21/ 0	Tee Connector to suit BULL 'AAC' conductor and BULL 'AAC' conductor in 2X25kV system.	Drawings	
75	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00055/21/ 0	Rigid connector on S.I. to suit BERSISMIS (36mm Dia.) "AAC" conductor in 2X25kV system.	Drawings	
76	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00056/21/ 0	Rigid connector on S.I. to suit BULL (38.25mm Dia.) "AAC" conductor in 2X25kV system.	Drawings	
77	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00057/21/ 0	Flexible connector to suit 50MM O/D Al. Tube Bus bar for Double Pole circuit breaker and LV side of Traction transformer in 2X25kV system.	Drawings	
78	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00058/21/ 0	Rigid through connector to suit BERSIMIS (36mm Dia) "AAC" Conductor and SPIDER "AAC" conductor for 25 kV PT type II (T-Type)	Drawings	
79	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00059/21/ 0	Rigid through connector to suit BULL (38.25mm Dia) "AAC" Conductor and SPIDER "AAC" conductor for 25 kV PT type II (T-Type)	Drawings	
80	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00060/21/ 0	Tee Connector to suit 500/DAL Tube and "BERSISMIS" 'AAC' conductor in 2X25 kV system.	Drawings	
81	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00061/21/ 0	Tee Connector to suit 50 O/D Al. Tube and BULL 'AAC' conductor in 2X25 kV system.	Drawings	
82	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00062/21/ 0	Typical Termination arrangement for strung bus "BERSISMIS" (AAC) conductor in 2X25kV system.	Drawings	

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83	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00063/21/ 0	Typical Termination arrangement for strung bus "BULL"(AAC)conductor in2X25kVsystem.	Drawings	
84	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00064/21/ 0	Flexible connector to suit BULL (38.25 mm Dia.) "AAC" conductor for Double Pole circuit breaker and LV side of Tractiontransformerin 2X25kVsystem.	Drawings	
85	20/12/2021	ETI/PSI/P/11030 Mod.D	Bimetallic terminal Connector to suit ZEBRA (28.58mm Dia.) ACSR conductor &AL/CU Pad of isolator/CT/CB or 50mm O/D Al tube and AL/CU Pad of isolator/CT/CB.	Drawings	
86	20/12/2021	TI/DRG/PSI/ CONNECT/ RDSO/00053/21/ 0	Tee Connector to suit "BERSIMIS" 'AAAC' and "BERSIMIS" 'AAAC' in 2X25kVsystem.	Drawings	
87	16/12/2021	TI/SPC/OHE/ TOOLPL/0991	GEARLESS HAND OPERATEDPULLING ANDLIFTING MACHINES	Specifica- tions	REVISED
88	16/12/2021	TI/SPC/OHE/ TOOLPL/1991	RatchetLeverHoist (PULL-LIFTS)	Specifica- tions	REVISED
89	25/11/2021	TI/SPC/PSI/ INTRLK/0210	TECHNICAL SPECIFICATION FOR INTERLOCKS FORAC TRACTION SWITCHGEARS	Specifica- tions	
90	25/11/2021	TI/SPC/PSI/ DRWING/0210	TECHNICAL SPECIFICATION FORSTANDARDS DRAWING FOR POWER SUPPLY INSTALLATION	Specifica- tions	
91	19/11/2021	TI/DRG/PSI/AT/ RDSO/00049/21/0	Typical layout of cable trench, foundation & cable schedule of Switching station 2x25 kV ATSystem (for four line section).	Drawings	

92	19/11/2021	TI/DRG/PSI/AT/ RDSO/00052/20/0	Typical layout of cable trench, foundation & cable schedule of Sectioning and Paralleling Post (SP) in 2x25 kV AT System on Double line for Scott Connected Transformer TSS.	Drawings	
93	19/11/2021	TI/DRG/PSI/AT/ RDSO/00015/20/0 1 ModA	General arrangement of Subsectioning and Paralleling Post (SSP) in 2X25kV $\hat{A}T\hat{A}^{TM}$ System (on double line section) for Scott Connected Transformer TSS	Drawings	
94	19/11/2021	TI/DRG/PSI/AT/ RDSO/00016/20/0 1 ModA	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV $\hat{A}T\hat{A}^{TM}$ System (on double line section) for Scott Connected Transformer TSS	Drawings	
95	19/11/2021	TI/DRG/PSI/AT/ RDSO/00036/20/0 1 ModA	General arrangement of Sub sectioning and Paralleling Post (SSP) in 2X25kV $\hat{A}T\hat{A}^{TM}$ System (on double line section) for V-Connected Transformer TSS	Drawings	
96	19/11/2021	TI/DRG/PSI/AT/ RDSO/00037/20/0 1 ModA	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV $\hat{A}T\hat{A}^{TM}$ System (on double line section) for V- Connected Transformer TSS	Drawings	
97	19/11/2021	TI/DRG/PSI/AT/ RDSO/00017/20/0 1 ModA	General arrangement of Subsectioning and Paralleling Post (SSP) in 2X25kV $\hat{A}T\hat{A}^{TM}$ System (on three line section).	Drawings	
98	19/11/2021	TI/DRG/PSI/AT/ RDSO/00018/20/0 1 ModA	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV $\hat{A}T\hat{A}^{TM}$ System (on three line section).	Drawings	

99	19/11/2021	TI/DRG/PSI/AT/ RDSO/00019/20/0 1 ModA	General arrangement of Subsectioning and Paralleling Post (SSP) in 2X25kV ~AT~ System (on four line section).	Drawings	
100	19/11/2021	TI/DRG/PSI/AT/ RDSO/00020/20/0 1 ModA	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV ~AT~ System (on four line section).	Drawings	
101	19/11/2021	TI/DRG/PSI/AT/ RDSO/00021/20/0 1 ModA	General arrangement for Boundary Sectioning and Paralleling Post (SP) in 2X25kV ~AT~ System (on double line section) for Scott connected Transformer TSS.	Drawings	
102	19/11/2021	TI/DRG/PSI/AT/ RDSO/00022/20/0 1 ModA	General arrangement for Boundary sectioning & paralleling post (SP) in 2 x 25kV ~AT~ system (on 3 line section)	Drawings	
103	19/11/2021	TI/DRG/PSI/AT/ RDSO/00023/20/0 1 ModA	General arrangement for Boundary sectioning & paralleling post (SP) in 2 x 25kV ~AT~ system (on 4 line section)	Drawings	
104	19/11/2021	TI/DRG/PSI/AT/ RDSO/00050/21/0 1 ModA	General arrangement for Boundary Sectioning & Paralleling post (SP) in 2x 25kv "V-connected" at system (on Double line section)	Drawings	
105	17/11/2021	TI/SPC/OHE/ Fittings/0130(10/1 3) rev.1	Technical Specification for 25kV A.C. OHE fittings	Specifi- cations	
106	15/11/2021	TI/DRG/PSI/AT/ RDSO/00009/20/ 1 ModB	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Double Line section) with parallel to track.	Drawings	

107	15/11/2021	TI/DRG/PSI/AT/ RDSO/00010/20/ 1 ModB	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Double Line section) with perpendicular to track.	Drawings	
108	15/11/2021	TI/DRG/PSI/AT/ RDSO/00030/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Three Line section) with parallel to track.	Drawings	
109	15/11/2021	TI/DRG/PSI/AT/ RDSO/00031/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	
110	15/11/2021	TI/DRG/PSI/AT/ RDSO/00032/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with parallel to track.	Drawings	
111	15/11/2021	TI/DRG/PSI/AT/ RDSO/00033/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with perpendicular to track.	Drawings	
112	15/11/2021	TI/DRG/PSI/AT/ RDSO/00024/20/ 1 ModB	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Double Line section) with parallel to track.	Drawings	
113	15/11/2021	TI/DRG/PSI/AT/ RDSO/00025/20/ 1 ModB	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Double Line section) with perpendicular to track.	Drawings	

114	15/11/2021	TI/DRG/PSI/A T/ RDSO/00038/ 20/1 ModA	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (ForThreeLine section) withparallelto track.	Drawings	
115	15/11/2021	TI/DRG/PSI/A T/ RDSO/00039/ 20/1 ModA	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	
116	15/11/2021	TI/DRG/PSI/A T/ RDSO/00040/ 20/1 ModA	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) withparallelto track.	Drawings	
117	15/11/2021	TI/DRG/PSI/A T/ RDSO/00041/ 20/1 ModA	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with perpendicular to track.	Drawings	
118	02/11/2021	TI/DRG/PSI/ TRCSFD/ RDSO/00048/2 1/0	Typical layout of cable trench, foundation & cable schedule of 132/2x25 kV traction sub - station with connected transformers (for four line section) with perpendicularto track	Drawings	
119	02/11/2021	TI/DRG/PSI/A T/ RDSO/00034/ 20/1 ModA	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Double Line section)withparallel to track.	Drawings	
120	02/11/2021	TI/DRG/PSI/A T/ RDSO/00035/ 20/1 ModA	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (ForDouble Line section) with perpendicularto track.	Drawings	

121	02/11/2021	TI/DRG/PSI/AT/ RDSO/00011/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with parallel totrack.	Drawings	
122	02/11/2021	TI/DRG/PSI/AT/ RDSO/00012/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub StationwithV-Connected Transformers (For ThreeLinesection)with perpendiculartotrack.	Drawings	
123	02/11/2021	TI/DRG/PSI/AT/ RDSO/00013/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Four Line section) with parallel totrack.	Drawings	
124	02/11/2021	TI/DRG/PSI/AT/ RDSO/00014/20/ 1 ModA	Typical layout of 132/2X25kV traction Sub StationwithV-Connected Transformers (For FourLinesection)with perpendiculartotrack	Drawings	
125	02/11/2021	TI/DRG/PSI/ TRCSFD/ RDSO/00047/21/ 0	Typical layout of cable trench, foundation &cable schedule of 132/2x25 kV traction sub - station with Scott connected transformers (for four line section) with parallel to track	Drawings	
126	02/11/2021	TI/DRG/PSI/AT/ RDSO/00042/20/ 1 ModA	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Double Linesection)withparallel totrack.	Drawings	
127	02/11/2021	TI/DRG/PSI/AT/ RDSO/00043/20/ 1 ModA	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (ForDouble Line section) with perpendiculartotrack.	Drawings	

128	02/11/2021	TI/DRG/PSI/AT/ RDSO/00026/20/ 1 ModA	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with parallel to track.	Drawings	
129	02/11/2021	TI/DRG/PSI/AT/ RDSO/00027/20/ 1 ModA	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	
130	02/11/2021	TI/DRG/PSI/AT/ RDSO/00028/20/ 1 ModA	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Four Line section) with parallel to track.	Drawings	
131	02/11/2021	TI/DRG/PSI/AT/ RDSO/00029/20/ 1 ModA	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Four Line section) with perpendicular to track.	Drawings	
132	25/10/2021	TI/SPC/PSI/ LTDPNL/0210	Low tension distribution panels for traction sub-station, sub-sectioning & paralleling post, Sectioning & paralleling post	Specifications	
133	27/09/2021	TI/DRG/PSI/SLD/ RDSO/00045/21/0	General scheme of supply for 2x25 kV, 50 Hz Scott connected traction transformer traction system.	Drawings	
134	27/09/2021	TI/DRG/PSI/SLD/ RDSO/00046/21/0	General scheme of supply for 2x25 kV, 50 Hz V-connected traction transformer traction system.	Drawings	
135	23/09/2021	TI/DRG/PSI/AT/ RDSO/00042/20/01	General arrangement for Boundary sectioning & paralleling post (SP) in 2x 25 kV 'at' system (on double line section).	Drawings	

136	23/09/2021	TI/DRG/PSI/AT/ RDSO/00023/20/01	General arrangement for Boundary sectioning & paralleling post (SP) in 2 x 25kV ATsystem(on 4linesection)	Drawings	
137	23/09/2021	TI/DRG/PSI/AT/ RDSO/00022/20/01	General arrangement for Boundary sectioning & paralleling post (SP) in 2 x 25kVâ~ATâ™system(on 3linesection)	Drawings	
138	23/09/2021	TI/DRG/PSI/AT/ RDSO/00021/20/01	General arrangement for Boundary Sectioning and Paralleling Post (SP) in 2X25kVâ~ATâ™System (ondoublelinesection).	Drawings	
139	23/09/2021	TI/DRG/PSI/AT/ RDSO/00020/20/01	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV â~ATâ™ System (on four linesection).	Drawings	
140	23/09/2021	TI/DRG/PSI/AT/ RDSO/00019/20/01	General arrangement of Subsectioningand Paralleling Post (SSP) in 2X25kVâ~ATâ™System (onfourlinesection).	Drawings	
141	23/09/2021	TI/DRG/PSI/AT/ RDSO/00037/20/01	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV â~ATâ™ System (on double line section) for V- ConnectedTransformer TSS	Drawings	
142	23/09/2021	TI/DRG/PSI/AT/ RDSO/00036/20/01	General arrangementof Sub sectioning and Paralleling Post (SSP) in 2X25kV â~ATâ™ System (on double line section)forV-Connected TransformerTSS	Drawings	
143	23/09/2021	TI/DRG/PSI/AT/ RDSO/00016/20/01	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV â~ATâ™ System (on double line section) forScottConnected TransformerTSS	Drawings	

144	23/09/2021	TI/DRG/PSI/AT/ RDSO/00015/20/01	General arrangement of Subsectioning and Paralleling Post (SSP) in 2X25kV ~AT~ System (on double line section) for Scott Connected Transformer TSS	Drawings	
145	23/09/2021	TI/DRG/PSI/AT/ RDSO/00016/20/01	General arrangement of Sectioning and Paralleling Post (SP) in 2X25kV ~AT~ System (on double line section) for Scott Connected Transformer TSS	Drawings	
146	23/09/2021	TI/DRG/PSI/AT/ RDSO/00017/20/01	General arrangement of Subsectioning and Paralleling Post (SSP) in 2X25kV ~AT~ System (on three line section).	Drawings	
147	23/09/2021	TI/DRG/PSI/AT/ RDSO/00042/20/01	General arrangement for Boundary sectioning & paralleling post (SP) in 2x 25 kV ~v-connected" 'at' system (on double line section).	Drawings	
148	13/09/2021	TI-DRG-PSI-AT- RDSO-00044-21-0	TYPICAL SCHEMATIC DIAGRAM OF PROTECTION FOR 220/2*25 kV TRACTION SUB-STATION WITH V-CONNECTED TRANSFORMERS	Drawings	
149	13/09/2021	TI-DRG-PSI-AT- RDSO-00043-21-0	TYPICAL SYSTEMATIC DIAGRAM OF PROTECTION FOR 132/ 2*25 kV TRACTION SUB-STATION WITH SCOTT CONNECTED TRANSFORMERS	Drawings	
150	13/09/2021	RDSO-TIOLKO (PSI)/71/2020	Problem faced with working of M/s Megawin make CB and BM	Instructions/ SMIs	Draining of battery at SSP/SP

151	01/09/2021	TI/DRG/PSI/AT/ RDSO/00041/20/1	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with perpendicular to track.	Drawings	
152	01/09/2021	TI/DRG/PSI/AT/ RDSO/00040/20/1	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with parallel to track.	Drawings	
153	01/09/2021	TI/DRG/PSI/AT/ RDSO/00039/20/1	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	
154	01/09/2021	TI/DRG/PSI/AT/ RDSO/00038/20/1	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Three Line section) with parallel to track.	Drawings	
155	01/09/2021	TI/DRG/PSI/AT/ RDSO/00025/20/1	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Double Line section) with perpendicular to track.	Drawings	
156	01/09/2021	TI/DRG/PSI/AT/ RDSO/00024/20/1	Typical layout of 220/2X25kV traction Sub Station with Scott Connected Transformers (For Double Line section) with parallel to track.	Drawings	
157	01/09/2021	TI/DRG/PSI/AT/ RDSO/00033/20/1	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with perpendicular to track.	Drawings	
158	01/09/2021	TI/DRG/PSI/AT/ RDSO/00032/20/1	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Four Line section) with parallel to track.	Drawings	

159	01/09/2021	TI/DRG/PSI/AT/ RDSO/00031/20/1	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	
160	01/09/2021	TI/DRG/PSI/AT/ RDSO/00030/20/1	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (ForThreeLineSection) withparallelto track.	Drawings	
161	01/09/2021	TI/DRG/PSI/AT/ RDSO/00010/20/1	Typical layout of 132/2X25kV traction Sub Station with Scott Connected Transformers (ForDoubleLineSection) with perpendicular to track.	Drawings	
162	30/08/2021	TI/SPC/PSI/ HVCB/0121 with A&C Slip No. 1	Specification for 220KV, 132KV,110KV,100KV, 66KV and 50 kV Double Pole, Triple Pole Outdoor SF6 Circuit Breaker for Indian Railway.	Specifi- cations	WithA&C slip no. 1
163	25/08/2021	TI/SPC/PSI/ ERTHNG/0210	Technical Specification For Earthing of Power Supply Installations of 25kV & 2X25kV, AC 50Hz,TractionSystem	Specifi- cations	This specification supersedes the specification no.ETI/ PSI/120 (02/91)with A&C slip no.01
164	04/08/2021	TI/DRG/PSI/AT/ RDSO/00029/20/1	Typical layout of 220/2X25kV traction Sub StationwithV-Connected Transformers (For FourLineSection)with perpendicularto track.	Drawings	

165	04/08/2021	TI/DRG/PSI/AT/ RDSO/00028/20/1	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Four Line section) with parallel to track.	Drawings	
166	04/08/2021	TI/DRG/PSI/AT/ RDSO/00027/20/1	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	
167	04/08/2021	TI/DRG/PSI/AT/ RDSO/00026/20/1	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with parallel to track.	Drawings	
168	04/08/2021	TI/DRG/PSI/AT/ RDSO/00043/20/1	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Double Line section) with perpendicular to track.	Drawings	
169	04/08/2021	TI/DRG/PSI/AT/ RDSO/00042/20/1	Typical layout of 220/2X25kV traction Sub Station with V-Connected Transformers (For Double Line section) with parallel to track.	Drawings	
170	04/08/2021	TI/DRG/PSI/AT/ RDSO/00014/20/1	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Four Line section) with perpendicular to track.	Drawings	
171	04/08/2021	TI/DRG/PSI/AT/ RDSO/00013/20/1	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Four Line section) with parallel to track.	Drawings	
172	04/08/2021	TI/DRG/PSI/AT/ RDSO/00012/20/1	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with perpendicular to track.	Drawings	

173	04/08/2021	TI/DRG/PSI/AT/ RDSO/00011/20/1	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Three Line section) with parallel to track.	Drawings	
174	04/08/2021	TI/DRG/PSI/AT/ RDSO/00035/20/1	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Double Line section) with perpendicular to track.	Drawings	
175	04/08/2021	TI/DRG/PSI/AT/ RDSO/00034/20/1	Typical layout of 132/2X25kV traction Sub Station with V-Connected Transformers (For Double Line section) with parallel to track.	Drawings	
176	04/08/2021	TI/SPC/PSI/ AUTOTR/0091	Specification for 150 MVA 220/132kV Three Phase oil immersed type Autotransformer	Specifications	This specification superseded the specification no. TI/SPC/ PSI/AUTO-TR/0090
177	29/07/2021	TI/SPC/PSI/200-250/ CHGR/0210	Technical Specification for battery charger for 110 Volt battery, 200/250 Ah at Traction Sub-station for 25kV / 2x25 kV electric traction installation	Specifications	
178	29/07/2021	TI/SPC/PSI/40-150/ CHGR/1210	Technical Specification for Battery charger for 110 Volt battery, 150 Ah (for 2x25 kV) and 40Ah (for 25kV) at SP/ SSP for electric traction installation	Specifications	
179	29/07/2021	TI/SPC/RCC/ SCADA/0133	Technical Specification for Supervisory Control and Data Acquisition System for 25kV and 2x25 kV Single Phase 50Hz ac Traction Power Supply	Specifications	Effective from 29.01.2022

180	29/07/2021	TI/MI/0048 Revision 1	Maintenance Instructions for Provision of Disconnector Assembly to the Lightning Arresters provided over 25 kV side of traction system on Indian Railways	Instructions/ SMLs	form.a.[lease
181	23/07/2021	TI/SPC/PSI/ PROTCT/7101	Technical specification for Control and Relay Panel Including Numerical type protection relays for Scott-connected/V-Connected Single-Phase Traction Transformers, OHE protection, 55 kVAT Protection & Shunt Capacitor Bank Protection for 2x25 kV Traction Sub-station, Sectioning and Paralleling Post, Sub-Sectioning & Paralleling Post and Auto Transformer Post	Specifications	Specification of control and relay panel for 2x25KV ac Trac- tion- Effective from 19.01.2022
182	19/07/2021	TI/SPC/PSI/ LVGIS/0210	Technical Specification for 25kV Gas Insulated Switchgear (GIS) for AC Traction System of Indian Railways	Specifications	
183	19/07/2021	TI/SPC/PSI/ HVGIS/0210	Technical Specification for 220kV, 132kV Gas Insulated Switchgear (GIS) for AC Traction System of Indian Railways	Specifications	
184	13/07/2021	TI/STR/019 (Revision-1)	Schedule of Infrastructure Requirements for Approval of Vendors for supply, manufacture, testing and quality control of Current Transformer	Specifications	
185	29/06/2021	TI/SPC/OH E/ NETRA/014 0 (07/2019)R ev2	Technical Specification for Shunt Capacitor & Series Reactor equipment for 2X25kV Feeding System	Specifications	This specification - supersedes the specification no.ETI/PSI/126(08/1989) with A&C slip no.01 to 03

186	29/06/2021	TI/SPC/OHE/ NETRA/0140 (07/2019)Rev 2	Technical Specification for Shunt Capacitor & Series Reactor equipment for 2X25kV Feeding System	Specifi- cations	This specifi- cations supersedes the specifi- cation no.ETI/ PSI/126(08/1989) with A&C slip no.01 to 03
187	25/06/2021	TI/SPC/PSI/PT/0210	TECHNICAL SPECIFICATION FOR 220kV OR 132kV OR 110kV OR 66kV or 25kV POTENTIAL TRANSFORMER	Specifi- cations	This specification supersedes the specification No.TI/ SPC/PSI/ PTs/0990
188	22/06/2021	TI/SPC/PSI/ TRNPWR/3201	Specification for 13.5/18.9MVA, 21.6/30.24MVA, 30/42MVA & 40/56MVA Single Phase Traction Power Transformer	Specifi- cations	Page 006A supersedes the spec-PSI/TRNPWR/3200 with A&C slip no.01, ETI/PSI/118(10/93) with A&C slip no.01 to 11, TI/SPC/ PSI/30TRN/2070 with A&C slip no. 01, TI/SPC/PSI/30TRN/1050 with A&C slip no.01 & 02 and ETI/PSI/163 wit h A&C slip no. 01 to 04
189	21/06/2021	TI/SPC/PSI/CT/0210	TECHNICAL SPECIFICATION FOR CURRENT TRANSFORMERS WITH CT RATIO OF 220 kV, 400- 200/5A & 200-100/5A 132kV, 800-400/5A & 400-200/5A 110kV, 800- 400/5A & 400-200/5A 66kV, 1200-600/5A & 800-400/5A 50kV, 1500- 750/5A & 200/5A 25kV, 3000-1500/5A, 1600-800- 400/5A, 1500-750/5A, 1000-500/5A, 400- 200/5A & 100-50/5A 11kV, 500/5A	Specifi- cations	This specifi- cations supersedes the earlier specification No.ETI/ PSI/36(05/75), ETI/ PSI/90(06/95), ETI/ PSI/117(7/88), ETI/ PSI/145(03/92) & ETI/ PSI/147(03/92)
190	07/06/2021	TI/DRG/PSI/ CR2X25/ SPSSPATP/021 0	Typical Layout of Control Room Building in 2x25 kv SP/SSP/AT Post.	Drawings	for Switching post in 2X25kV system

191	27/05/2021	TI-DRG-PSI-CR2X25-RDSO-0210	Typical layout of control Room Building in 2X25kV Traction Substation.	Drawings	
192	23/02/2021	ETI/C/3(5/83)Rev.-1	Technical specification for spraying zinc coating on OHE Masts for railway electrification	Specifications	
193	23/02/2021	TI/SPC/CIV/POR/0080(08/2008) Rev.-1	Corrosion resistance paint system for outdoor structure of traction distribution and traction rollingstock	Specifications	
194	03/02/2021	TI/SPC/PSI/AUTOTR/1200	Specification for 8MVA,12.3MVA& 16.5MVA-55/27.5kV Autotransformer of 2X25kV System	Specifications	
195	03/02/2021	TI/SPC/PSI/TRNPWR/5200	Specification of Scott Connected 54MVA & 60/84/100MVATraction Power Transformer of 2X25kV System	Specifications	
196	03/02/2021	TI/SPC/PSI/TRNPWR/4200	Specification of Single Phase Dual LV 21.6MVA &38/53/63MVATraction Power Transformer of 2X25kV System	Specifications	
197	20/01/2021	TI/SPC/OHE/STRIP(Al-Cu)/0901	Technical Specification for BIMETALLIC (ALUMINIUM-COPPER) STRIP	Specifications	This specification is revision of the Specification No. ETI/ OHE/55(4/90)
198	18/01/2021	TI/SPC/OHE/JMP/0941	Technical Specification for Annealed Stranded Copper Conductors for Jumper Wire for Electric Traction	Specifications	This specification is revision of the Specification No. ETI/ OHE/3(2/94)
199	08/01/2021	TI/SPC/OHE/CCC/0871	Technical Specification for Continuous Cast Copper Wire Rods	Specifications	This specification is revision of the Specification No. ETI/ OHE/65(8/87)
200	04/01/2021	TI/SPC/OHE/CAT(Cu-Cd)/0971	Technical Specification for Cadmium Copper Conductors for Over Head Electric Traction	Specifications	This specification is revision of the Specification No. ETI/ OHE/50(6/97)

201	01/01/2021	TI/SPC/OHE/ CW/0971	Technical Specification for Hard Drawn Grooved Copper Contact Wire (Drawn out of Continuous Cast Copper wire rods)	Specifi- cations	This spec- ification is revision of the Specifi- cation No. ETI/ OHE/76(6/97)
202	14/12/2020	TI/SPC/OHE/ HDCSCF/0031	Technical Specification for Hard Drawn Stranded Copper Conductor	Specifi- cations	This specifi- cation is revision of the Specifi- cation No. TI/ SPC/OHE/ HDCSCF/0030
203	24/11/2020	TI/IN/0043Rev.0	PSI Guidelines for increasing speed potential to 160 kmph on NDLS_- HWH & NDLS- BCT Routes	Instructions / SMIs	
204	23/10/2020	TI/IN/0042	OHE Guidelines for increasing speed potential to 160 kmph on NDLS_- HWH & NDLS- BCT Routes	Instructions / SMIs	
205	26/02/2020	TI/SMI/0032Rev.02	SETTING UP EARTHING STATION AT SWITCHING POSTS (SSP & SP) WITH CONVENTIONAL EARTHING SYSTEM	Instructions / SMIs	Rev.02
206	20/01/2020	TI/MI/0059	Prevention of bird faults and melting/flashing of catenary wire under suspension clamp	Instructions / SMIs	
207	08/01/2020	TI/SPC/PSI/ TRNPWR/3200	Technical specification for 13.5/18.9MVA, 21.6/30.24MVA & 30/42MVA Single Phase Traction Power Transformer	Specifi- cations	effec- tive from 01.04.2020
208	18/11/2019	RE/33/P/1160RevK	Suspension Clamp	Drawings	Suspension Clamp Including Packing Saddle
209	11/11/2019	TI/SPC/OHE/ MRI/0140Rev.01	Technical Specification for Measuring and Recording Instrumentation to be Retrofitted on 5-Wheeler Tower Cars	Specifi- cations	W.E.F. 11.11.2019
210	05/11/2019	TI/DRG/PSI/TSSLO/ RDSO/00013/19/00	Layout and General arrangement 132/25kV Traction Sub-Station	Drawings	with reduced area

211	02/11/2019	TI/IN/0040Rev0	Cleaning Instruction for 25 kV Composite Insulator	Instructions / SMIs	Cleaning Instruction for 25 kV Composite Insulator
212	31/10/2019	TI/SPC/OHE/SPOLT/0140Rev.1	Self-propelled Over-Head-Equipment-Laying-Train for Broad Gauge (1676 mm) Routes of Indian Railways	Specifications	
213	08/07/2019	TI/SPC/OHE/TIPS/1030,REV.1	Specification for infrared imaging system for stationary installation	Specifications	Rev.1
214	25/06/2019	TI/SPC/OHE/3PHTATD/050	Checklist for maintenance of 25 kV Porcelain & Composite insulators	Instructions / SMIs	Checklist for Insulators
215	30/05/2019	TI/SPC/PSI/NCLR/0190	Technical Specification for Numerical Control Logic Relay (NCLR) and Control Panel for Automatic Phase Switching Section (APSS) for 25 kV Single Phase 50 Hz AC Traction Power Supply System of Indian Railway	Specifications	
216	15/05/2019	TI/SPC/RCC/DCADA/0130 (Rev.02)	Technical Specification for Supervisory Control and Data Acquisition System for 25kV Single Phase 50Hz Traction Power Supply	Specifications	with A&C slip no.03
217	14/05/2019	TI/SPC/PSI/LVCBIN/0120 (Dec,2013)Rev.0	25kV Single Pole, Double Pole, Pole Mounted Outdoor Vacuum circuit Breaker and Vacuum Interrupter for Indian Railway	Specifications	With A&C Slip No. 1 & 2
218	26/04/2019	TI/REPORT/OHE/2019/00132	Failure Analysis of 25 kV Solid Core Porcelain Insulators used in IR	Reports	Failure Analysis of 25 kV Solid Core Porcelain Insulators used in IR
219	31/12/2018	ETI/OHE/SK/588 REV.B	EYE RO D D R A W I N G 1.8 METER FOR 800KG COUNTER WEIGHT ASSEMBLY	Drawings	

NOTE:-

1. Please refer ACTM-Vol.II (Part-II) Chapter –II -Section-III for list of “Standard Drawings of Overhead equipment”.
2. Above drawings can be purchased from the office of CEE/CORE/ALD on payment of their costs.
3. Any amendment in specification and drawings subsequent to LOA, if required to be carried out shall need approval of **Dy.CEE/GS/SC** duly considering the financial implication of the same either in upward or downward direction.

ANNEXURE-X**UNIT QUANTITIES OF FINISHED WIRES AND CONDUCTORS FOR VARIOUS WORKS**

Wire/ Conductor	Applicable linear density Kg/m	No. Sch- 1	Bare unit requirement per unit of work (m.)	Allowance for erection per unit of work returnable as scrap (m.)	Total requirement per unit of work (col.4&5)	Remarks
1	2	3	4	5	6	7
Contact wire (107 sq.mm)	0.9512	6(a) 6(b) 6(c) 6(d) 10 12(a) 31(g) 12(c)	1005.0 1005.0 1005.0 1005.0 0.5 4.0 3.0 4.0	5 5 5 5 - - - -	1010.0 1010.0 1010.0 1010.0 0.5 4.0 3.0 4.0	
Cadmium copper catenary wire (65 sq.mm)	0.5973	5(a)(ii) 6(a) 10 12(C) 15(a) * 31(g)	1.0 1005.0 0.5 0.65 0.5 3.0	- 5 - - - -	1.0 1010.0 0.5 0.65 0.5 3.0	
19/7/1.25 (160 sq.mm) copper CONDUCTOR (large jumper)	1.504	15(d)	As required	-	As required	
37/2.25 mm (150 sq.mm) copper conductor (feeder wire)	1.3335	7(e)	1010	10	1020.0	
Cadmium copper wire (130)(tail feeder/large span)	1.1692	4(b)(iv) 5(a)(ii)* 6(a)* 6(d) 6(a)(v)	4.5 1.0 As required As required	- - - -	4.5 As required As required As required	
All aluminium conductor (spider)	0.6520	7(a) 7(b)	1010.0 2020.0	10 20	1020.0 2040.0	

Wire/ Conductor	Applicable linear density Kg/m	No. Sch- 1	Bare unit requirement per unit of work (m.)	Allowance for erection per unit of work returnable as scrap (m.)	Total requirement per unit of work (col.4&5)	Remarks
1	2	3	4	5	6	7
Large Jumper(105) (Conventional /Tramway) Large Jumper 105 sq.mm)	0.982	10 15(a)(i)*	4.0/1.25 6.0	- -	4.0/1.25 6.0	
Cadmium copper bridle wire	0.2187	6(c)	8.5	-	8.5 per bracket	
Small jumper (50 sq.mm)	0.4352	4(b)(i) 4(b)(ii) (iii) &(iv) 6(a) 10 +15(a)	4.5 4.5 6.0 1.6 1.6	- - - - -	4.5 4.5 6.0 1.6 1.6	
Dropper wire (5mm)	0.1746	5(b) 5(c) 6(a)&(d)1 2 (a)&(d) 12(b) 31(a) 31(g) 6(c)	1.5 1.5 180.0 5.0 6.0 10.0 10.0 As required	- - 20 - - 2 2	1.5 1.5 200.0 5.0 6.0 12.0 12.0	
Dropper wire (7mm)	0.341	4(a)(I) 4(a)(v) 12(c)	1.8 1.8 0.80	0.2 0.2 -	2.0 2.0 0.80	
19/2.1(65 sq.mm) PVC catenary wire	-	15(c) 15(e)	AS required	-	As required	
19/2.29mm al alloy catenary	0.320	6(d)	1005	10	1015	

* see note 4

NOTE :

- Col.4 of the above table indicates the bare unit requirement of the various types of wire and conductors for various items of schedule-1. This concludes allowance for sag wherever required.
- Col.5 of the above table indicates the permissible allowance for the erection which should be left over with the contractor and should be returned to the purchaser in the form of scrap on completion of work incase these items are supplied by the purchaser. Such working allowance has been indicated on the assumption that all wire and conductors shall be made available in tailor made lengths as shall be indicated by the contractor to suit individual employment and, further, that the actual supplies shall be made in the serial order as will be indicated by the contractor. Should the purchaser be unable to supply the conductor as per above on account of which drums of a length longer than the ones desired by the contractor shall have to be erected, then such, extra length as shall result from the difference of the length of the drums actually employed and length of the drums ordered by the contractor shall be considered over and above the quantities admitted as allowances for section under column 5. Such extra length shall, in addition, be considered and shall be returned to the purchaser in the form of scrap.

3. Col.6 of the above table indicates the total quantities of wires and conductors to be supplied to the contractor by the purchaser, free of cost incase these items are made railway supply (annexure IV). Such quantities do not take into account extra quantities which may be used on account of note 2 above and quantities damaged which shall be allowed for over and above the quantities indicated in Cl.6.
4. Whenever cadmium copper wire (130) is required against 5(a) (ii), the quantity of cadmium copper wire (65) against this will be correspondingly reduced whether the jumper wire is supplied by the purchaser or the contractor.
5. When copper wire (130) is required against 6(a), the quantities of cadmium copper wire (65) and contact wire (107) against this will be correspondingly reduced whether the jumper wire is supplied by the purchaser or the contractor.
6. Whenever antitheft jumper is provided against 15(a), the length of jumper used shall be calculated depending on the setting distance of the anchor structure.
7. Whenever large jumper(105) is employed against 15(a), the requirement of cadmium copper wire (65) shown against this will not be permissible and vice-versa.
8. Whenever anti-creep is of the boom anchor type, catenary (cadmium copper) wire against 15(a) shall be 2 meters instead of 0.5 meters.
9. The above unit requirement of quantities is for preparing utilisation statement of Non-SOR (Schedule-B) items payment to the extent of quantity used in SORs (Schedule-A) as erection.

Annexure –XI

LIST OF ADRESSES

ADDRESSES : The list of addresses, to which correspondence, documents and other matters relating to the contract, should be sent is as under :-

i) For all Policy, Contractual and Commercial matters :-

- 1) The Principal Chief Electrical Engineer, S.C RAILWAY, Secunderabad - 500 071

ii) For Security Deposit and performance guarantee:

1. The Dy.CEE/GS/SC of South-Central Railway

iii) For matters relating to particular design and working drawing :-

- 1) The Dy.CEE/GS/SC of South Central Railway

iv) For matters relating to basic design and drawings for fittings, components equipments and proto type tests :-

- 1) The Director General (TI),Research Designs & Standard Organization, Manak Nagar, Lucknow - 226001.
- 2) Principal Chief Electrical Engineer, Indian Railways (CORE)/Allahabad.

v) Matters relating to progressing of field work, scheduling of quantities and submission of bills :-

- 1) The Dy.CEE/GS/SC of South Central Railway
- 2) Concerned Assistant Divisional Electrical Engineer, Maint, looking of Gati Shakti (Secunderabad Division) of South-Central Railway

vi)CLARIFICATIONS :

Any clarification required by the Tenderer may be obtained from the "Dy.CEE/GS/SC (Secunderabad) of South Central Railway"

vii) For matters pertaining to issue of materials on loan to contractor :

- Dy.CEE/GS/SC (Secunderabad) of South Central Railway.



Research Designs & Standards Organization
(Traction Installation Directorate)

Table-I

OHE SPAN CHART
OHE: 65/107 Sq. mm. Tension: 1000/1000 kgf. Permitted
Contact Wire Position Limit: 800 mm
(Calculated based on M/s RITES Manual, Volume-IV, Chapter - 1)

Sl. No.	Section	Basic Wind Speed	Designed Wind Pressure	Maximum permissible Span for 65/107 OHE (metres)
		(m/Sec)	(kg/m ²)	1000/1000 kgf Tension
1.	Nallapadu -Guntakal	50/44	178/136	54/58.5
2.	Wadi -Guntakal	39	105	67.5
3.	Gooty-Dharmavaram	39/33	105/73	67.5/72
4.	Guntur-Tenali doubling	50	178	54
5.	Vijayawada-Mechillipatnam-Gudivada-Bhimavaram-Narsapur-Nidadavolu	50 50 50 50 50	178 178 178 178 178	54
6.	Guntakal-Bellary	39/33	105/73	67.5/72
7.	MMTS Phase II-HYB suburban section.	44	136	58.5
8.	Guntakal-Kalluru (under M.M.)	39	105	67.5
9.	Kazipet-Vijayawada Patch tripling	44/50	136/178	58.5/54
10.	Peddampet-Mancherla Patch tripling (Major section: KZJ - BPQ)	44	136	58.5

Note : (i) Displacement of OHE caused by mast deflection due to wind: 0 as reverse deflection of mast provided initially during erection.
(ii) Depression of track due to low joints : 0

[Signature]
7.8.2013

SPECIAL CONDITIONS OF CONTRACT

2.1 USE OF LADDER TROLLEY/CRANES:

No ladder trolleys will be arranged for erection of OHE arrangements. The contractor shall make his own arrangements for carrying out installation of traction over head equipment. The contractor shall arrange road cranes with jib of required length for transporting and loading of the catenary wires and expenses of crane shall be borne by the contractor.

In case the contractor fails to bring his own Ladder Trolley Railway will loan Ladder Trolley. Hiring charges for ladder trolley and tower car will be advised as per the extant instructions of the Headquarters. The hire charges will be levied on hourly basis from the time of starting of work at site to completion of work at site. Any damage to ladder trolley, tower car or other tools and plants so supplied by Railways, contractor has to be make good at the contractor's cost at the time of return.

2.2 RAILWAY SUPPLY:

Normally no material will be supplied by the Railway to the Contractor against Schedule items except mentioned in this para.

In order to speed up the work within the target, the required material for the work will be loaned to the contractor if available for execution of work. The loaned material shall be return back to the purchaser before taking final bill otherwise, recovery will be made from contractor's bill as per standard procedure adopted by the purchaser. The loaned materials will be supplied at concerned OHE depot. Necessary transport required for movement of materials to the work site shall have to be arranged by the contractor. The necessary Contact and Catenary wire will be supplied by the Railways at the nearest OHE depot, the contractor should make his own arrangement for transportation to the site for execution of the work.

If any material not included in the schedule/supply in contractual portion/quantum of work which is required for execution will be supplied by Railways at the nearest depot.

2.3 The tenderer should make his own arrangements for erection of OHE masts, stringing of OHE etc., if any. No wiring/material train/crane will be supplied by Railways.

2.4 POWER BLOCK WORKING – PROTECTION OF MEN WORKING:

- 2.4.1 Railway will arrange only power block for the works related to power block depending on the traffic and other conditions. The contractor shall ensure the removal of men and material before cancellation of power block. The contractor shall have to take full advantage of available power block by employing adequate staff for getting the maximum possible work done during the available block period. For adhering to target date of completion, the contractor may have to work during night time under power block for which the contractor is not entitled for any additional

payments other than those to be paid under Item No.32 of the price schedule-A on SOR Items

- 2.4.2 The contractor shall take all precautions necessary to protect staff working under him or his sub contractor. The contractor shall treat all other lines live except the line under Power block. He should ensure execution of work under the supervision of a competent person to carry out the work in electrified areas. Unless the adjacent lines are also under power block, voltage and currents will be induced in the line under power block. To protect against these induced voltages and currents, earth discharge rods are to be provided. Care should be taken by the contractor that these discharge rods are intact and not disturbed by his staff. He shall also ensure that none of the staff working under him shall work/reach beyond safe working limits
- 2.4.3 Under all conditions the contractor shall have to arrange protection of his staff against traffic. He shall have to also take all necessary precautions to guard against any possible obstructions to traffic during working by providing necessary guy while erection/dismantling of structures, coverage of excavated foundation pits with sand filled bags to keep free of stacked materials from obstructions to traffic etc.,
- 2.4.4 At the end of each power block work the contractor shall ensure removal of all men and material and no work inclusive of OHE should be left out in a state of obstruction to running of trains and the OHE should be made fit for electric traffic, failing which Railway will remove such obstructions and the Contractor will be liable to pay cost of such removal.
- 2.4.5 If the contractor fails to execute and to work within the time of power block granted, Railway shall be at liberty to take action and recover penalty for availing additional power block in accordance with standard practice of the Railway. The contractor shall in consultation with the - Railway submit a weekly power block programmed for work, 7 days in advance of the commencement of work.
- 2.5 The Engineer reserves the right to alter the scope of work and special conditions as well to drop portion of the work within the time of tendering and awarding the contract.
- 2.6 The contractor shall be prepared to carry out the work at any other specified locations depending up on the requirement, as directed by the Railway officials at site.
- 2.7 If there is any conflict between special conditions and the general conditions of the contract, the conditions laid down in special conditions will be sustained.
- 2.8 **APPROVED SUPPLIERS AND THEIR ADDRESSES**

Before ordering the equipment, the successful tenderer shall seek approval from Dy.CEE/GS/SC, Secunderabad regarding the latest list of approved suppliers for the equipments.

2.9 ELECTRICAL SUPPLY:

If any power is required during the process of execution, the contractor has to make his own arrangements and no power supply will be arranged by the Railways at the site of work.

2.10 QUALITY OF MATERIALS AND QUALITY CONTROL:

2.10.1 All materials used in the execution of the contract shall be of the best quality and of the class most suited for the purpose specified, components, assemblies and equipments to be procured/purchased from proven source, chosen from the approved list based on RDSO/CORE approved suppliers. The work shall also confirm to the following acts, rules and standard codes of practice.

i) I.S.S.

ii) RDSO specification.

All the equipments/ materials covered by this contract shall comply with the technical specifications (can be pursued in the office of Dy.CEE/GS/SC Secunderabad, S.C. Railway during office working hours) to tender documents and relevant I.S.S. as referred to therein in all respects and shall be adequate to perform the duties for which they are designed.

2.10.2 All erection work shall be of the best quality to the entire satisfaction of the Railways the contractor shall ensure that the equipments and services under the scope of this contract, whether manufactured or assembled within the contractor's premises or at his sub-contractor's premises or at the Railway's site or at any other place, or satisfactorily in accordance with the provisions of this contract. For this purpose, the contractor shall adopt necessary quality assurance Program me to control such activities at all sites.

2.10.3 The contractor has to procure all the materials from the vendors given in the latest approved list of RDSO/CORE.

2.11 The contractor shall have to take all precautions to prevent possible electrical accidents due to proximity of adjacent live OHE always in live condition, unless otherwise a power block is granted on the adjacent line. The contractor shall also take all precautions to protect his staff working on the line against traffic (running of trains) on the working lines/adjacent lines.

2.12 INSPECTION:

2.12.1 All the equipments, materials, fittings etc., shall be subjected to inspection by RITES/Railways. The inspection Officer(s) for this contract shall be

nominated by the Railway. Insulators have to be tested by the Railway's representative before erection. The consignee can further check the items after receipt at his depot inspite of RITES/RDSO inspection. RITES inspection charges will be borne by the Railways.

- 2.12.2 The contractor shall provide, without any extra cost to the Railway all materials, equipments, tools, labour and maintenance of every kind with necessary testing facilities which the Railway or the inspecting officer may consider necessary for any test an examination to be made at the contractor's or sub-contractor's premises and at site.

2.13 **CERTIFICATE OF INSPECTION AND APPROVAL:**

- 2.13.1 No equipment/ stores will be considered ready for erection until the Railway or the Inspecting Officer nominated by it, shall have certified in writing that they have been inspected and approved by him. Proof loading of all the components coming under tension will be done before erection by the inspecting official.
- 2.13.2 The Inspecting Officer or his authorised representative shall have, at all reasonable time, access to the contractor's premises and shall have power to:
- 2.13.2.1 Inspect and examine the materials and workmanship of the work, at any time during the manufacture at the manufacture's premises or in the premises of the contractor or sub-contractor or at the site of erection.
 - 2.13.2.2 Certify before any equipments is submitted for inspection that it cannot be in accordance with the contract owing to unsatisfactory method employed.
 - 2.13.2.3 Reject any part of the work submitted by the contractor as not being in accordance with the contract.
 - 2.13.2.4 Reject the whole of the work including equipment tendered for inspection, if after the inspection of such portion as he may, in his discretion, think fit, he is satisfied that the same is unsatisfactory.
 - 2.13.2.5 Mark rejected equipment with rejection mark so that the same may be easily identified.
 - 2.13.2.6 Re-inspect at the time of erection, at site any equipment both previously inspected and approved by the inspecting officer at the contactors or Sub-contractor's premises not with-standing any approval given earlier, the contractor shall make good such rejections made, based on such re-inspection at site to the satisfaction of the Engineer. The ultimate responsibility for correct supply/execution of work shall rest with the contractor unless the Railway insists an option of his designs inspite of the contractor not being agreeable to it.

2.14 **GUARANTEE:**

- 2.14.1 The contractor shall guarantee satisfactory working of the installation erection/shifting of OHE by him for a period of Twenty fourmonths (24 months) from the date of commercial operation or from the date of provisional acceptance by the purchaser whichever is earlier. During the period of guarantee contractor shall keep available and attend to any defect and replace the equipment/components resulting from defective erection or defects in the equipment supplied by the contractor. In such case, the contractor will be informed in advance of the works proposed to be carried out by the purchaser.
- 2.14.2 The contractor shall guarantee that everything to be executed under this contract shall be new and free from all defects and faults in materials, designs, workmanship, and manufacture and shall be of the highest grade consistent with the established and generally accepted standard for work of the type contracted for and in full conformity with technical specifications drawings and other contract stipulations.
- 2.14.3 This warrant shall survive inspection of, payment for and acceptance of the work but shall expire Twenty four months (24 months), from the date, of acceptance of the completed work by the Railway except in respect of complaints, defects and/ or claims notified to the contractor before the expiry of the warranty period.
- 2.14.4 The contractors liability in respect of any complaint, effect or claim shall be limited to the execution, installation and erection of replacement parts free of any charge, or the repair of defective parts only to the extent that such replacement or repairs are attributable to or arise from faulty workmanship or design or material in the arise from faulty workmanship or design or material in the manufacture of the equipment/stores and for negligence on any manner and also in the event of failure of the equipment to perform as intended.
- 2.14.5 The contractor shall, if required, replace, repair, execute and/or install the goods or such portion thereof as is rejected by the Railways, free of cost at site or at the option of the Railway the contractor shall pay to the Railway the value thereof and such other expenditure and damage as may arise by reason of the breach of the conditions herein specified.
- 2.14.6 All replacement and repairs that the Railway shall call upon the contactor to delivery or perform under this warranty shall be delivered and performed by the contractor within a period of 14 days promptly from the date of receipt of advice to that effect from the Engineer. In case where such replacement, repair, execution and/or installation takes place during warranty period, the provision of this warranty clause shall apply to that portion to replace or new until the expiration of 24 (Twenty four) months from the date of such replacement, repair, execution and/or installation.

This extended period shall herein after be referred to as "Extended Warranty Period".

- 2.14.7 If any defect be not remedied satisfactorily within the above mentioned 14 days the Railway may proceed to do the work at the contractor's risk and cost and also without prejudice to and other rights of the Railway under this Contract.
- 2.14.8 Moreover, the Railway; may, at its discretion, recover the ground rent for the goods/parts which have been rejected during the warranty period for the specified period of 3(three) months if the rejected materials are not taken over within the period of 3 (three) months by the contractor or his representative.
- 2.14.9 The Warranty herein contained shall not apply to any material which shall have been repaired or altered by the Railway, or on its behalf in and way without the consent of the contractor so as to affect its strength, performance of reliability or to any defects to any part due to misuse negligence or accident and to Items of normal wear and tear to be specifically mentioned by the contractor in his offer and got accepted by the Railway. The decision of the Railway in regard to contractor's liability and the money if any payable, under this warranty shall be final and conclusive.
- 2.14.10 For the faithful fulfillment of the obligations of the warranty contemplated in this clause and for the due and faithful fulfillment of the contract as a whole, the contractor has to furnish guarantee. The security deposit paid by the contractor will only be released as per General Conditions of Contract.
- 2.14.11 The performance guarantee in the form of an irrevocable bank guarantee shall remain in full force as specified in the General Conditions of Contract.
- 2.14.12 As and when an amendment to the contract extending the date of completion is issued the contractor shall, within 15 (fifteen) days of the receipt of letter of amendment should extend validity to the guarantee bond rendering the same valid for the contract as amended.
- 2.14.13 The guarantee bond and/or any amendment there to shall be executed on a stamped paper of requisite money value in accordance with the laws by the party competent to do so.
- 2.14.14 The release of Security Deposit shall be as specified in prices and payment.

2.15 In all the matters of dispute the decision of the **Dy.CEE/GS/SC** shall be final and binding.

2.16 **OBSTRUCTION TO RAILWAY STAFF:**

The Contractor(s) shall not obstruct directly or indirectly the Railway staff on duty and the staff working, with the Railways system in any form.

2.17 **MEMORANDUM OF DESCRIPTIVE MATTER:**

The Tenderer may, if he deems fit, if necessary, shall submit a short and concise memorandum or descriptive matter, which cannot be incorporated in other parts of the tender. In the event of the tenderer quoting rates based on the assumptions which are

contrary to the principles laid down in the tender papers, the basis for such assumption of rates to which they are connected should be incorporated in the memorandum. If no mention is made in the memorandum it would be presumed that the same basis has been laid down in the tender papers has been followed by the tenderer.

2.18 SPECIFIED RAILWAY STORES.

- a) The various equipments, components and materials to be supplied by the Railways to the contractor will be handed over to the contractor as far as possible in the State of ready for installation. The contractor has to Endeavour to bring the equipments into successful operation. In the event of failure of any item supplied by Railways due to inherent defects/deficiencies in the item the contractor shall not be responsible, should be defects be repairable at site without requiring dismantlement of the equipment then the repair shall be done by the contractor free of cost.

b) RECONCILIATION OF MATERIALS SUPPLIED BY THE PURCHASER.

The following procedure shall be adopted for the final reconciliation of various equipments, materials, fittings and conductors supplied by the purchaser. All the materials supplied by the Purchaser shall be correctly accounted. On completion of the work all surplus materials supplied by the purchaser together with ones found defective or broken on account of defective materials or workmanship shall be returned to by the Contractor. For the purpose of measurement of OHE, the length of the conductor will be as per tolerance given in Annexure-X.

2.19: PROVISIONAL ACCEPTANCE:

- (a) Immediately after completion of works, the Contractor shall certify and advise the Purchaser in writing that the section is (i) complete (ii) ready for satisfactory commercial service and (iii) ready to be handed over. He will also place at the disposal of the Purchaser the required staff for checking it and putting it into operation.
- (b) The test or tests, as per the specification excluding power collection tests which would be carried out subsequently in connection with the taking over by the Purchaser of the equipment and installations shall be carried out jointly by the Purchaser and the Contractor within a month after the receipt of the Contractor's notifications, as stated in sub para above.
- (c) After inspection and satisfactory conclusion of tests and when the Purchaser is satisfied with the satisfactory working of the installations he will issue a provisional acceptance certificate which would be signed by both the parties. The provisional acceptance certificate will not be withheld for any minor defects.
- (d) Should the result/s of inspection and the test/s be not satisfactory, and extension of one month will be granted to the Contractor to make good the defects and deficiencies, pointed out by the Purchaser, fresh inspection and test will then be carried out after the Contractor has attended to the defects and deficiencies. If these tests are also not satisfactory, the Purchaser may proceed at the Contractor's expenses by all means deemed expedient, to have the installation made satisfactory until they comply with the specifications, and approved drawings and designs.
- (e) In such a case, or in case of delay in completing the work under this contract within the time limit the Purchaser reserves the right if he deems it possible to use in a reasonable manner any section or any part of the section even if some installations of the sections are not completely erected, the Purchaser will give to the Contractor for this purpose seven days previous notice. The Contractor shall then take at his own expense all necessary steps to complete the works in accordance with the provisions of the contract. In case it becomes

impossible to proceed with the above mentioned taking over tests, for reasons other than for which the Contractor is responsible, the " Provisional Acceptance Certificate " shall be issued at or within a mutually agreed reasonable period not exceeding three months after completion of the relevant section as indicated in sub para/s above.

NOTE:

1. Provincial Acceptance Certificate for the work will be issued immediately after all tests (excluding power collection tests) are completed to the satisfaction of the Purchaser. Should the Purchaser be unable to complete the tests and energisation of the line / equipment within a reasonable time which shall not exceed 1 month from the date of Contractor's notification, the issue of provisional acceptance certificate shall not be delayed and shall be issued within a maximum time of two months after notification underabovepara (a) has been given. The power collection tests shall normally be carried out for the entire Section within two months of the date of energisation of the siding.
2. The issue of Provisional Acceptance Certificate shall not be withheld for rectification of minor defects, which may reasonably be considered not essential for Energisation, and operation of installation. In such cases, only the value of materials and cost of rectification of minor defects shall be withheld from the security deposit until rectification is completed.
3. Break down maintenance shall continue to be done by OHE contractor even after issue of PAC till CRS inspection and its clearance. Payments for materials [contractor supply] used during break-down maintenance done after issue of PAC shall be made as per rates of the contract. Railway supply materials shall be given by Railway. For this purpose, payments shall continue to be made even after issue of PAC. Damaged materials during break-down shall be handed over by the contractor to Railway.

2.20: FINAL ACCEPTANCE:

- (a) The final acceptance of the entire equipment installed on the group shall take effect from the date of expiry of the period of guaranteeaboveof the expiry of the last of the respective periods of guarantee of various sections for which provisional acceptance certificates are issued or brought into commercial operation, provided in any case that the Contractor has complied fully with his obligations in respect of the Section.
 - (b) If on the other hand the Contractor has not so completed with his obligation in respect of the section, the Purchaser may either extend the period of guarantee in respect of the section until the necessary works are carried out by the Contractor or carry out those works or being them carried out suomoto on behalf of the Contractor at the Contractor's expenses. After expiry of the period of guarantee for each section, a certificate of final acceptance for the section shall be issued by the Purchaser and the last of such certificate will be called the last and final acceptance certificate. The contract shall not be considered as completed until the issue of final acceptance certificate by the Purchaser.
 - (c) The Purchaser shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of the work unless the Contractor shall have made a claim in writing the respect there of before the issue of final acceptance certificate under this clause.
 - (d) Notwithstanding the issue of final acceptance certificate, the Contractor and the Purchaser (subject to sub-clause as above) shall remain liable for fulfilment of any obligation incurred under the provision of the contract prior to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties here to.
- 2.21 The contractor shall arrange at his own cost all tools, plants and facilities as necessary for erection and transfer of equipments from existing location to proposed locations etc.

- 2.22 The contractor or his representatives will accompany the purchaser and Engineers for inspection or attend their offices whenever called upon to do so. Contractor shall take instruction through site order book.
- 2.23 The contractor shall not be entitled to any extra payment due to hindrance resulting from normal Railway operations, such as delay on account of adequate number and duration of blocks not being granted, but the purchaser shall grant a reasonable extension of time to the contractor for delays beyond his control.
- 2.24 The contractor should insure at his cost the Stores brought to site against risks in consequences of damage, war and invasion as required under the emergency risk.
- 2.25 If any material is supplied by the purchaser on loan to speed up the work, the material has to be returned by the contractor to the purchaser within 90 days of obtaining materials on loan from Railways. Otherwise, all or some of the materials at the discretion of Dy.CEE/GS/SC will be treated as sold. For materials treated as sold, the cost will be recovered by the purchaser from the contractor at double the cost of the book rate or the last purchase rate or the prevailing market rate whichever is higher plus 5% on account of initial freight, 2% on account of incidental charges together with supervision charges of 12.5% on the total cost inclusive of material freight and incidental charges. Freight between the purchaser's source of supply and the contractor's depot or railway siding shall be the contractor's account. In case of materials not treated as sold contractor has necessarily to return the materials.
- 2.26 **Precautions to be taken while working in the vicinity of the running trains.**
- 2.26.1 When the work is required to be carried out on the track itself or as close to the track as may pose a hazard to rail traffic, the work shall be carried out under the supervision of an authorized Railway Representative only.
- 2.26.2 During the execution of the works, the contractor or his representative shall not leave the site where the works are being carried out. At the site of work, the contractor shall always make available one representative who shall be approved by the Railway Administration who shall be invested with adequate powers by the contractor so that orders or instructions given to the said representative by the Railway Administration in writing could be considered as duly given or conveyed to the contractor himself. Representative of the Railway will check up the work from time to time.
- 2.26.3 The contractor shall not allow any road vehicle belonging to him or his suppliers etc. to ply in Railway land next to the running line. If permitted by Railway Administration for execution of certain works such as supply of ballast, sand, etc. the following precautions must be taken by the Contractor in the presence of Railway representative.
- i) The road vehicles will ply only between sunrise and sunset.
 - ii) Nominated vehicles and drivers will be utilized for work in the presence of at least one flagman and one supervisor certified for such work.
 - iii) The vehicles shall ply 6 m. clear of the track. Any movement/work at less than 6 m. and up to minimum of 3 m. clear of track center shall be done only in the presence of Railway employee authorized Engineer-in-Charge. No part of the road vehicle will be allowed at less than 3.5 m from the track center. Cost of such Railway employee shall be borne by the Railway.
 - iv) The contractor shall remain fully responsible for ensuring safety and in case of any accident, shall bear the cost of all damages to his equipment and men and also damages to Railway and its passengers.
- 2.27 **Works Contract procedure for settling of disputes of contractors.**
- i) The provision of clause 63 and 64 of the general conditions of contract will be applicable only for settlement of claims /disputes for values less than or equal to 20% of the original

value (excluding the cost of materials supplied free by railway) of the contractor or 20% of the actual value of the work done (excluding the value of the work rejected) under the contract, whichever is less. When claims/disputes are of value more than 20% of the value of the original contract or 20% of the value of the actual work done under the contract whichever is less. The contractor will not be entitled to seek such disputes/claims for reference to arbitration and the provisions of clause 63 and 64 of the G.C.C. of the contract will not be applicable for referring the disputed to be settled through arbitration.

ii) The contractor shall furnish his monthly statement of claims as per clause 43(1) of G.C.C. of the contract. But the contractor should seek reference to arbitration to settle the disputed only once, subject to the condition as per para-1

iii) In case of failure of any agency to carry out work in time, Railway Reserves the right to get the work done through any other alternative agency with similar works in the section / railway.

2.28 **Deduction of TAX at source:**

All the Contractors/Service Providers/Suppliers should have Register with GSTN as per Goods and Services Tax ACT 2017.

2.29 Conservancy charges: Not applicable

2.30 The contractor shall not start any work without the presence of Railway supervisor or his representative and contractors supervisor at site. The Engineer-in-charge shall approve the methodology proposed to be adopted by the contractor with a view to ensure safety of trains, passengers and workers and he shall also ensure that the methods and arrangements are actually available at site before start of the work and the contractor's supervisors and the workers have clearly understood the safety aspects and requirements to be adopted /followed while executing the work. There shall be an assurance register kept at each site, which will have to be signed by both, ie., Railway Supervisor or his representatives as well as the contractor's supervisors as a token of their having understood the safety precautions to be observed.

2.31 **PROVISION OF EPF & MP Act 1952 :** The contractor shall comply with the provision of EPF & MP Act 1952 and obtain code number from the concerned authorities whenever workmen employed by him are 20 or more. He shall also indemnify Railways from and against any claim, penalties, recoveries under the above Act and Rules. Contractors to get the code number under the EPF so as to enable the PF Commissioners to extend the social security benefits to the workmen engaged by the Railway Contractors. The first month's bill will be released only after code number is taken from the PF Office and a copy of coverage intimation produced. Subsequently for each month, bills will be released only on submission of challans & 12A. Monthly return copy in proof of remittance of PF dues for every month.

2.32 **PROVISIONS OF APPRENTICES ACT, 1961 :**

(a) The Contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act, 1961 and the rules and order issued there under from time to time in respect of Apprentices directly or through petty Contractors or Sub-Contractor's employed by him for the purpose of carrying out the Contract. If the Contractor directly or through petty Contractor's or sub-Contractors fails to do so, his failures will be a breach of the contract and the Railway may, in its discretion, rescind the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

NOTE :The Contractors are required to engage Apprentices when the works undertaken by them last for a period of one year or more and/or the cost of work is Rs. one lakh or more.

2.33 **EMPLOYMENT OF ENGINEERING GRADUATE/DIPLOMA HOLDERS**

2.33.1 In terms of provisions of new clause 26A to the GCC, the contractor shall also employ following qualified engineers during the execution of the allotted work.

- a) One qualified graduate engineer when cost of work to be executed is Rs. 200 lakhs and above, and
- b) One qualified diploma holder engineer when cost of work to be executed is more than Rs. 25 lakhs, but less than Rs. 200 lakhs.

2.33.2 In case contractor fails to employ the qualified engineers as per above para, the contractor, in terms of provision of clause 26.A-2 to GCC, shall be liable to pay an amount of Rs. 40,000/- and Rs. 25,000/- for each month or part thereof for the default period for the provisions as contained in abovepara (a) & (b) respectively.

2.33.3 The decision of the Engineer-in-charge as to the period for which the required technical staff was not employed by the contractor and as to the reasonableness of the amount to be deducted on this account shall be final and binding on the contractor.

- 2.34 **DISASTER MANAGEMENT :** In case of accidents / natural calamities involving human lives, the Railway administration can draft vehicles and equipments of the contractor however, for payment purpose, the item will be operated as additional NS item duly negotiating the rates.
- 2.35 **THE BUILDING AND OTHER CONSTRUCTION WORKERS (RECS) Act, 1996 AND BUILDING AND OTHER CONSTRUCTION WORKERS WELFARE CESS Act, 1996 IN RAILWAY CONTRACTS :** The tenderer for carrying out any construction work in Andhra Pradesh/Telangana/Maharashtra/Karnataka must get themselves registered from the Registering Officer under Section – 7 of the Building and Other Construction Workers Act, 1996 and rules made there to by the concerned state governments and submit certificate of Registration issued from the Registering Officer of the respective State Government (Labour Department). For enactment of this act, the tenderer shall be required to pay cess @ 1% of cost of construction work to be deducted from each bill. Cost of materials shall be outside the preview of cess when supplied under a separate schedule item.
- 2.36 The contractor should exhibit a display board at the work site of their agreement with proper information on a steel board of size not less than 1mX1m for better appreciation of their work/project to Railway officials and to the public as well

Name of the Organization/Railway

- (i) Name of Project:
- (ii) Approx. cost of Project:
- (iii) Expected Date of completion:
- (iv) Name and Address of the Contractor:
- (v) Address of Engineer-in-Charge:

2.37 **Goods and Service Tax:**

Care in Submission of Tenders:

(a)(i) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.

(ii) Tenderers will examine the various provisions of the Central Goods and Service Tax Act, 2017(CGST)/Integrated Goods and Service Tax Act, 2017(IGST)/ Union Territory Goods and Services Tax Act, 2017(UTGST)/ respective state's State Goods and Service Tax Act (SGST) also, as notified by Central/State Govt & as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.

(iii) The successful tenderer who is liable to be registered under CGST/IGST/ UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to Railway immediately after the award of contract, without which no payment shall be released to the contractor. The contractor shall be responsible for deposition of applicable GST to the concerned authority.

(iv) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/SGST Act, the Railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.

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TECHNICAL SPECIFICATIONS**SECTION-1: OVERHEAD EQUIPMENT**

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1.2	Sectioning.
1.3	Pantographs.
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1.5	Types of equipments
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1.7	Tensions.
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1.9	Height of contact wire
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1.13	Cantilever assembly
1.14	Overlaps.
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2.5	SIZE AND GRADING OF AGGREGATES.
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2.8	TYPES OF FOUNDATION IN BLACK COTTON SOIL.
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3.2	TYPES.
3.3	DESIGN.
3.4	CANTILEVER MASTS.
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3.6	HEAD-SPANS.
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Section-5: DESIGNS AND DRAWINGS

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GENERAL & PARTICULAR SPECIFICATIONS

SECTION – 1 : OVERHEAD EQUIPMENT:

1.1: TRACK :

- a) **GAUGE AND TRACK CENTRES** -The track gauge is 1676 mm (5'-6"). In multiple track zones, the normal distance between track centres varies between 4270 mm(14'.ft) and 4420 mm (14'-6").
- b) **SPEED** - The overhead equipment which shall be of the simple polygonal type and pre-sag should be designed for a maximum speed of 160Km/h (Approx.100 miles/h) if regulated and for a maximum speed of 80 Km/h (Approx. 50 miles/h) if Tramway type, unless otherwise specified in Section-10 of this part for any particular section.
- c) **CURVES** -The minimum radius permissible is 175 mm (573 ft) i.e., a 10°curve. Inside station limits, the curvature at a 1 in 8.5 turnout is 8° i.e., of radius 219 m (716 ft).
- d) **SUPER ELEVATION** -The maximum super elevation is 165 mm (6.5"). On curves, the minimum setting of structures shall be decided on the basis of maximum super elevation (see para 2.3.10 at Section-8 of this part). For purposes of design and erection of overhead equipment, the actual super elevation as existing at site or as indicated to the contractor shall be adopted.
- e) **LOW JOINTS** -For low or loosely packed rail joints a difference of 25mm (1") in the level of opposite rails may be taken as the basis for estimating the displacement of the pantograph with respect to its normal position.
- f) **FORMATION** -Generally sections with more than one track have common formation. In certain lengths, however the formation for different tracks may be separate.
- g) **DISPLACEMENT** - The general design of overhead equipment shall permit a displacement of +100 mm of tracks without difficulty and any adjustment of the overhead equipment on this account shall be of such a nature as could be done conveniently without changing any component of the overhead equipment.

1.2: SECTIONING :

- a. **INSULATED OVERLAPS** : Insulated overlaps are provided for facility of isolation. Some of the overlaps may be provided with manually operated isolators switches. In addition for connecting the overhead equipment to booster transformers, insulated overlaps are indicated in the sectioning diagrams.
- b. **YARD SUPPLY** - The sectioning diagram/s also indicate the tracks in stations yards and siding whose equipments is electrically independent from those of other tracks.

The overhead equipment in yards and sidings may be fed through isolator switch or interrupter in accordance with arrangement indicated in the sectioning diagram/s.
- c. **SECTION INSULATORS** - Section insulators shall be provided as indicated in the sectioning diagrams, to isolate sections of overhead equipment in yards and sidings. Section isolators may also be used to form neutral sections at special locations as indicated in the approved drawings.
- d. **Deleted**
- e. **FEEDERS & RETURN FEEDERS 25 KV ALONG TRACK FEEDERS** :25 kV along track feeders may connect sections of overhead equipment to a switching station or an isolator switch or gantry. Such feeders will be run usually on traction structures and sometimes on independent masts. A single 'SPIDER' conductor shall be used for such feeders.
- f. **RETURN CONDUCTOR : DELETED.**
- g. **SCHEMATIC ARRANGEMENTS:-**The different arrangements of feeders, return feeders, 25 KV along track feeders and return conductors are shown in the drawing listed.
- h. **SECTIONING DIAGRAM** -The provisional sectioning diagram/s to be electrified is /are available in the office of Sr.DEE/TrD/SC and tenders can see in the office working hours.

1.3 :PANTOGRAPHS :

- (a) The outline of the pantograph, its dimensions and its current collecting area are shown in a drawing listed.

- (b) **NUMBER AND PRESSURE** -Each locomotive will be equipped with two pantographs, but only one pantograph generally the trailing one will be in use at a time. The working pressure of the pantograph on the contact wire may vary between 5 and 15 kg.
- (c) **SPACING IN MULTIPLE HEADED TRAINS** -The distance between adjacent running pantographs in the case of multiple heading would normally be 20 meter. This distance may, however, be reduced to 7.9 meter between two pantographs in very exceptional cases.
- (d) **INSULATION CLEARANCE** -The electrical clearances for the pantograph on tangent tracks and on curves for design and erection of overhead equipment shall be based on the schedule of Dimensions 1676mm. Gauge, 1939 printed in 1973 in metric units, issued by the Ministry of Railways(Railway Board), Government of India and any other orders that may be issued by the Railway Board from time to time.

1.4 : **OVERHEAD EQUIPMENT** :

BRIEF DESCRIPTION -Essentially the traction overhead equipment shall consist of a grooved contact wire of conventional/Tramway type.

- (a) **Catenary wire** : The catenary wire shall be Cadmium copper catenary wire having 65 sq.mm.
- (b) **CONTACT WIRE** -The contact wire shall be grooved and made of hard drawn copper having 107 sq.mm / 150 sq.mm cross section.
- (c) **JUMPERS**--All jumpers connected to OHE conductors shall be of copper only. The in-span jumpers potential equalizer jumpers at insulated overlaps and neutral section, shall be of 50mmsq. nominal, 19/1.8mm size. Flexible jumpers of nominal section 105 sqmm., 19/7/1.06 mm size shall be used at overlaps, turnouts, crossings etc., 130 sq.mm jumper to be used for tail feeders 160 sq.mm jumpers to be used for cross feeders.
- (d) **BRIDLE WIRE**: -Bridle wire for supporting contact wire for regulated tramway equipment shall be of Cadmium copper 7/2.10 mm in size.
- (e) **ANTI THEFT JUMPER**: -Anti theft jumper of 50 mm sq. nominal, 19/1.8 mm in size shall be used in out of run wire of conventional OHE and copper cadmium anticreep wire as an anti-theft measure. The jumper connecting the aluminium conductors to any other conductors terminal or clamp shall be made with the aid of suitable bi-metallic clamps. All Aluminium jumpers of size 19/7/1.4 mm bare 3/4 hard shall be used to connect other Aluminium conductors such as return conductor. The tail ends of feeder wires from the strain clamps at the termination of a feeder, return feeder or return conductor may be connected directly to a terminal or clamp where feasible to avoid the use of a separate jumper wire.

1.5 : **TRAMWAY TYPE OF EQUIPMENT** :The overhead equipment used shall normally be regulated type equipment (contact wire only).

- (a) **TRAMWAY TYPE EQUIPMENT REGULATED CONTACT WIRE ONLY**: In tramway type equipment regulated, only a contact wire is provided without a continuous catenary or droppers. The tension in the contact wire is regulated. At support, bridle wire is used for supporting the contact wire.
- (b) The section in which different types of equipment should be provided are indicated in Section-10 of this part.

1.6 : **PLANE OF CONTACT** :

- (a) **REGULATED** -The regulated overhead equipment shall be so erected that the contact wire has the designed sag.
- (b) **TRAMWAY TYPE** -In tramway type equipment, the contact wire will have its own natural sag when erected.
- (b) **DROPPER** :Dropper charts to be used for standard span of regulated and unregulated overhead equipment would be supplied by the Purchaser. Dropper for non-standard spans, span with section insulators and special locations shall be calculated by the Contractor in accordance with the method indicated by the Purchaser and submitted to the Purchaser for approval.

1.7 : TENSIONS :

(a) **REGULATED** - (i) In regulated equipment the tension is the Copper catenary and in the Copper contact wire shall be 1,000 kgf in each conductor.

(ii) The regulated tension in the Aluminium alloy catenary shall be 1,000 kgf and 1,000 kgf in copper contact wire.

(b) **TRAMWAY TYPE:** In regulated type tramway equipment, the tension shall be 1,250 kgf.

1.8 : CLEARANCE :

(a) **GENERAL** - The distance between live parts and parts at earth potential (for parts likely to be earthed) shall be as large as possible. In all cases the values given in Schedule of Dimensions, 2004 or its latest revision shall be observed along with any other supplementary rules that may be issued by the Railway Board time to time.

(b) **OVERBRIDGES & TUNNELS** - The clearances which are to be made available at over bridges, signal, gantries and other over line structures shall be based on the above rules.

(c) **PLATFORM SHEDS AND OTHER STRUCTURES** - In the course of checking the overhead equipment pegging plans, the Contractor shall prepare a list of platform sheds and other structures in the vicinity of track to be wired. The clearances to these structures shall be in accordance with those shown in the relevant drawings listed in Annexure-I at Part-N. If these clearances are not available, the Contractor shall advise the Purchaser in time to enable the later to take up necessary modifications.

1.9 : HEIGHT OF CONTACT WIRE :

(a) Normally, the minimum height of contact wire above rail level shall be 5.50 m at mid span under the worst temperature conditions. This height may be reduced under bridges and in tunnels to the extent permitted by the purchaser. The minimum height shall be 4.80 m. In electric locomotive sheds and over electric locomotive inspection pits, the minimum height shall be 5.80 m. At level crossings the minimum height shall be 5.50 m. Any infringement restricting minimum height at level crossings will be removed by the Purchaser.

(b) **GRADIENT OF CONTACT WIRE** -- Any change in the height of the contact wire shall be made gradually and the maximum slope shall not normally exceed 3 mm per metre on main lines and 10 mm per metre on sidings. The end span of any section with a gradient of contact wire shall have a slope not greater than half the main slope.

1.10 : STAGGER : To ensure uniform wear of contact strips of pantographs, the contact wire shall normally be staggered in a manner which will be indicated by the Purchaser.

1.11 : TERMINATION :

(a) **GENERAL** -- Traction overhead lines shall be terminated using components specified at Section-9 of this part. The termination may be carried forward by one or two spans if anchoring facilities so require.

(b) Terminating wires shall be electrically connected to the conductors with which they are likely to approach closely or come into contact under normal conditions.

(c) **SUPPLEMENTARY INSULATION** - If a terminating wire passes a live conductor to which it should not be connected, i.e. in a different elementary section, the portion of the terminating wire close to the live conductor shall be separated by means of insulators. The insulators swept shall be located in such a manner as to clear the zone of the pantograph under the worst conditions and as far away as is possible from live conductors.

1.12 : TYPES OF STRUCTURES :

(a) The overhead equipment of main tracks in case of multiple tracks section shall be electrically and mechanically independent of the one another by provision of independent cantilever masts to the maximum extent possible.

(b) **PORTALS** :- In cases where the tracks in a multiple track section do not permit location of independent masts and where automatic tensioning of overhead equipment is required, rigid portals may be used. Also in the vicinity of points and crossings, portals may be used, provided it is not possible to have prescribed setting with independent cantilever masts. These structures shall be equipped with standard bracket assemblies for supporting individual equipment of different tracks. The use of such structures is to be avoided as far as possible and for this purpose, the Purchaser will arrange to slew the tracks, if practicable. A single portal shall normally not cover more than five tracks.

Portal structures shall also be employed at anticreep central locations and such portals will have necessary guy arrangement.

(c) FOUNDATIONS -Foundations for all structures shall be designed in an economical manner by following the methods of design indicated by the Purchaser and observing the schedule furnished by him

1.13: CANTILEVER ASSEMBLY :The bracket assembly carrying overhead equipment shall be of the swivelling type. The assembly shall be such that the tubes adopted will permit easy adjustment of the whole equipment after erection to cater for displacement of the track during maintenance up to the extent of 100 mm on either side except as otherwise relaxed by the Purchaser. In special locations, pull-off arrangements may be used with the approval of the Purchaser.

1.14: OVERLAPS :Overlaps shall be provided at suitable intervals such that neither the tension length exceeds 1,500 m nor the fixed anchor to balance weight anchor exceeds 750 metres.

(a) GENERAL -The two contact wires at the overlapping zone shall be parallel to each other in a plane parallel to the track and run separated from each other.

(b) INSULATED -In the case of insulated overlaps, the separation between the two contact and the two catenary wires shall be 0.5 m.

1.15: POINTS & CROSSINGS :Arrangements of overhead equipment of different types e.g. regulated, unregulated or tramway at points and crossings shall be in accordance with the standard drawings listed.

1.16 :SECTION INSULATORS :

(a) BRIEF DESCRIPTION -The section insulators shall provide effective electrical isolation of two elementary electrical sections of overhead equipment and permit smooth passage of the pantograph in either direction at all speeds up to 80 KM/H. The outline of a section insulator is shown in a drawing listed. The section insulators shall be of the single wire type.

(b) SIZE AND WEIGHT -The section insulator assembly shall be such that it should be possible to install the insulator in the overhead equipment provided the axial distance between the catenary and the contact wire with section insulator in position is not less than 450 mm. The weight of the complete assembly shall not be more than 45 kg for single wire type excluding the weight of the catenary insulator and the catenary ending clamps.

1.17 :ISOLATORS :Manually operated isolators single or double pole type, with or without earth contact assembly may be required to bridge certain section insulators or insulated overlaps. In certain large yards, isolators controlling different lines may be grouped together on a gantry.

1.18 :BRIDGES AND TUNNELS :

(a) OVERBRIDGES -The complete overhead equipment (i.e., both the catenary and the contact wires) shall normally pass under over-line structures. Additional intermediate suspension points shall be provided, if necessary, to ensure the specified minimum height of contact wire being maintained. In special cases catenary may be anchored on either side of the over line structure and the contact wire carried underneath.

(b) SAFETY SCREENS - On over-bridges, metallic protective screens shall be provided in order to prevent any person from coming into contact with the live overhead equipment. Such screens shall be properly earthed.

(c) HEIGHT GAUGES AT LEVEL CROSSINGS -Height gauges will be provided at all level crossings in accordance with the general arrangement drawings listed

1.19 :BONDING AND EARTHING :

(a) Bonding and earthing shall be done in accordance with the code for bonding and earthing.

(b) LONGITUDINAL AND TRANSVERSE BONDING Longitudinal and transverse bonding of tracks, bonding of structures including traction structures to rails and associated earths shall be provided in accordance with the above code.

(c) TRACTION STRUCTURE BONDING :-Every traction mast or structure shall be bonded to a non-track circuited rail unless it is provided with a continuous earth wire or it is individually earthed by means of an earthing station. For general arrangement drawings.

(a) DOUBLE RAIL TRACK CIRCUIT :-.**1.20 : L.T. SUPPLY TRANSFORMER STATIONS:**

1.21 : LIGHTNING ARRESTORS : No lightning Arrestors will be provided on the traction overhead equipment.

1.22 : Bolts and nuts shall be ordered from on same supplier.

SECTION-2 : FOUNDATIONS

2.1 : SCOPE: This section deals with the design of foundations and anchor blocks for traction structures carrying overhead equipment (including those on bridges), structures at switching stations, booster stations, L.T. Stations, Feeding stations, sub-stations, concrete pedestal for equipments, cable trenches required for traction substation, feeding station, shunt capacitor bank and other concrete work. It also deals with the specifications for concrete.

2.2 : DESIGN OF FOUNDATION :

(a) SOIL PRESSURE :For design of foundations for traction structures carrying overhead equipment, the Contractor shall determine the type and allowable bearing pressure of soil at suitable intervals and adopt the type and size of foundations, suitable for particular locations with the help of the approved employment schedules. In cases of particularly weak soil, the bearing pressure may have to be determined for each location where so advised by the Purchaser. Soil bearing pressure, using SPT (falling weight equipment) should be determined generally for every 5 kilometer interval or less wherever change of soil is encountered. In general IS code of practice (IS:6403/1981 or latest for "Code of practice for determination of bearing capacity of shallow foundations") should be followed. In addition, at every 250m the soil bearing pressure should be determined by dial gauge type penetrometers. Dial gauge type penetrometers shall also be made available by the Contractor at each foundation site so as to facilitate cross check at each individual location.

For design of foundation for masts and gantries at switching stations and traction sub-stations, the Contractor shall determine the type and allowable bearing pressure of soil at the locations of such stations and shall prepare designs for the foundations suitable for each location to suit the bearing pressure of the soil in consultation with the Purchaser.

(b) STRUCTURES CARRYING OVER-HEAD EQUIPMENT: Foundations for traction structures carrying overhead equipment shall be either of the side bearing, side gravity or new pure gravity type according to their location, formation of the sub-grade and bearing pressure of the soil. In new filled-up soil or cinder formation, pure gravity sand-filled core foundations, or foundations with cast-in-situ reinforced concrete piles, or cantilever types foundation with counter-weights or guyed foundations may be adopted.

(c) ON BRIDGE PIERS :Complete design of foundations for traction structure on bridges to suit different locations and local conditions will be furnished by the Purchaser.

(d) MASTS & FABRICATED STRUCTURES AT SWITCHING STATIONS and FEEDING STATIONS :Foundations for the masts of gantries at switching stations and feeding stations shall be of the pure gravity type, the base of which shall rest on consolidated soil.

(e) FENCING POSTS :Foundation for fencing posts shall rest on consolidated soil if the depth of unconsolidated soil is less than 1.5 m below the datum level and shall be rectangular parallel piped in shape. If the depth of unconsolidated soil is more than 1.5 m the foundation block shall rest on reinforced concrete piles cast-in-situ or reinforced concrete foundation may be adopted as desired by the Purchaser.

(f) TYPICAL DESIGN :Typical design and drawings of side bearing and new pure gravity and side gravity type foundations are included in the drawings listed. Employment schedules for standard foundations for traction structures for various locations and types are also included in the drawings.

(g) SPECIAL FOUNDATIONS: In the case of foundations at locations not covered by the employment schedules obtained from the Purchaser, the Contractor shall prepare special designs and furnish full design calculations justifying the choice of the type of foundations for such locations. In black cotton soil specially pile foundations of under reamed type as per RDSO'S standard designs (Reference RDSO'S Drawings No.ETI/C/0062, Rev.B or latest for "Short bored pile foundation for traction mast (permissible BM and volume")) or any other approved design may have to be cast at limited locations for trial purpose. The

tenderer may furnish the technical details of alternative design, construction methods proposed to be adopted and their previous background/experience, if any. The decision of the Purchaser with regard to feasibility and suitability of adoption of the alternative design for each type of foundation will be final.

(h) EQUIPMENT :Pedestals for Interrupters and L.T. supply transformers where required, shall be of mass concrete with the base resting on consolidated soil. Foundations for circuit breakers supported on steel structures and for other items of equipment such as isolators, instrument transformers, **bus-bar** support insulators etc., shall be of the pure gravity type, the base of which shall rest on consolidated soil and shall be left with core holes into which the legs of supporting structures shall be suitably fixed by grouting.

(i) DELETED

(j) CABLE TRENCHES :The cable trench shall rest on original ground if the depth of unconsolidated soil is less than 0.5 m. If the depth of the unconsolidated soil is more than 0.5 m., the cable trench shall be made of reinforced cement concrete of approved design supported at suitable intervals on concrete pillars. Cable trench details are shown in a drawing.

(k)Gantry Structures, Mast & fabricated structure of feeding station

Foundations for the gantry structures/portals, mast of gantries at feeding station shall be of the pure gravity type, the base of which shall rest on consolidated soil.

l)Equipment

Pedestals for power transformers shall be made of mass concrete with base resting on consolidated soil. Foundations for Circuit Breakers supported on steel structures and for other items of equipment such as isolators, instrument transformers, bus-bar support insulators etc., shall be of the pure gravity type, the base of which shall rest on consolidated soil, and shall be left with core holes into which the legs of the supporting structures shall be suitably fixed by grouting.

m)Fencing posts

Foundations for fencing posts shall rest on consolidated soil if the depth of unconsolidated soil is less than 1.5 m below the datum level and shall be rectangular parallelo-piped in shape. If the depth of the unconsolidated soil is more than 1.5 m the foundation block shall rest on reinforced concrete piles cast-in-site or reinforced concrete foundation may be adopted as desired by the Purchaser.

2.3 :BEARING PRESSURE :

(a) GUIDING INFORMATION: Subject to Para 2.2.2(a) above, the following allowable bearing pressures may generally be expected for various kinds of soil. The information is given for general guidance only.

- i) Average good soil in banks and cutting ... 11,000 kg/sq.m.
- ii) Morum soil in cutting ... 22,000 kg/sq.m.
- iii) New banks & bad soils in banks and cuttings. ... 5,500 kg/sq.m.
- iv) Black cotton soil : Pure gravity foundation shall normally be adopted. However, under reamed pile foundations may be adopted at the option of the Purchaser in limited locations for trial purpose. In the case of dry black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 16,500 kg/sq.m. the depth of the foundation block being not less than 2.8m. In the case of wet black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 8,000 kg/sq.m.

In the case of hard rock, a hole should be blasted in the rock, or by means of any other drilling and pneumatic method and the mast sealed into it with concrete.

2.4 : CONCRETE :Concrete for foundations shall be nominal mix of grade **M-10** obtained by mixing cement, coarse aggregate, fine aggregate and water in accordance with proportions given vide Table-3 of IS:456-2000 reproduced below. For grouting, muffing, embedding of structures in foundations and for cable trenches at switching stations, nominal mix concrete **M-15** obtained by mixing materials in proportions as indicated in Table -9 of IS:456-2000 shall be used. Volume batching may be adopted vide relevant clause of IS:456-2000 reproduced below :-

IS : 456-2000: TABLE - 9 : PROPORTIONS FOR NOMINAL MIX CONCRETE

(Clause 9.3 and 9.3.1)

Grade of concrete	Total quantity of dry aggregate by mass per 50 Kg of cement, to be taken as the sum of the individual masses of the fine and coarse aggregate, kg max.	Proportion of fine aggregate of coarse aggregate (By mass)	Qty. of water per 50 kg. of cement, max.
1	2	3	4
	KG		Litrs
M 5	800	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5	60
M 7.5	625		45
M 10	480		34
M 15	330		32
M 20	250		30

NOTE: The proportions of the fine to coarse aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate shall be used.

Example : For an average grading of the fine aggregate (that is zone II of Table 4 of IS : 383-1970*) the proportions shall be 1:1 1/2, and 1:2 and 1:2 1/2 for maximum size of aggregate 10mm, 20 mm and 40 mm respectively.

* Specification for coarse and fine aggregates from natural sources for concrete (second revision).

"In case uniformity in the materials used for concrete making has been established over a period of time, the proportioning may be done by volume batching, provided periodic checks are made on mass/volume relationships of the materials, where weigh-batching is not practicable, the quantities of fine and coarse aggregate (not cement) may be determined by volume. If the fine aggregate is moist and volume batching is adopted, allowance shall be made for bulking in accordance with IS:2386 (Part-III)-1963".*

 *Method of test for aggregates for concrete-part-III specific gravity, density, voids, absorption and bulking.

In judging the acceptability of the materials, **quality of concrete and the method of work, the Purchaser will generally observe the provisions of the "Indian Standard code of Practice for Plain and Reinforced Concrete, IS:456-2000.** The crushing strength of concrete shall not be less than the limits given below :-

Crushing strength of 15cm cubes by works test.

Concrete.	At 7 days age.	At 28 days age.
(a) M- 10	70 kg/sq.cm	100 kg/sq.cm
(b) M- 15	100 kg/sq.cm	150 kg/sq.cm
(c) M- 20	140 kg/sq.cm	200 kg/sq.cm

NOTE :

- Test specimen of works tests shall be taken at the site of work from mixture of concrete ready for pouring into the foundation hole. All tests shall be carried out in accordance with IS: 516-1959 or its latest version. The sample of concrete from which test specimens are made shall be representative of the entire batch. The test cube shall be generally placed in the core of the foundation from where the sample is taken till it is taken for testing. Test sample shall be taken to the approved lab by the contractor. It is the responsibility of the contractor to get test cubes tested and test certificates submitted. Otherwise, alternate tests shall be carried out by contractor at his cost to satisfy that the concrete laid is having strength as per specification.
- Age is reckoned from the day of casting.
- Three cubes for 7 days testing and three cubes for 28 days testing. Reading: Average of three readings to be taken.

- d. Six (6) cubes to be taken for every 50 cu.m of foundation cast.
- e. **CURING** : Curing shall be done for 21 days such that the surface is always moist. The surface to be covered as per IS 453 of 2000 i.e., with canvas or such other materials so that the surface is wet.

Vibrator to be used for all foundations.

2.5 : SIZE AND GRADING OF AGGREGATES : The graded coarse aggregate **40 mm** nominal size (table 2 of IS: 383-1970) shall be used for foundation. A coarse aggregate for grouting muffs and embedding shall be of **20 mm** graded nominal size as per Table 2 of IS: 383-1970 (specification for coarse and fine aggregate from natural sources for concrete). Fine aggregate shall be graded from 10 mm downwards. The maximum size of aggregate for under reamed pile foundation shall be 20 mm graded nominal size.

2.6 : SAND CORED FOUNDATIONS : After erection of masts in sand-cored foundations, the core hole of the foundation blocks shall be filled with dried sand and covered with a layer of bitumen of 80 mm thickness below 30 mm from top level of the block. A hemispherical shaped muff shall be provided on such foundations in lieu of standard type.

2.7 : SINKING OF CONCRETE SHELLS : Where the water-table is high, one or more sections of reinforced concrete shells may have to be sunk before casting concrete. The size of each of shell shall be 1,200 mm outside dia x 50 mm thick x 600 high reinforced with 6 mm (1/4") dia rods spaced 150 mm apart, both longitudinally and circumferentially, the concrete shall be of grade M-15 as per provisions.

2.8 : TYPE OF FOUNDATION IN BLACK COTTON SOIL : Types of foundations in black cotton soil. The foundations in dry black cotton soil should be of type BC or NBC or any other type as approved by the Purchaser.

2.9: CEMENT: The cement to be used should be of ordinary Portland cement to IS :269-1989.

2.10 Use of crushed stone sand shall be as per **SCR HQ Ir.no E.252/TRD/Genl/Vol.III/1631** dated 11-12.2017.

SECTION-3: STRUCTURES

3.1 :SCOPE : This section deals with the design of steel structures and steel work for overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations. This chapter also deals with the design of steel structures and steel work for gantry structures, supporting structures and small part including chairs, brackets and other fabricated steel work for mounting various equipments, bus-bars, cables etc., at Traction sub-stations, feeding stations and shunt capacitor banks.

3.2 :TYPES : Structures and gantries may consist of any or more of the following types

- i) Broad flange beams.
- ii) Rolled steel joists (I section).
- iii) Fabricated steel Structures (welded/bolted).

Structure/uprights shall generally be embedded in concrete foundation blocks in special cases Structures may be secured by means of holding down bolts.

3.3 :DESIGN :

(a) STEEL STRUCTURES : Designs for steel Structures shall, except where otherwise provided, comply with the Indian standard code of practice for use of structural steel in General Building Construction - IS : 800-1984. The thickness of smallest steel sections used shall not be less than 5 mm for galvanised members.

(b) All the steel Structures and small part steel for carrying overhead equipment are to be fully galvanised after drilling and fabrication as per specification No. ETI/OHE/13 (4/84, Rev.3 or latest for "Specification for Hot dip zinc galvanization of steel masts (Rolled & Fabricated), tubes and fittings used on 25kV ac OHE") and no painted structures are to be used.

(c) All the steel structures like gantries /portals , other supporting members, small part steel work etc. shall be galvanised with a minimum value of average mass of zinc coating being not less than 610 g/sq.m as per RDSO's specification No. ETI/OHE/13 (4/84, Rev.3 or latest for "Specification for Hot dip zinc galvanization of steel masts (Rolled & Fabricated), tubes and fittings used on 25kV a.c. OHE").

(d) For purposes of design, all possible loads which may occur in the worst combination shall be considered.

(e) For purposes of design of gantries, the tension in the 220 KV incoming /outgoing lines shall be taken as 200 kg at 4 degree C (without wind) in each conductor and 150 Kg. at 4 C (without wind) in the earth wire. The tension in the 66 kV strung bus-bars and earth screen wire at 66/25 KV sub-stations shall not exceed 200 Kg at 4 degree C (without wind).

(f) Uprights and fencing posts.

Uprights carrying equipment such as potential transformers, current transformers, lightning arrestors, bus-bar support insulators, shall be made from standard metric steel sections viz., channels, angles or small joists, either single or fabricated.

(g) The deflection at the top of the mast or structure shall be limited to one eightieth (1/80) of its height above foundation.

(h) The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

(i) Steel conforming to IS: 2062-1992 shall be used for all fabricated steel work. Steel should be to designation ST:42-S

3.4 :CANTILEVERMASTS :

(a) LOAD : For purposes of design the worst possible combination of all loads that may occur shall be considered. The load shall include the following (weights to be assumed for design of Structures are shown against important items).

- i) Weight of overhead equipment (1.60 kg/meter for each conventional and 0.9512 kg/meter for each Tramway OHE).
- ii) Weight of bracket supporting the overhead equipment (60 kg/normal bracket)
- iii) Weight of a man (60 kg)
- iv) Weight of an earth wire (0.32 kg/metre).
- v) Weight of feeder, return conductor or other special equipment wherever they occur.

vi) The effect of eccentricity of vertical and horizontal loads on the bracket due to variation in temperature.

vii) Wind loads perpendicular and parallel to the track. The wind pressure adopted shall be taken as that indicated in **Section-10 of this part**.

viii) Radial forces on the mast, due to stagger, curvature, anchorage etc.

ix) Weight of the mast itself.

x) Any other load or loads that may occur due to special location of the Structures.

(b) DEFLECTION : Notwithstanding the provisions contained in IS:800 – 1984 Referred to in para 2.3.3 above regarding permissible deflection, the following shall apply.

i) The deflection at the top of the mast due to permanent loads shall not exceed 8 cm and the mast shall be so erected that it becomes reasonably vertical after application of permanent loads.

ii) The additional deflection under maximum wind pressure shall not exceed 8 cm at the level of the contact wire.

(c) TORSION : The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

(d) TYPICAL DESIGN : The typical design of a traction mast is included in the set of standard drawings listed in Annexure-1 at Part-N. Employment schedules for standard masts for various locations and types are included in the standard drawings listed in Annexure-1 at Part-N, to enable selection of suitable type for different locations and local conditions.

3.5 : ANCHOR MASTS :

(a) Masts at which overhead equipment will be anchored shall also normally be of the same type as those in other locations. Anchor masts shall normally be provided with suitable guys, but struts may be permitted in special cases.

(b) DWARF MASTS: At certain locations where due to local conditions it is not feasible to anchor the guy rod on a foundation block in the ground, a dwarf mast shall be used in accordance with approved designs.

3.6: HEAD SPANS:

(a) LOAD: The loads to be considered shall be as detailed in para 2.3.4 (a) above as far as applicable and at their worst combination.

(b) SAG FOR HEAD SPAN WIRE: The sag of the head span wire shall be approx. one-tenth (1/10) of the span.

(c) MINIMUM TENSION IN CROSS SPAN & STEADY SPAN WIRES: For purpose of design, a minimum tension of 200 kg, shall be ensured in the span wires for worst combination of temperature and wind load.

(d) DEFLECTION OF MAST: Deflection at the top of the mast or Structure shall be limited to one-eightieth (1/80th) of its height above foundation.

(e) TYPICAL DESIGN: Typical design for head span mast carrying overhead equipment for 4 tracks will be furnished to the contractor.

3.7: PORTALS :

(a) GENERAL: Portals shall be of fabricated steel of standard types of purchaser's designs. The most important designs are covered by Drawings listed.

(a) LOAD: The load shall be as detailed in Para 2.3.4 (a) above is applicable.

3.8: STRUCTURES ON BRIDGES:

(a) The structure may be either cantilever masts or portals (hinged or fixed at base) depending on the type and condition of bridge pier capping. As far as possible cantilever masts grouted in foundations blocks on pier will be used. Where this is not possible cantilever masts with holding down bolts or suitable portals (hinged or fixed at the base) may be adopted.

(b) Designs of structures on bridges to suit different locations and local conditions will be furnished to the contractor by the Purchaser.

3.9: SPECIAL STRUCTURES :In the case of structures at locations not covered by the employment schedules furnished by the Purchaser, the contractor shall furnish complete design calculations justifying the choice of the type of structures for such locations.

3.10: SETTING OF STRUCTURES:

(a) The setting is the distance from the Central line of the track, on straight or curve to the face of the mast/structure of fitting located on the mast.

(b) On straight curve:

(c) **EXTRA CLEARANCE ON CURVES** - The minimum setting of structures on curves shall be determined by adding to the above minimum figures an extra clearance indicated in the table included in the set of standard drawings listed.

(d) **STRUCTURES WITH COUNTER WEIGHTS** - In case of structures carrying counter-weight assemblies, the term "setting" shall refer to the minimum distance of the counter-weight from the track centre under the worst conditions of wind.

(e) **STRUCTURES ON PLATFORM** - The setting of structures on platform shall be not less than 4.75m.

(f) **STRUCTURES NEAR SIGNALS** - In the vicinity of signals, structures shall be located in a manner which shall ensure good visibility where necessary, the setting shall be increased as per the relevant drawing included.

(g) **SETTING OF STRUCTURES** - The value of setting of masts/structures shall be painted on each mast/structure. The figure shall be 25 mm in size in white on a red background or as approved by purchaser in writing. In addition, the track level shall also be marked on the mast/structure by a horizontal red painted stroke.

3.11: NUMBERING OF STRUCTURES CARRYING OVERHEAD EQUIPMENT:

All structures shall be numbered in accordance with the numbering given in the approved overhead equipment layout plans. Enameled number plate shall be provided on each mast or structure as per approved designs.

3.12 STEEL WORK FOR SWITCHING STATIONS, FEEDING STATIONS AND GANTRIES

(a) **TENSION OF CONDUCTORS** :For purpose of designs, the maximum tension of different conductors, without wind load, shall normally be as under:-

- i) Deleted.
- ii) Maximum tension in the cross feeders at switching stations under worst conditions:-
 - 1) For spans less than 18 m ... 100 kgf.
 - 2) For spans more than 18 m ... 200 kgf.
- iii) Maximum tension in longitudinal feeders running parallel to the track at the switching stations under worst conditions. 1,500 kgf.
- iv) Tension in anchored overhead equipment in case of sectioning and paralleling stations. 2,000 kgf.

(b) **DEFLECTION OF GANTRY MASTS** :Deflection under the permanent loads (at an average temperature of 35°C without wind) at the top of the fabricated structures of mast shall be limited to one eightieth (1/80) of its height above foundation.

(c) Masts of the gantry at which feeder or overhead equipment will be anchored at the switching stations shall normally be provided with suitable guys, but struts shall not be permitted.

1. **CHAIRS AND BRACKETS:** Chairs, brackets and supporting steel work carrying potential transformers, lightning arrestors, insulators, etc., shall be made of fabricated steel and be mounted on the main auxiliary gantry preferably by means of clamps to avoid drilling of mast sections.
2. **UPRIGHTS AND FENCING:** Uprights carrying operating handles of isolators and fencing posts shall be made from steel sections, viz., channels, angles or small joists, either single or fabricated.

(d) **HORIZONTAL MEMBERS OF GANTRY**

Horizontal member of main as well as auxiliary gantry carrying isolator switches, insulators, potential transformers etc., shall be made from steel sections viz., channels, angles and small joists, single or fabricated. They shall preferably be attached to masts by means of clamps to avoid drilling of masts sections.

For purpose of design, all possible loads which may occur in the worst combination shall be considered. The loads shall include the following:

Weight of insulators, instrument transformer, isolator switches, bus-bars and their accessories.

Loads caused by feeders, along and across tracks, return feeders etc.

Loads caused by anchorage due to guying of anchored masts (where applicable).

Pull or Push on the structures due to anchorage and radial tension (where applicable).

Wind load on the different structures, conductors and equipment. The wind pressure shall be taken as that indicated in Section-10 of this part.

Weight of men working on the structures.

Weight of structure itself.

Erection loads.

Any other load or loads which may occur due to special equipment wherever they occur.

SECTION-4: EQUIPMENTS, COMPONENTS AND MATERIALS

4.1: GENERAL : This section deals with the details and specifications of the equipment components and materials to be used for traction overhead equipment, switching stations, L.T. supply transformer stations, traction sub-stations and shunt capacitor banks. This section does not cover foundations and structures. In general based on the specifications issued by various bodies, such as Indian Standard Institution, British Standard Institution etc. Specifications have been issued by the Purchaser. Such specification may be bought separately from the office of the Purchaser. All these specifications are included in the set of drawings and specifications.

4.2: COMPLIANCE WITH STANDARD SPECIFICATION: In the technical specifications of equipments, components and materials, references are made to the following standard specifications:

- i) International Electro Technical Commission (abbreviated as IEC) publications.
- ii) British Standards (abbreviated as BS)
- iii) Indian Standards (abbreviated as IS)

Tenderers may, however, offer equipment in accordance with the appropriate National Standard Specifications of the country of manufacture, but such offers will be treated as deviations and will summararily be rejected.

4.3: QUALITY ASSURANCE: The provisions for quality assurance will apply, including facilities to be provided by the manufacturer

4.4 :PROTO TYPE TESTS :

(a) FITTINGS, COMPONENTS AND MATERIALS : All the fittings, components and materials to be supplied by the contractor, in terms of this contract, the requisite number of proto types of components shall be supplied free of cost to the Purchaser for tests and approval. The tests will be conducted in a laboratory selected by the Purchaser.

(b) EQUIPMENTS: This comprises inspection and tests conducted on the first equipment of a specified manufacturer, which the Purchaser considers sufficient to prove that the design is in conformity with the specification at the manufacturer's factory. The type tests shall be conducted on each equipments as indicated in the individual specifications, in the presence of the Purchaser's representative. The Contractor shall arrange to get these tests conducted at his own cost.

(c) RESPONSIBILITY: Any testing and approval by the Purchaser of prototype shall in no way absolve the contractor of his responsibility under the terms of the contract for the equipment supplied and erected.

(d) EXEMPTION FROM PROTO TYPE TESTS : If prototype samples of equipments, components or fittings of any manufacturer have already been approved in connection with the electrification of other sections of Indian Railways, on the 25 kV 50 HZ single phase A.C. system prototype samples of such equipments, components or fittings will be exempted from the tests. Supply of bulk quantities shall, however, be effected only after the Purchaser's prior approval is obtained in writing.

(e) The results of prototype tests will be communicated to the Contractor as expeditiously as possible. Any delay in this respect will be ground for extension of time for completion.

4.5: ROUTINE INSPECTION AND TESTS: These comprise inspection and tests conducted at the manufacturer's factory for ensuring quality of manufactured items as part of the quality Assurance Programme.

4.6 : TEST CERTIFICATES : Three copies of the test certificates of successful prototype tests carried out at the manufacturer's factory on all equipments/ component/ fitting shall be furnished to the Purchaser within a month after completion of the prototype tests. Three copies of the routine tests carried out on each equipment shall also be furnished, after the equipment is passed by the Purchaser's representative on inspection.

4.7 : BULK MANUFACTURE : Bulk manufacturer may be undertaken only after specific written approval of the Purchaser or his representative has been obtained indicating that tests on the prototypes are satisfactory. Where prototypes have already been approved in connection with electrification works already in progress, bulk manufacturer may proceed after exemption from prototype tests is received from the Purchaser in writing.

4.8: INTER CHANGEABILITY: Allequipments, components and fittings shall be inter-changeable and supplies shall be in accordance with the Purchaser's designs unless otherwise specifically approved by him. Components such as fuses, indication lamps etc., should be replaceable with substitutes available indigenously, as far as possible. Important components and fittings and their drawings.

4.9: TECHNICAL SPECIFICATIONS : The following specifications (**latest revision as on the date of opening the tender**) will govern the supply and testing of important materials, components and equipments. Special maintenance instructions issued by RDSO/Railway Board for OHE/PSI equipment form part of the specification of this tender and contractor shall procure materials and erect equipment in confirmation with latest SMI's also.

Structural Steel	IS: 2062-1975, IS:800-1984 IS:808-1964 & IS :808-PT.I-1978, (PT.II) 1978 ,(PT.III) 1979, (PT.V) 1976, (PT.VI) 1976.
Tensile Testing	IS:1731-1971 IS:2004-1978, IS:1608-1972 For steel products, etc.
Welding Disc.	IS: 816-1969, IS: 731-1971, IS: 3188-1980.
Dropper Wire	IS: 282-1982.
Annealed Copper Jumper Wire.	IS: 434 (PT.I)-1964.
Al. Jumper wire	IS: 694 (Pt.II).
All Aluminium conductor	IS: 398 (PT.I)-1976.
Material for Aluminium Tubular bus-bar.	IS: 5082-1981.
Dimensions for Aluminium Tubular Bus-bar	IS:2673-1979.
Galvanized stay strand	IS: 2141-1979.
PVC insulated cables	IS: 1554 (Part-I) 1976.
Tin bronze castings	IS: 306-1968.
Aluminium bronze castings	IS: 3091-1965.
Malleable iron castings	IS: 2108-1977.
Grey iron castings	IS: 210-1978.
Aluminium castings	IS: 617-1975.
Copper strip for formed Fittings	IS: 1897-1983.
Cadmium copper conductor for overhead Railway Traction	ETI/OHE/50(6/97) With A&C slip NO.1 of(6/97)
Contact wire	ETI/OHE/42(6/97) with A&C slip NO.1
Annealed stranded copper conductors for jumper wire	ETI/OHE/3(2/94) with A&C slip No 1. (4/95)
Copper Bus-bar	RE/30/OHE/5(11/60)
steel tubes	ETI/OHE/11(5/89)
Hot dip galvanisation of steel masts (Rolled and fabricated) tubes and fittings used on 25 KV a.c. OHE	ETI/OHE/13(4/84) with A&C slip No.1 of (5/86). 2 of (4/90) & 3 of (4/90).
Stainless steel wire ropes	TI/SPC/OHR/WR/1060 (6/2006)
25 KV solid core insulator	TI/SPC/OHE/INS/0070(4/2007)

including those for polluted zones	
25 KV single and double pole isolator	ETI/OHE/16 (1/94) Rev 2(3/2004)
Bolts, Nuts and Washers	ETI/OHE/18(4/84) with A&C slip No.1 to 4(10/2002).
Aluminium Alloy Section and tubes.	ETI/OHE/21 (9/74)
Standard drawings for Traction overhead equipment	RE/OHE/25 (3/66)
Section Insulator assembly	ETI/OHE/27 (8/84)with A&C slip No.1 (10/92)
Enamelled steel plates	ETI/OHE/33 (8/85)
Galvanised steel wire	ETI/OHE/36 (12/73) Rev1(5/98)
Fittings for 25 KV 50 Hz AC traction equipment	ETI/OHE/49 (9/95) with A&C slip no.1 (5/97)
7.5 KV lighting Arrestor	ETI/PSI/3(8/75) A.C. slip No. 1 of (2/91)
25 KV Interrupter	ETI/PSI/167(9/97)
25 KV Potential Transformer.	TS/SPC/PSI/PTs/0992(08/2005)
25 KV Booster Transformer (100 KVA)	ETI/PSI/92(8/93)
-do- (oil filled)	ETI/PSI/98 (8/92) with A&C slip No.1 of 9/92, 2(1/94) & 3(6/94)
25 KV Drop out fuse switch & operating pole for use with 10 KVA &100 KVA, 25 KV/230 V LT supply transformer.	ETI/PSI/14(1/86) with A&C slip No. 1 of (4/87).
25 KV/240 V, 5KVA,10KVA, 25KVA,50KVA LT Transformer	ETI/PSI/15(8/2003).
3-pulley type Regulating equipment (3:1)	ETI/OHE/48A(9/85) Rev 5(08/2005)

4.10: NOMENCLATURE AND MARKING :

(a) All components and fittings supplied by the Contractor's shall bear the respective identification number and a mark to identify the source of supply except in the case of galvanised tubes, bolts and nuts and/or any other fittings as may be agreed to by the Purchaser.

(b) In case of insulators, galvanised steel tubes, stainless steel wire rope and conductors, name of manufacturer shall be specified in "As Erected" drawings for identification.

4.11: STEEL WORK AND PROTECTION AGAINST RUST :

(a) **GALVANISING** -All ferrous materials and fittings shall be hot dip galvanised according to the specification No. ETI/OHE/13 (4/84, Rev.3 or latest for "Specification for Hot dip zinc galvanization of steel masts (Rolled & Fabricated), tubes and fittings used on 25kV ac OHE").

(b) **PAINTING** - Some components or parts may, with the approval of the Purchaser, be protected only by paint and parts so protected shall be given two coats of composite Aluminium primer and two coats of Aluminium paints. The second coat of Aluminium paint shall be applied after erection.

(c) **RECTIFICATION AT SITE** -In case of modifications, which would damage the protective coat, repairs to such damage would be allowed only in exceptional circumstances. The part damaged shall be protected in accordance with the method indicated in specification No.ETI/C/3 (2/94, Rev.1 or latest for "Technical specification for Annealed stranded copper conductors for jumper wire for Electric Traction") or any other method approved by the Purchaser. The Contractor shall in all such cases obtain prior permission from the Purchaser before carryingout repairs.

4.12: BRACKET ASSEMBLY COMPONENTS :

4.13: INSULATORS :

(a) All insulators except those on return conductors and earth wires shall be of the solid core type. Disc insulators shall be used on return conductors and earth wires or other locations desired by the Purchaser. All solid core insulators shall confirm to TI/SPC/OHE/INS/1070(04/2007, Rev.0 or latest for "Specification for solid core porcelain insulators for 25kV a.c. 50Hz single phase overhead traction lines" and composite

insulator shall confirm to TI/SPC/OHE/INSCOM/1070 (01/2007, Rev.0 or latest for "Technical specification for Silicone composite insulators for 25kV ac 50Hz single phase overhead traction lines".

(b) **INTER-CHANGEABILITY**: For free inter-changeability only the following types of insulators shall be used. While the shapes of the insulators may vary slightly from those shown in the drawings, the essential dimension of the galvanised malleable cast iron caps as given in standard drawings shall be adopted.

- i) **9-Tonne Insulators**:- These will be used at all places for cut-in and terminal insulation including those in return conductors, but excluding those in earth wire.
- ii) **Solid core post insulators**:- These will be used at all places for supporting isolators mechanisms, bus-bars, jumpers etc., of 25 kV.
- iii) **Disc insulators 255 mm** :- Clevis type 255 mm disc insulators will be used for return conductor suspension and for earth wire cut-in insulator.

4.14 : ENDING FITTINGS AND SPLICES :

- (a) **GENERAL DESIGNS** - Terminating or ending fittings and splices on copper conductor shall be of the cone type clamping on both the inner and outer strands of conductor except for contact wire ending clamps which may be of wedge type. The arrangement shall be easy to install and also be such as would apply the clamping pressure gradually without shock (See ETI/OHE/49 (9/95, Rev.1 or latest for "Technical specification for Fittings for 25 kV a.c. OHE"). For Aluminium Alloy/conductor, the end fittings shall be either cone type, strain clamp type or any other type as approved by the Purchaser.
- (b) **LOADING** : All the parts shall be capable of withstanding without damage, a load greater than the ultimate strength of the wires to which they are fitted. In the case of thread no damage shall occur when they are subjected to a load equal to two third of the ultimate strength of the wires.
- (c) **RESTRICTED USE OF SPLICES** : [deleted]
- (d) **STRENGTH OF ASSEMBLED FITTINGS**: The strength of fittings assembled with appropriate conductors or wires shall be not less than that of the conductor or wire itself.
- (e) **ADDITIONAL TERMINATING WIRES**: Cadmium copper stranded wire of 65 sq.mm. nominal section or 37/2.1 mm (as used in head span construction) may be used as additional terminating wires for extending single and double conductors respectively, if termination at the nearest structure is not feasible .

4.15: ELECTRICAL CONNECTIONS FOR OHE:

- (a) **GENERAL DESIGNS** - All electrical connections between conductors shall be made by parallel clamps. The general arrangements of connections are soon in the standard drawings.
- (b) **JUMPERS**: Copper jumpers shall be of any of the followings:-
 - i) Large jumpers of annealed copper in accordance with specification No. ETI/C/3 (2/94, Rev.1 or latest for "Technical specification for Annealed stranded copper conductors for jumper wire for Electric Traction").
 - ii) Small jumper of annealed copper in accordance with the specification IS:434 - Pt.I.

JUMPERS: Aluminium jumpers wherever used, shall be of all Aluminium stranded conductor 19/7/ 1.4 mm bare 3/4 H generally conforming to IS:8130.
- (c) **BUS-BARS** : Bus-bars or rigid jumpers of copper where used shall be of 18 mm copper rod in accordance with RE/30/OHE/5 (11/60). Aluminium bus-bars wherever used shall be of 36/28 mm tubing (See 2.4.22 below). Aluminium tubular bus-bars shall be made of Aluminium Alloy grade 63401 (WP condition) to IS:5082-1981. The tolerance on diameter and thickness shall be as per class I, IS: 2673-1979.
- (d) **FEEDERS**: Feeders shall be of all Aluminium conductor 19/3.99 mm (SPIDER).
- (e) **RETURN CONDUCTOR** : DELETED
- (f) The general characteristics of all wires and conductors is included in a drawings listed in Annexure-I, Part-N.
- (g) Earth wire shall be of steel reinforced Aluminium conductor 7/4.09 mm (RACCOON) conforming to IS: 398 - (part-II) 1976.

4.16: TERMINAL CONNECTORS FOR EQUIPMENTS : Isolators, interrupter, potential transformer line indication type, lightning arrestor, fuse switch and L.T. supply Transformer shall be supplied by the Purchaser along with the terminal connectors suitable for taking jumper/bus-bar as required. However, Al-Cu strips shall be provided by the Contractor for bimetallic connections wherever required.

4.17: REGULATING EQUIPMENT : 3-pulley type regulating equipment (3:1 ratio) shall comply with the specification as indicated in para 2.4.9 of this Section.

4.18: --Deleted

4.19: ISOLATORS : 25 KV Isolator switches shall comply with specifications as indicated in para 2.4.9 of this Section.

4.20: INSULATION LEVEL : Interrupters, Potential Transformers line indication type, 42 kV Lightning Arrestors and other equipments shall be suitable for insulation levels indicated in the relevant specifications.

All equipment including insulators to be used at the traction substations, feeding station and shunt capacitor banks shall be suitable for the insulation level specified below:

SERVICE VOLTAGE	220 kV	132 kV	110 kV	66 kV	25 kV
i) Power frequency 1 min. wet withstand test – KV (rms)	460 kV	275 kV	230 kV	275 kV	100 kV
ii) Impulse (1.2/5° microsecond) withstand test positive and negative polarity (crest value) – KV (peak).	1050 kV	650 kV	550 kV	650 kV	250 kV

4.21: BUS-BARS :

(a) No splicing will normally be allowed in the tubular bus-bars unless the length of the bus-bar exceeds 6m.

(b) **GENERAL** - The bus-bar shall be clean, smooth, mechanically sound and free from surface and other defects. Provision shall be made where necessary to allow for expansion and contraction of bus-bars caused by temperature variation. The open ends of bus-bars shall be covered by suitable tube caps, wherever the tubular bus-bars are required to be bent, the radius of the bend shall be not less than 200 mm.

(c) **JOINTS** -

i) The joints in bus-bars shall be mechanically and electrically sound so that the temperature rise under normal working condition does not exceed 40°C for an ambient temperature of 65°C.

ii) All Aluminium joints shall be thoroughly cleaned and smeared with suitable corrosion inhibiting joint compound before and after assembling the joint. Similar procedure shall be followed for connecting the equipment terminals to the Aluminium bus-bars with bi-metallic connectors.

(d) **ACSR Conductors**

ACSR conductors used as bus-bars or bus-bars connections shall be of ZEBRA ACSR size 61/3.18 mm (28.62 mm dia) at 132/25 kV traction sub-station.

(e) **Aluminium tubes**

Aluminium tubes used as bus-bars or bus-bars connections shall be of dia 50 x 39 mm for traction sub-station and shunt capacitor banks and of size 36 mm x 28 mm for feeding stations. The aluminium tubes shall be made of alloy 63401 to IS:5082-1998 and IS:6051-1970 or its equivalent. The maximum manufacturing tolerance on diameter and thickness of the tubes shall not exceed the values specified under Class-I of IS 2673 – 1979.

(f) **Bus-bar junctions and connectors.**

Bus-bar junctions and connectors shall be made with aluminium alloy Grade 460 M to IS: 617 – 1994 of equivalent.

(g) **TERMINAL CONNECTORS**

The equipments as power transformer, circuit breakers shall be supplied by the purchaser with suitable terminal connectors of approved design and of bimetallic type wherever required.

(h) INSULATORS

The pedestal insulators for service voltage of 132 kV shall be of Solid Core type confirming to specification as indicated in Annexure-1 at Part-N. The pedestal insulators for service voltage of 25 kV shall be of the solid core type conforming to specification as indicated in Annexure-1 at Part-N.

(i) NOMENCLATURE

All components/fittings supplied by the Contractor to Railway's standard designs shall bear the standardized nomenclature and identification numbers, if any.

4.22: CABLING :

(A) Switching stations

(a) CABLE FOR L.T. SUPPLY : 240 V A.C. supply from L.T. supply transformer at switching stations shall be brought and terminated on the L.T. a.c. distribution board in the remote control cubicles at the switching stations by 1100 Volt 70 sq. mm aluminium two-core PVC insulated PVC sheathed and steel armored heavy duty cable conforming to IS:1554 (part-I): 1975.

(b) CONTROL AND INDICATIONS CIRCUITS -All other cables for control and indication at switching stations shall be 1100-V grade PVC insulated and sheathed un-armored (heavy duty) complying with IS:1554(part-I)-1975.The cables shall be provided as indicated in the Table below:-

PURPOSE	RUN	CIRCUIT VOLTAGE	CORE SIZE & MATERIAL	No. OF CORES
Control and indication of Interrupter s.	From each interrupter to terminal board	110V D.C.	2.5 sq.mm copper	7
Catenary indication	From each PT line indication type to terminal board.	100V AC	-do-	2
Heater supply for interrupter control mechanism cabinet.	i) From interrupter to interrupter.	240 V AC	2.5 Sq.mm Copper	-do-
	ii) From each interrupter to fuse box.	-do-	-do-	-do-
	iii) From fuse box to distribution board.	-do-	-do-	-do-
Battery supply	i) 110 V battery charger to 110 V Battery.	110 V DC	4.0 Sq. mm Copper	-do-
	ii) 110 V Battery to 15 A, DC fuse box.	110 V DC	-do-	-do-
	iii) 15 A DC fuse box to terminal board.	-do-	4.0 Sq. mm Copper	2

NOTE:

i) In case of feeding stations which are located within the traction sub-station premises, the cables shall be run from individual equipment and terminated inside the sub-station control room.

ii) Notwithstanding the sizes of cables given above, the Tenderer shall assure himself that various cables would suit the ratings of equipments offered by him.

(c) SPECIFICATION -The cables shall be resistant to decay, abrasion, acids, alkalis and other corrosive materials. All indoor wiring on walls shall be clamped neatly on teak wood battens fixed to the wall by means of wall plugs/wooden pegs. The cable run layout at typical switching stations is shown in the relevant drawing already included.

(B) CABLES FOR SUB-STATIONS : Deleted

4.23 : LITERATURE FOR EQUIPMENT :The Contractor shall within one month of issue of Letter of Acceptance of Tender, supply six (6) copies of detailed schedule, catalogues and drawings of all parts of the equipment.

SECTION-5.0: DESIGNS AND DRAWINGS

SECTION-1

DESIGNS AND DRAWINGS FOR O.H.E, SWITCHING STATIONS AND BOOSTER TRANSFORMER STATIONS

5.1: GENERAL :

- (a) This chapter deals with the procedure for approval of designs and drawings.
- (b) The type designs shall be as few as possible to cover the largest field of application consistent with economic consideration.
- (c) In all drawings as far as possible only such symbols as are in international use, shall be used as per Indian Railway Works Manual unless otherwise specified or conveyed by purchaser.

5.2: CONTRACTOR'S DRAWINGS :

(a) The Contractor shall submit to the Purchaser for approval except where otherwise specified below, all detailed designs and drawings which are necessary to ensure correct supply of equipments, components and materials and to enable correct and complete erection of overhead equipment, switching stations, booster transformer stations, L.T. Supply transformer stations, TRACTION SUB-STATIONS AND SHUNT CAPACITOR BANKS in an expeditious and economic manner.

(b) RESPONSIBILITY: It is to be clearly understood that all original designs and drawings shall be based on a thorough study. General designs and dimensions shall be such that the Contractor is satisfied about the suitability of the designs for the purpose. The Purchaser's approval will be based on these considerations and notwithstanding the Purchaser's acceptance, the ultimate responsibility for the correct design and execution of the work shall rest with the Contractor in terms of the conditions of Contract.

5.3 :STANDARDS FOR DRAWINGS : All designs, legends, notes on drawings and schedules of materials shall be in English and shall be prepared in the metric system. All designs and drawings shall conform to specification No. ETI/OHE/53 (6/88) amended upto Nov.2006 or latest (Principles for OHE layout plans and sectioning diagrams for 25kV ac traction) and ETI/PSI /31(5/76) or latest (Standards for drawings for power supply installations)

5.4 :BASIC DESIGNS :

(a) STANDARD DESIGNS: Where the Contractor adopts designs and drawings conforming to the standard designs, drawings and specifications of the Research, Designs and Standards Organization. Manak Nagar, Lucknow-226 011 (RDSO) for basic arrangements, equipments, components and fittings of traction overhead equipment, switching stations and L.T. supply transformer stations and adopts employment schedules furnished by the Purchaser, he shall verify such designs, drawings and employment schedules and satisfy himself that these are correct before use. Within two months of the issue of letter of Acceptance of Tender the Contractor shall indicate to the Purchaser, the list of standard basic arrangements, components and fittings drawings and employment schedules, which he will adopt for the purpose of the work.

(b) DEVIATIONS: Normally deviations from the standard drawings of the Purchaser will not be accepted. However, in exceptional cases where the Contractor desires to suggest improvements as a results of his experience or other development, he shall justify his proposals with supporting explanatory notes.

(c) STANDARD DRAWINGS:

Drawings shall be made in accordance of works manual. The some details are given as below:

Para 902: Plans for Other Departments

- a) The Engineer may, at his discretion, request sketch plans for other Departments or other Government Departments, or for private parties. Detailed plans should be prepared when there is a likelihood of the schemes proposed being sanctioned or when the charges for preparation of plans and estimates have been deposited.
- b) When preparing plans, the Engineer may obtain complete details from other departments. He should arrange for the plans to be signed by the representative of the department concerned or the private party in token of approval and acceptance the terms "tracing" includes drawings/ documents which are capable of being reproduced.

Para 903: Sizes of Drawings

- a) Sizes of the trimmed sheets of all drawings, except yard plans, should be as given in Table 9.1. All plans required to be of longer length will be in the form of a roll, keeping the width

as specified. The size to be used would depend on the extent of details required; broad guidelines are indicated in Table 9.1.

No.	Sheet Designation	Trimmed (mm) (WxL)	Size
1.	A0	841x1189	Index Plan and Section, General arrangement and detailed drawings for road over bridges, major/important bridge works & important structures, building (steel and concrete) etc.
2.	A1	594x841	General arrangement.
3.	A2	420x594	Temporary arrangement & detailed drgs. for bridge works, steel structures, building and temporary arrangement drgs. for Sr. No. 1 above.
4.	A3	297x420	Site plans for road over/road under bridges, passenger platform coverings, buildings etc. and drawings for minor detailing.
5.	A4	210x297	Plans for inclusion in Works Programme booklets for handy reference, PERT charts of works of limited activities etc.

General power supply diagram, Pegging Plan, wiring plan, OHE sectioning diagram, Layout OHE plan, bonding plan, OHE profile drawing, can be in running continuous sheets of width minimum 285 mm to 350 mm with proper folding. The miniature wiring monitoring cum sectioning diagram to be made in continuous sheet of width 140mm to 160mm suitably folded. The progress of wiring done is coloured as it progresses.

The track in layout plan shall be shown as double line contrary to other drawings which facilitate depiction of the stagger of contact wire.

Cross section diagram for portals shall be in A3 sheets and others shall be in A4 sheets. Substation drawing, SP and SSP drawings shall be in size A3 except substation layout plan which shall be in A2 size.

- b) Depending on the size of a yard, yard plans should be prepared in the trimmed widths of 841 mm or 420 mm or 210 mm. The length of the yard plans should not be more than 1189 mm when they are not intended to be kept as a roll. Yard plans can be in parts, if necessary, maintaining the scale for the drawing.
- c) Borders enclosed by the edges of the trimmed sheet and the frame limiting the drawing space shall be as detailed in BIS: SP - 46-1988 and shown in Annexure 9.1.
- d) A standard arrangement of drawing layout will ensure that all necessary information is included and its essential part is located easily. The title block should be placed at the bottom right hand corner. Folding marks must be made on the drawing sheet

904 Titles and Numbering of Drawings-

- a) Title block should be of size 170 mm x 65 mm
Following basic information should be given in the title block.
 - 1) NAME OF THE RAILWAY
 - 2) NAME OF DIVN/CONSTN. ORGANIZATION
 - 3) NAME OF WORK
 - 4) REFERENCE TO SANCTION PARTICULARS
 - 5) SCALE OF DRAWING AND REFERENCE TO STANDARD DRAWING, IF ANY
 - 6) DRAWING NUMBER
 - 7) COMPLETION DRAWING NUMBER
 - 8) DATED INITIALS OF THE CONCERNED OFFICIALS
 - 9) ALTERATIONS, IF ANY, WITH FULL PARTICULARS
- b) Multiple drawing sheets marked with the same number should be indicated by means of a sequential sheet number on the total number of sheets in the following manner Sheet No. = n/p

Where n is sheet number and p = total number of sheets

- c) If a drawing cancels a previous one, a note to this effect and the number of cancelled drawing should be recorded on the drawing. Correspondingly, the cancelled drawing should have an appropriate endorsement.
- d) In the case of land plans or plans where other Railways or Organisations are concerned, additional space should be provided for their signatures. In cases involving organisations other than the Railways, the designations should be written in full.
- e) All signatures on tracings should be in indelible ink and dated.

Para 906 Details on Drawing

- a) The following information should, when applicable, be shown
 - i. The magnetic north point and true north with magnetic variation, if known and where buildings are designed to suit a particular orientation, an indication to that effect.
 - ii. The names of the nearest junctions or terminals stations, that on the left hand being the one from which the kilometrage starts.
 - iii. The kilometrage from headquarters of the railway to the centre of the station, the kilometrage of all junction points, the zero of all branch lines, the centre of a station, junction point and zero of any line, when once adopted for any 'yard' or portion of the line, shall be a permanent mark for all future references and shall not vary with additions, alterations, or remodelling of yards.
 - iv. The original centre line of the railway together with its chainages.
 - v. The boundaries of land according to the land plans. Where it does not unduly interfere with important details of the plan, side widths from the centre line and boundary posts (and desirably their numbers) should be shown.
 - vi. Any known bench mark with the datum from which its value has been reckoned.
 - vii. The degree, radius, total angle of deflection and the tangent points of all curves on the line, both on the plan and in the longitudinal section. Beginning and end of transitions together with their lengths should also be shown.
 - viii. All gradients, together with the distance from which the level or gradient extends out of station.
 - ix. All borrow pits, rivers and pipelines, streams, sullage and sewer drains together with their direction of flow. For rivers their names and the highest known flood levels must be given.
 - x. Temples, mosques and graves, roads and footpaths with the names of towns or villages they lead to.
 - xi. The position and block numbers of buildings. Where a building consists of two or more storeys, the number of floors shall be mentioned. Where outhouses exist, these shall be marked "O.H. Lo Block No."
 - xii. In the case of foundations, the nature of the soil as determined from trial pit, and bore log details.
 - xiii. The clear length of all inspection pits, capacity of weigh-bridges in tonnes; diameter of turntables; capacity of high level tanks and of ground tanks; diameter and depth of all wells whether for drinking or for loco use; diameter of water columns, hydrants, taps, main and subsidiary pipe lines; the clear lengths and sizes of drains and sewers and stormwater drains; location of septic tanks.
 - xiv. The length and capacity in terms of vehicles of sidings; position of fouling marks and buffer stops; distance, centre to centre of tracks; distance of all the facing points on the main line from the centre of station; the serial numbers of the turnouts; the angles of crossings; inclination of gathering lines; the distance from the centre of station of all signals, signal cabins with their distinguishing feature, signals being shown as viewed by the Driver and with their bases at the sites they occupy; lengths of passenger and goods platforms and their heights above rail level; telegraph posts and crossings of telecommunication and power lines over head or underground.
 - xv. Road crossings with their class and location; road over bridges and underbridges;
 - xvi. Infringements of standard dimensions, if any.
- b) Drawing for a structure including building should be prepared in three parts :
 - i. Site plan

- ii. Architectural and/or General Layout drawing
- iii. Structural and/or execution drawing.

In case of small buildings, all these parts can be included in one sheet but-placed distinctly. The site plan can be separate or part of an existing general plan. Site plans for new quarters should include the type drawing numbers and show the north line and direction of prevailing wind. The Architectural drawing should normally include ground plan, section through the building in such directions as are necessary to exhibit the intended form and dimensions of the various parts, and elevation of one or more faces. It should invariably indicate the number of floors for which the foundation of the building is designed. It should also include roof drainage arrangement, sanitary details, layout of bathrooms and layout of kitchen. Details of finishing items and specification should also be indicated in the Architectural drawing in the form of a note. Landscaping and developmental work involved must also be shown. The structural drawing will indicate foundation plan, details of R.C.C. members and a bar bending schedule as per standard I.S. bar bending specification.

- c) The drawings for a bridge should include the site plan, plan and longitudinal section of the river or nala above and below the proposed site in the case of large bridges being rebuilt on account of insufficient waterway or being built at a new site and a sufficient number of cross sections showing highest flood level. If a correct survey of an important river does not exist, the river should be surveyed for a distance of 8 km upstream and 2 km down stream, all spill channels upstream being shown on the plan; these distances of 8 km and 2km are to be taken as measured at right angles to the centre line of the Railway and not along the course of the river. On these drawings, notes should be made of area of flood sections and hydraulic mean depths for each case, catchment area, velocity obtained by calculation and by experiments (preferably at high flood), waterway through bridge proposed to be allowed with a note on increase in velocity and probable highest flood level due to afflux, ground plan of foundations, sections through the bridge in such directions as are necessary to show the intended form and dimensions of the various parts, front and side elevation of abutments and piers, and drawings of such details as have not been standardised. The standard of loading for which the bridge is designed should be recorded in the plan and reference to the type drawing of the particular girder should also be recorded.
- d) Plans of water supply, pumping, storage and distribution systems should show complete dimensions and details including reduced level of salient points. The lines should be drawn in thicker lines than the rest of the plan and only sufficient buildings (with their designations) and tracks shown as are necessary to make the purpose and location of pipe-lines understood.
- e) Plans of drains and sewerage should show complete dimensions and details with sufficient features of the site including gradient and reduced level of salient points.
- f) The set of drawings should be complete so as to enable the work being executed as per the specifications and standards desired.

907 Symbols and Colours on Drawings

- a) Symbols to be used on site plans and plans of station yards should conform to BIS code SP46-1988. For other commonly accepted abbreviations and symbols, table 19.1 of BIS code SP46-1988 may be referred to.
- b) For clarification of drawings it is sometimes necessary to shade some members/parts of members for which section, are drawn. In such cases, colour washing/ shading in hroartline may be done on the back of the tracing for the affected area.
- c) In regard to black and coloured lines on tracings and prints, the following conventions should be observed
 - i. Existing work that is to remain should be in full line;
 - ii. Work that is to be dismantled should be in thin clotted lines;
 - iii. New additional work should be in full red lines. This does not apply to a drawing in which all the work is new;
 - iv. New additional work that is not to be done at the same time as the bulk of the work shown on the drawing should be in broken red lines. This does not apply to a drawing in which all the work is new;

- v. Work to be relaid or rebuilt elsewhere on the same plan should be in full yellow lines.
- d) When desirable to do so, coloured lines may also be used to distinguish tracks of different railways at junctions, M.G. or N.G. from B.G. tracks and buildings of different railways. If this is done, the colour used should be distinctly different from those mentioned above.
- e) The following colours will print clearly on ferro-paper:

Black .. Indian ink

Red .. Vermilion red or scarlet lake

Yellow .. Chrome yellow

Green .. Emerald green

Blue . .. Prussian blue Cobalt blue mixed with a little Chinese white.

Para 908 Standard Drawings

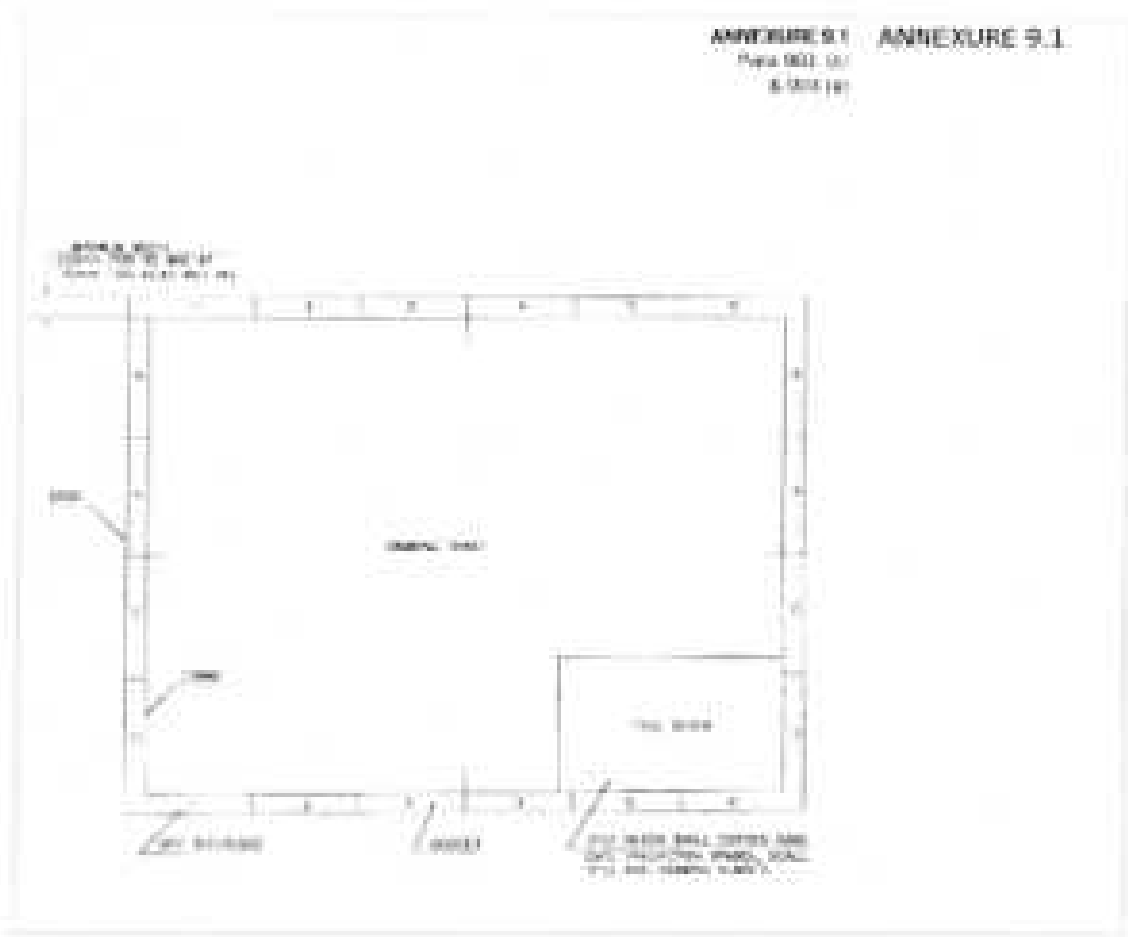
Standard drawings issued by the RDSO such as for track and bridges and the Track Manual Drawings, TI directorate of RDSO, shall not be traced. Copies as required should be obtained or Standard drawings should be carefully filed in each office separately from other drawings and a record thereof maintained.

Para 909 Plans issued by the Dy.CEE/GS/SC's Office

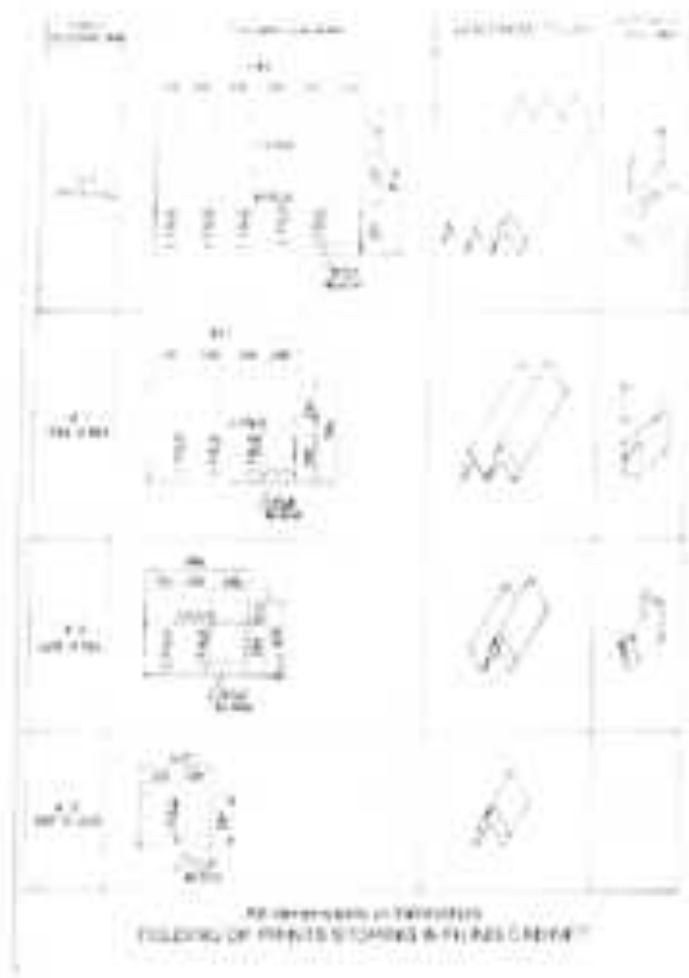
Copies/Prints of plans issued by the Dy.CEE/GS/SC office should be carefully maintained and recorded; copies as required may be obtained.

Para 910 Plans in Divisions, Assistant Electrical Engineer's and Section Engineer's offices:

- a) The Divisional/Executive I- Engineers and Assistant Engineers should be in possession of a set of each of the Standard Drawings, type plans, and station yard plans, land plan", plans and longitudinal sections of the line, track diagrams, plans of bridges and other structures and plans of water supply and drainage as pertain to their jurisdiction. Plans in their custody should be carefully stored. They shall ensure that the Section Engineer of Permanent Way, Works & Bridge, OHE, PSI are in possession of necessary plans as pertain to their jurisdiction and to works.
- b) Plans need revision as and when renewals are carried out and additions or alterations are made. Every endeavor should be made to keep the track diagrams and plans, particularly of station yards and colonies, up-to date and the Chief Engineer's office kept advised with details. When alterations are extensive and cannot be shown on an existing plan, a fresh plan should be prepared.



ANNEXURE 9.2

Para 907 ABBREVIATIONS

1. Scope - This section covers such of the abbreviations which are recommended for use in general engineering drawings. Abbreviations already covered in specific subjects, such as units and quantities, tolerancing, gears, fluid power, electrical and electronics are not dealt in this section.
2. Enclosed Table lists some of the common abbreviations recommended. Abbreviations are the same both for singular and plural usage. Only capital letters are used for abbreviations to ensure maintenance of legibility bearing in mind reproduction and reduction process. Abbreviations which have already been standardized nationally/internationally using lower case letters should, however, be written according to the corresponding standard.
3. When using abbreviations and symbols in engineering drawings, the following points are to be borne in mind.
 - a) They should be used sparingly only when space saving in a drawing is essential.
 - b) Short words such as 'day', 'unit', 'time', etc., should preferably be written in full, even when an abbreviation has been standardized.
 - c) Periods (full stop symbol) are not to be used except where the abbreviation marks a work (for example, No; FIG.)
 - d) For hyphenated words, abbreviations are to be with the hyphen.
 - e) Sometimes one and the same letter symbol may represent more than one term or quantity. Hence it is advisable not to use such symbols to mean two different terms in one and the same drawing. If it becomes unavoidable, the symbols may be provided with suitable sub script.

RECOMMENDED ABBREVIATIONS

Term	Abbreviations	Term	Abbreviations	Term	Abbreviations
Across corners	A/C	Across flats	A/F	Alteration	ALT
Approved	APPD	Approximate	APPRO	Auxiliary	AUX
Arrangement	ARRGTX	Assembly	ASSY	Bearing	BRG
Bureau of Indian Std.	BIS	Cast Iron	CI	Centre Line	CL
Centre of gravity	CC	Centre to Centre	C/C	Centres	CRS
Chamfered	C HMED	Checked	CHKD	Cheese head	CHHD
Constant	CONST	Continued	CONTD	Counterbore	C'BORF
Countersunk head	CSK HD	Countersunk	CSK	Cylinder/Cylindrical	CYL
Diameter	DIA	Dimension	DIM	Drawing	DRG
East	E	Etcetera	Etc	External	EXT
Figure	FIG.	General	GEN	Ground Level	GL
Haxagon/Hexagonal	HEX	Head	HD	Horizontal	HORZ
Hydraulic	HYD	Inspection/ed	INSP	Inside diameter	ID
Insulation	INSUL	Internal	INT	Left Hand	LH
Long	LG	Material	MATL	Machine/Machinery	M/C
Manufacture/ing	MFG	Maximum	MAX	Mechanical	MECH
Minimum	MIN	Miscellaneous	MISC	Modification	MOD
Nominal	NOM	North	N	Number	NO
Outside	OD	Pilch circle diameter	PCD	Quantity	QTY
Radius	RAD	Required	REQD.	Right Hand	RH
Round	RD	Reference	REF	Screw/Screwed	SCR
Serial Number	SL. NO.	Sheet	SH	South	S
Sketch	SK.	Specification	SPEC	Sketch	
Standard	STD	Spotface	SF	Symmetrical	SYM
Temperature	TEMP	Thick	THK	Thread	THD
Through	THRU	Tolerance	TOL	Typical	TYP
Undercut	U/C	Weight	WT	West	W

5.5 : SPECIAL DESIGNS :

(a) In cases where standard designs, drawings or employment schedules do not cover requirement of special locations or site conditions, the Contractor shall submit his own designs or drawings alongwith supporting calculations and notes for scrutiny and approval of the Purchaser.

(b) Such special designs shall generally be in conformity with basic designs furnished by the Purchaser and in accordance with the specifications. If the Contractor wishes to adopt special designs which do not conform to the general basic designs of the Purchaser, he shall submit alternative designs and drawings justifying his proposals.

5.6: PARTICULAR DESIGNS & WORKING DRAWINGS FOR O.H.E. :

5.6.1 PURCHASER'S PEGGING PLANS: The pegging plans for sections to be equipped indicating the type of overhead equipment, locations of masts and other general particulars prepared on the basis of the latest survey will be furnished by the Purchaser. The Contractor shall verify and check these plans at site.

5.6.2: CONTRACTOR'S PEGGING PLANS:

If the Contractor is called upon to carryout survey and prepare overhead equipment pegging plans, he shall submit such plans for approval after checking their feasibility at site.

(i) The detailed scope of work required to be carried out by contractor are broadly categorized here under.

(a) Collection of Instructions and relevant documents if any from Dy.CEE/GS/SC in respect of the section.

- (b) Preparation of Pegging plans in AutoCAD duly showing the details of existing electrified line, L.T. Supply Transformer stations including associated modifications to the existing OHE and Switching Stations if any.
 - (c) Preparation of sectioning diagram in auto cad duly covering existing Elementary sections.
 - (d) Preparation of other design drawings, if any.
 - (e) The proposed new BG line to be provided with conventional OHE by using **65 Sq.mm catenary wire and 107 Sq.mm HDG copper contact wire.**
 - (f) Site marking / inspection of OHE Pegging plans (jointly with purchaser's representative if required).
 - (g) Incorporating corrections in the tracings and soft copy of Pegging plans, if found necessary, during site marking / inspection, to evolve pegging plans and submission of three prints thereof for comments / approval.
 - (h) Preparation of quantity assessments in the standard format adopted by TRD construction organization in respect of overhead equipment and power supply equipment. The quantity assessment shall be made for each section covered under one plan.
 - (i) All types steel structures required in the Pegging Plan shall be tabulated and furnished on the Pegging Plans. Length of conductors (Catenary and Contact wires) required for each tension length and anticreep wire shall be shown on the final Pegging Plan in a tabulated form. List of ROB, FOB, Tunnels, Level crossings with Nos. etc., should be submitted. For FOB& ROB chainage, height from Rail level to bottom mast structure also should be furnished.
 - (j) Preparation of OHE profile drawings including calculations and other data for over-line structure / Bridges [ROB/ RUBs], if any for adopting special design.
 - (k) Preparation copies in auto cad for the standard RDSO/CORE design drawings such as dropper schedule employment schedules, IOL / UIOL drawings etc. by using **65 Sq.mm catenary wire and 107 Sq.mm HDG copper contact wire** duly adopting complete guidelines, laying down the standards / specifications / principles etc.
 - (l) All available plans of the section, bench marks, reports of earlier studies, basic rules for preparation of designs, details of proposed work along with route, typical designs of loco sheds, substations etc., will be made available to the contractor on request during course of execution of the work.
 - (m) In case where lines to be electrified are not in their final position, the purchaser shall furnish the remodelling plans and / or peg out the altered position of tracks. Based on the pegged out location of tracks and the information available in this remodelling plans the contractor shall prepare the survey plans and finalise the Pegging Plans.
 - (n) Slewing of tracks, if required for location for OHE structure will be indicated by the purchaser, which contractor will record on the Pegging Plans.
 - (o) The pegging plans shall also indicate details of removal of infringements such as diversion of drains, pipes, signal wire, rods or other installations, details of which shall be jointly finalized with the purchaser.
 - (p) The stretches of the section where return conductor and Booster transformers are to be located shall be intimated to the contractor.
- (ii) The following information shall be collected while carrying out the field survey of the section, in respect of the tracks required to be wired and also all the tracks in their vicinity, to enable preparation OHE Pegging Plans.
- (a) Track centre distance at every 30M in case of double and multiple tracks, in stations and yards, commencing from the kilometre post. Chainage of the existing gradient posts and details of the gradient indicated thereof e.g. 1:100 (R) and 1:200 (F) etc.,
 - (b) Chainage of the existing curve pillars and the particulars as furnished thereof in respect of the curvatures e.g. degree of curvature; radius of curvature, length of curve, deflection angle, chainage of transition, turning point and of the turning points as well as super elevation will be measured if available at site.
 - (c) Versine in every span length for each individual track through-out the section.
 - (d) Cross section of the formation at a regular interval of 200m, commencing at the kilometre posts, to indicate the ground profile. The ground profile will cover a distance of about 4/5m from the centre line of the track and will be measured with a string and survey rod.
 - (e) Type of soil: - One statement indicating the type of soil has to be submitted in duplicate to purchaser based on observations, along with each Pegging Plan.

- (f) The chainages of both the edges, the width, number and class of the level crossing, dimensions relating to the position of gate lodge and the level crossing barrier with reference to the track.
 - (g) The chainage of the centre line of all the existing trolley refuges. The number of bridge/culvert, the chainages of both the abutments, centre line and with/shape of the piers. Wherever structures are to be located on a bridge or inside of a tunnel, sufficient details will be given on the location where structures will be located.
 - (h) In case of structures locating on piers, and inside tunnel dimensions of space available, a cross section giving details of bridge member and in case of suspension from top or vertical members of bridge/tunnel, the cross section at the suspension/fixing points will be shown, giving all relevant details with dimensions. The design of supporting arrangement will not, however, form part of the contract.
 - (i) The chainages of the both the edges, width and clear headroom available for each of the wired tracks under the over line structures e.g., Road Over Bridge, Foot Over Bridge, Flyover Bridge, through girder bridges etc. In respect of overhead electrical high tension (11kV & above) crossings chainages and clear head room has to be shown. In case of LT/P&T crossings only centre line chainage will be provided.
 - (j) Chainage at both the edges of the tunnel and cross sectional details at every 10m interval apart from one end of the tunnel to the other end, indicating the tunnel cross section profile along with details of space available for locating OHE structure.
 - (k) All the underground obstructions, which may infringe with the casting of OHE foundations like watering arrangements, underground cables and pipes will be shown on the Pegging Plans. The details may be ascertained from the local Railway staff. Necessary assistance in this respect will be provided by the purchaser if required.
 - (l) The chainage of the actual toe of the switch, the nose and the fouling board for every turn out will be indicated. The chainage of the centre line of the diamond crossing, the number of slips and chainage of the actual toes of the switches.
 - (m) The chainage, implantation, number and position of existing signals, with reference to adjacent tracks. The distance of extreme edges of a group of point rods requiring adjustments / special arrangements in locating OHE structures over/near them, from the centre of the adjacent track/s at regular interval of 25m throughout the length of the run of point rods. Position details/chainage of signal location boxes.
 - (n) Chainage/Position details with reference to adjacent track/s in respect of all the building structures e.g., station building, cabins, cable huts, goods and parcel sheds, tea and other vendor stalls on platforms etc.,
 - (o) Chainage/position details of carriage watering arrangements, water columns and ash pits. Chainage of the edges of platforms ends and ends of ramps, height of the platforms and width in respect of island platform chainage of extreme edges of platform sheds is also to be mentioned.
 - (p) The distance of the near and far edges of pucca drains (requiring adjustment/special arrangements for location of OHE structures near/over them) at a regular interval of 25m throughout the length of the run of drain from the centre of adjacent track/s.
 - (q) Position/Chainages of edges of sub-ways and their outlets on platforms. Relevant details of any other existing feature/s and obstruction/s, which will affect location of OHE, structure over/near the same i.e. 10m on either side of the track. The existing OHE location position to be indicated in the Pegging Plan.
- (iii) The pegging plans should be prepared on the basis of the parameters prescribed in the principles of Overhead Equipment Layout issued by RDSO/Lucknow; latest directive of CORE/Allahabad and Railway Board on this subject. The following standards/conventions will be observed for preparation of Pegging Plans:
- (a) Standard width of the tracing shall be 297 mm or multiple thereof.
 - (b) A scale of 1:1000 for open section and 1:500 for station / yard shall be used. The station / open section shall commence at the Km. post immediately in advance of the first turnout from

- the main line and shall end at the Km post immediately after the last turn out from the main line.
- (c) An arrow at the end of the plan will be provided to indicate the direction and name of the adjacent/extreme station in the section. The track shall be represented by single line in open section and by double line in station section.
 - (d) Track shall be designated as UP/DN Up Loop / Dn. Loop Third BG line etc., according to the standard convention. The progressive direction of plotting shall be as per requirement of the purchaser.
 - (e) For structures in the vicinity of signals as per standard RDSO drawing setting will be adopted to cater for both existing semaphore and proposed CLS. The locations of proposed CLS signals will be indicated by the purchaser.
 - (f) Normally the plotting shall begin at the Km post and end of the Km post. The length covered will not be more than 3Km in one plan. Only one single plan shall be prepared to cover the entire length of station section from Km post at one end to other Km post at the other end. However, in case of every big yards, convenient subdivision shall be made and key plan showing the sub-division shall be prepared based on the relevant wiring plan.
 - (g) Two prints of pegging plans will be supplied to purchaser as soon as tracings are ready for reference and record. Comments of the purchaser, if any, received will be utilized for incorporating necessary corrections at the time of preparing Pegging Plans.
 - (h) All the observations and corrections made during site inspection after pegging plan will then be incorporated. The plan will then be thoroughly scrutinized to eliminate all design / field errors / omissions and Two prints of pegging plans and CD to be submitted for scrutiny and comments.
 - (i) On receipt of approval for the Pegging Plan on original tracing, distribution copies as given in Para 2.5.10[m] along with the soft copy to be submitted to purchaser.

5.6.3: PRINCIPLES OF LAYOUT: The Contractor shall in all cases ensure that the final pegging plans are in conformity with the latest 'Principles of preparation and checking of OHE layout plans and sectioning diagram issued by RDSO. (Specn. No. ETI/OHE/53(6/88) AND 3(6/90) with latest corrections.

5.6.4: PROVISIONAL LAYOUT PLANS: The Contractor shall prepare and submit overhead equipment layout plans incorporating the following information:

- i) The run of wires in different thickness or colour in special cases and termination.
- ii) The run of wires for future wiring indicated to the Contractor, in dotted lines.
- iii) Exact position of all cut-in-insulators, including section insulators.
- iv) Direction and value of stagger at each traction structure location.
- v) Clearance of live conductors to Structures in the vicinity including bridges, signals gantries etc.
- vi) Layout of feeders.
- vii) Jumper connections and connection to switches and switching stations.
- viii) List of infringements.
- ix) Kilometre numbers and type of Structures.
- x) Location and numbers of switches.
- xi) Schematic sectioning diagram drawn to convenient scale showing section insulator, number of switches, elementary sections and connections to switches and switching stations.
- xii) Table giving references of approved profile drawings, feeder layout plans and other relevant drawings.

5.6.5: O.H.E. PROFILE DRAWINGS: After completion of the overhead equipment layout plans, the Contractor shall prepare an overhead equipment profile drawings showing the actual height of the contact wire under each over line Structure the gradient and height of the contact wire on either side of the Structure and the encumbrances at Structures until normal height of contact wire and encumbrances are restored.

5.6.6: CROSS SECTION DRAWINGS: While the layout plans are being finalised, the Contractor shall submit for approval, cross-section drawings for each Structure showing guy rods, if any, indicating the cross-section of the formation, height and nature of soil, type of

foundation block, structure proposed, reverse deflection of the Structure and all necessary particulars for erection of the foundation and the Structures. In the preparation of drawings, care shall be taken to show all obstructions such as signal wires, points rods and their correct location in references to track/tracks as well as underground obstructions like pipes cables, etc. after collecting such information from the site.

5.6.7: FINAL LAYOUT PLANS: After all the cross section drawings in a section covered by the layout plan are finalised and foundations are cast, the Contractor shall revise the layout plans to take into account any modifications to the locations of Structures during the process of casting of foundations.

5.6.8: STRUCTURE ERECTION DRAWINGS : The Contractors shall then submit Structure erection drawings for each structure incorporating all the details included in the cross section drawing for the structure and as erected at site and the details of the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder or return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure. For structure with isolators, the details of electrical connections shall also be incorporated. Styles of stay, bracket and register arm tube shall be mentioned. Displacement in case of curve locations to be shown on SED drawing. Maximum of two locations to be used per sheet.

Makes of contact wire, catenary wire, insulators, ss wire rope, splices if used etc. shall be mentioned on the SED sheet.

OTHER REFERENCES/CODES FOR MISC. ITEMS LIKE STEEL WORK FOR STAY/ BRACKET ATTACHMENT MISC. SINGLE/DOUBLE CAT. ETC. WILL BE INDICATED ITEMS.

5.7 : PARTICULAR DESIGNS AND WORKING DRAWINGS FOR SWITCHING STATIONS AND BOOSTER STATIONS:

- a. PURCHASER'S LOCATION PLAN ETC: The existing location plans and schematic diagrams of connections for all the switching stations will be furnished by the Purchaser to the Contractor. These will indicate the following as applicable:-
 - i. Overhead equipment layout in the vicinity of switching or other stations.
 - ii. Location of main masts.
 - iii. Arrangement of cross feeders and longitudinal feeders to be anchored on the gantry if any, including jumper connections to the overhead equipment.
 - iv. Scheme of connections of interruptors.
 - v. Position of the remote control cubicle with respect to the switching stations.
 - vi. Fencing outline at the switching stations.

The Contractor shall satisfy himself about the correctness and applicability of the location plans given by the Purchaser before adopting them for detailed designs.

- b. DETAILED DRAWINGS: The Contractor shall submit for approval of the Purchaser the following drawings after incorporating all the details for providing addl. interruptors and other connected equipment.
 - (i) EMPLOYMENT SCHEDULES AND CHARTS: Employment schedules and charts applicable to all switching stations. These will include:
 1. Employment schedule for pure gravity type of foundations for main masts for various direct loads and bending moments;
 2. Employment schedule for all other foundations for various depths of parent soil from the datum level.
 3. Sag tension charts for cross feeders for various spans and tensions.

5.8 : BOOSTER TRANSFORMER STATIONS DRAWINGS: The Contractor shall submit for approval to the purchaser drawings for booster transformer stations, similar to those detailed for switching stations in 5.7(b). The following drawings may, however, be combined together:-

- i) Cross-section and foundation layout drawings;
- ii) General arrangement, structural and earthing layout drawings.

5.9 : SCHEDULE OF QUANTITIES :

- a) Within a month of the issue of Letter of Acceptance of Tender, the Contractor shall submit a schedule showing the phased requirement of raw copper for manufacture of wires, and conductors, separately for contact wire, catenary wire and other wires and conductors, for the purchaser to arrange raw copper. The assessment may be based on the quantum of work included in the Letter of Acceptance of Tender. (applicable if these items are supplied by Railways)

On receipt of approval of each layout plan from the purchaser, the followings Schedules of quantities relating to each layout plan shall be submitted within 3(three) days of approval of layout plan along with blue print/ autocad copies of the plans.

- i. Schedules of number of masts, types, weight of different masts and total weight of masts;
 - ii. Schedules of number of foundation, types, volume of different foundations and total volume;
 - iii. Schedule of quantities of various items of work other than masts and foundation
 - iv. Schedule of net tension lengths of contact, catenary and feeder wires and lengths required to be ordered;
 - v. Schedule of lengths of other wires and conductors required to be ordered;
 - vi. Schedules of small parts steel work.
- b) SWITCHING / BOOSTER STATIONS: Within 3 (three) days of receipt of approval of relevant drawings for each switching/booster station, the following schedules of quantities shall be submitted.
 - i. Schedule of number of foundations, types, volume of different foundation and total volume.
 - ii. Overlapping foundations will be treated as one foundation;
 - iii. Schedule of number of masts, types, weight of different masts, and the total weight of masts of each gantry;
 - iv. Schedule of steel work types, weight of each member and total weight; and
 - v. Schedule of quantities of various items of work of schedule 1 not included in Item (i), (ii) and (iii) above.

5.10 : SUBMISSION OF DRAWING AND SCHEDULE :

- (a) The submission of designs and drawings for approval shall be done. In case Contractor wish to deviate from standard drawings he should submit to the purchaser revised drawings with full details of deviation sought explaining the necessity of deviation, calculations and other supporting documents. The purchaser, if satisfy about the necessity and adequacy of deviations, shall refer the matter to RDSO for necessary approval. In case of deviations on working drawings, decision shall communicated by the purchaser to the Contractor. The number of copies of drawings which shall be submitted are indicated in the following sub-paras. The purchaser will return one copy of the drawings either with approval subject to modification where necessary or with comments. The purchaser shall Endeavour to return this copy within a period of fifteen days from the date of receipt and shall normally return the copy within a month. Where drawings are returned with comments or approval subject to modifications, the Contractor shall submit to the purchaser within fifteen days of receipt of such advice revised drawings for approval taking into account the comments or modifications. Also the Contractor shall as far as possible avoid correspondence on such comments and shall Endeavour to settle any difference of opinion on the comments by discussions with the purchaser's Engineers. No drawings shall be resubmitted without incorporating the modifications required by the comments of the purchaser, unless the purchaser has agreed to the deletion of such comments.
- (b) DEVIATION FROM STANDARD DESIGN: In case of deviation from standard designs and drawings, copies of correspondence and drawings shall be sent in duplicate to the Chief

Electrical Engineer or his successor/nominee (whose address will be intimated in due course). In the particular case of deviations in the design of fittings the drawings submitted by the Contractor shall be actual manufacturing drawings complete with tolerances and full specifications of the materials used. In addition, four samples of the modified fittings shall also be submitted after the drawings are approved.

- (c) SPECIAL DESIGNS: Special designs to meet the requirement of particular locations and local conditions shall be submitted in due time in duplicate for approval.
- (d) PURCHASER'S PEGGING PLANS: deleted
Two copies of the purchaser's pegging plans shall be sent back after verification if found correct. If modifications are required, fresh pegging plans incorporating the modifications shall be submitted in two copies for approval.
- (e) CONTRACTOR'S PEGGING PLANS: When the Contractor is called upon to survey and prepare pegging plans; he shall send three copies of such plans, while submitting them for approval.
- (f) CROSS-SECTION DRAWINGS: Cross-section drawings shall be submitted for approval in two copies for a convenient section at a time separately for sections within station limits and section outside station limits. Such drawings shall be submitted progressively and as far as possible without gaps.
- (g) O.H.E. LAYOUT PLANS AND PROFILE DRAWINGS: Overhead equipment layout plans, provisional and final and profile drawings shall be submitted for approval in three copies.
- (h) STRUCTURE ERECTION DRAWINGS: Structure erection drawings shall be submitted for approval in two copies for a section at a time separately for sections within station limits and sections outside station limits, progressively and without gaps.
- (i) Deleted
- (j) SCHEDULE OF QUANTITIES: Schedules of quantities for each approved layout plan/ switching station shall be submitted for approval in two copies.
- (k) SUB-SECTION FEEDER DRAWINGS - Deleted.
- (l) All drawings for switching stations, booster transformer stations and L. T. supply transformer stations shall be submitted for approval in three copies.
- (m) DISTRIBUTION COPIES: On receipt of purchaser's unqualified approval to the Contractor's drawings, Schedule of quantities, the Contractor shall submit original tracings of those drawings and schedules for the signature of the purchaser in token of approval within seven days of the receipt of approval and the purchaser shall as far as possible return the same to the Contractor within 7 working days thereafter. On receipt of these tracings from the purchaser, the Contractor shall submit copies for distribution to field officers and other departments as indicated below within 7 days of receipt of approved tracings:

i)	Standard designs including fittings drawings as per para 5.10(b) of this section	8 copies
ii)	Special designs, if any	8 copies
iii)	Final pegging plans, if any	8 copies
iv)	OHE layout plans at CSD stage	6 copies
v)	Cross-section drawings (CSD's)	6 copies
vi)	OHE layout plans at SED stage	10 copies
vii)	OHE layout plans at EIG application stage	5 copies
Viii)	OHE layout plans at CRS application stage	5 copies
ix)	OHE profile drawings including EIG & CRS application stage	10 copies
x)	Structure erection drawings including EIG & CRS application stage	12 copies
xi)	Schedule of quantities	6 copies
xii)	Drawings for switching Stations, booster transformer Stations & L.T transformer Stations. including EIG & CRS application stage	12 copies

In all the above cases, the contractor has to supply one copy on transparent paper print and in case of designs done on computer, one soft copy in **.pdf format and also .dwg format** to be submitted.

Drawings approved by the Purchaser shall not be modified without prior consent in writing from the Purchaser. Drawings incorporating approved modifications shall be re-submitted for formal approval of the Purchaser in the same manner as original drawings.

5.11 : COMPLETION DRAWINGS & SCHEDULES:

After completion of works, all drawings and designs submitted by the Contractor and approved by the purchaser shall be made up to date incorporation actual supply and erection particulars including the name and make of insulators, galvanized steel tubes, stainless steel wire rope etc. The mark of conductors shall be specified in the "As erected" OHE layout plans, SED and other relevant drawings for identification. Such drawings and schedules shall then be verified and corrected, if necessary, by the Contractor jointly with the purchaser's representatives. The verified and corrected drawings (as erected LOP's, SED's, profile drawings, SSP/SP/AT/BT FP, TSS, SHUNT CAPACITOR BANK drawings) shall be supplied in **10 (ten) sets**, one of which shall be transparencies of linen or any other durable material approved by the Purchaser. Soft copy of each drawing (in .pdf format and also .dwg format) in CD is also to be submitted. Contractor shall also submit six CDs/DVDs of soft copies of each drawing in the above formats.

ANNEXURE – A**PROFORMA****ENGINEERING ORGANIZATION AVAILABLE ON HAND**

Sl.No.	Name & Designation of Employee.	Qualification	Previous Experience	Working From To
01	02	03	04	05
A				
B				
C				
Z				

ENGINEERING ORGANISATION PROPOSED TO BE ENGAGED FOR THIS WORK FROM ABOVE

Sl.No.	Name & Designation of Employee.	Qualification	Previous Experience	Remarks
01	02	03	04	05
A				
B				
C				
Z				

ENGINEERING ORGANISATION PROPOSED TO BE ENGAGED FOR THIS WORK FROM OUTSIDE.

(A SUITABLY WORDED CONSENT LETTER FROM SUCH A PERSON SHOULD BE OBTAINED AND ENCLOSED).

Sl.No.	Name & Designation of Employee.	Qualification	Previous Experience	Remarks
01	02	03	04	05
A				
B				
C				
Z				

SIGNATURE OF THE TENDERER (S):
NAME OF THE TENDERER

ANNEXURE – B**1. PLANT & MACHINERY AVAILABLE ON HAND**

Sl. No	Particulars of machinery, Plant & equipment.	No. of units.	Kind and make	Capacity	Age and Condition	Approx. cost in Rs. In lakhs	Purchase Bill No. & Date and Registration particulars.
01	02	03	04	05	06	07	08
A							
B							
C							
Z							

2. PLANT & MACHINERY PROPOSED TO BE INDUCTED FROM ABOVE

Sl. No	Particulars of machinery, Plant & equipment.	No. of units.	Kind and make	Capacity	Age and Condition	Approx. cost in Rs. In lakhs	Purchase Bill No. & Date and Registration particulars.
01	02	03	04	05	06	07	08
A							
B							
C							
Z							

3 PLANT & MACHINERY PROPOSED TO BE INDUCTED FROM OUTSIDE

Sl. No	Particulars of machinery, Plant & equipment.	No. of units.	Kind and make	Capacity	Age and Condition	Approx. cost in Rs. In lakhs	If to be purchased give likely date of receipt and supplier's Name.
01	02	03	04	05	06	07	08
A							
B							
C							
Z							

SIGNATURE OF THE TENDERER (S):
NAME OF THE TENDERER

ANNEXURE - C**LIST OF COMPLETED WORKS BY THE TENDERER**

Sl.No	Name of work	Agreement No. and date	Designation and address of agreement signing authority	Agreement value in lakhs	Completed value of work (in lakhs)	Date of completion	Remarks
Railway Works							
A							
B							
C							
D							
E							
Z							
State Govt. Works							
A							
B							
C							
D							
E							
Z							
Public Sector Undertaking Works							
A							
B							
C							
D							
E							
Z							

SIGNATURE OF THE TENDERER (S):
NAME OF THE TENDERER

ANNEXURE - D**LIST OF WORKS ON HAND WITH THE TENDERER**

Sl.No	Name of work	Agreement No. and date	Designation and address of agreement signing authority	Agreement value in lakhs	Completed value of work (in lakhs)	Date of completion	Remarks
Railway Works							
A							
B							
C							
D							
E							
Z							
State Govt. Works							
A							
B							
C							
D							
E							
Z							
Public Sector Undertaking Works							
A							
B							
C							
D							
E							
Z							

SIGNATURE OF THE TENDERER (S):
NAME OF THE TENDERER

ANNEXURE – E**EXPERIENCE CERTIFICATE**

Sl. No	Work Details	Details
1	Name of Work	
2	Agreement Number, date and Name of the agency	
3	Agreement value in Rupees (in words and figures)	
4	Due date of completion	
5	Number of extensions granted	
6	Actual date of completion of work	
7	Value of final bill passed (in words)	
8	Work completed but final measurement not recorded (a) Amount paid so far in CC bill No	
9	Work completed but final measurements recorded with negative variation. (a) Amount so far paid as in CC bill No.	
10	Work completed, if final measurements recorded with positive variation which is not sanctioned yet (a) Original agreement value or last sanctioned agreement value whichever is lower	

NOTE :I. This certificate in this proforma is to be issued only for physically **Completed** work.

II. This certificate to be issued by an officer not below the rank of JA Grade or bill passing officer in Railways and Bill passing Officer/Executive In-charge of work in other government department/Govt. bodies /Public sector under taking. The certificate should bear the signature and seal of the issuing officer, name of the department etc.

Signature:

Name of the officer:

Designation:

Address:

Office Seal:

Phone/Fax No.:

Date:

NEFT MANDATE FORM

The Sr. DFM/SC,
SOUTH CENTRAL RAILWAY, SECUNDERABAD.
NEFT MANDATE FORM

Sir,

We prefer to the National Electronic Fund Transfer (NEFT) being followed by South Central Railway, SC Division, for remittance of our payments using RBI's NEFT scheme. In confirmation to this, I/We agree to receive our payments being made through the above scheme to our undernoted Account.

1	Name of Tenderer	
2	Full postal Address with PIN Code	
3	Email Address of Tenderer	
4	PAN number of Tenderer	
5	Bank's Name & Branch	
6	Full Address of Bank	
7	Name of City	
8	Bank Code No.	
9	Bank Telephone/Fax No. & Email	
10	Bank's IFSC Code for NEFT	
11	Bank's IFSC Code for RTGS	
12	Bank's MICR Code	
13	Tenderer Bank Account Number	
14	Type of Bank Account	
15	Tenderer Name as per Bank Account	
16	Telephone Nos. of Tenderer BSNL/Landline: Mobile/Cell Phone: Fax Number:	

(Tenderer should note that the above particulars are necessarily to be provided for return of EMD, SD & other payments due to the tenderer during execution and on completion of work). Certified that the above indicated particulars are true.

ANNEXURE - IV

SOUTH CENTRAL RAILWAY
CONTRACT AGREEMENT OF WORKS

CONTRACT AGREEMENT NO. _____ DATED _____

ARTICLES OF AGREEMENT made this _____ day of _____ 20____ between President of India acting through the Railway Administration hereafter called the "Railway" of the one part and _____ herein after called the "Contractor" of other part.

WHEREAS the Contractor has agreed with the Railway for performance of the works _____ set forth in the Bill(s) of Quantities hereto annexed upon the Standard General Conditions of Contract, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the Specifications of _____ updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the applicable Standard Schedule of Rates (SSOR) of _____ updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the Special Conditions and Special Specifications, if any and in conformity with the drawings here-into annexed AND WHEREAS the performance of the said works is an act in which the public are interested.

NOW THIS INDENTURE WITNESSETH that in consideration to the payments to be made by the Railways, the Contractors will duly perform the said works in the said Bill(s) of Quantities set forth and shall execute the same with great promptness, care and accuracy in a workman like manner to the satisfaction of the Railway and will complete the same in accordance with the said specifications and said drawings and said conditions of contract on or before the _____ day of _____ 20____ and will maintain the said works for a period of _____ Calendar months from the certified date of their completion and will observe, fulfill and keep all the conditions therein mentioned (which shall be deemed and taken to be part of this contract, as if the same have been fully set forth herein), AND the Railway, both hereby agree that if the Contractor shall duly perform the said works in the manner aforesaid and observe and keep the said terms and conditions, the Railway will pay or cause to be paid to the Contractor for the said works on the final completion thereof the amount due in respect thereof at the rates specified in the Bill(s) of Quantities hereto annexed.

Contractor _____ (Signature) Railway: Designation _____

Address _____ (For President of India)

Date _____ Date _____

Signature of **Witnesses** (to Signature of Contractor) with address:

Witnesses:

ANNEXURE-V

Reference -Para 6.1 of ITT of GCC April 2022

FORMAT FOR CERTIFICATE TO BE SUBMITTED / UPLOADED BY TENDERER ALONGWITH THE TENDER DOCUMENTS

I.....(*Name and designation*)**appointed as the attorney/authorized signatory of the tenderer (including its constituents),
 M/s_____ (hereinafter called the tenderer) for the purpose of the Tender documents for the work of _____ as per the tender No._____ of _____(*Railway*)**, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/we the tenderer (s) am/are signing this document after carefully reading the contents.
2. I/We the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from Indian Railway website www.ireps.gov.in . I/we have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with the railway Administration shall be final and binding upon me/us.
4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. **I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.**
6. **I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.**
7. **I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.**
8. I/we understand that if the contents of the certificate submitted by us are found to be forged/false at any time during process for evaluation of tenders, it shall lead to forfeiture of the Bid Securityand may also lead to any other action provided in the contract including banning of business for a period of upto two year. Further, I/we (*insert name of the tenderer*) **_____and all my/our constituents understand that my/our offer shall be summarily rejected.
9. I/we also understand that if the contents of the certificate submitted by us are found to be false/forged at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/Security Deposit and Performance guarantee and

may also lead to any other action provided in the contract including banning of business for a period of upto two year.

10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

SEAL AND SIGNATURE
OF THE TENDERER

Place:

Dated:

****The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer.**

This certificate is to be given by each member of JV or Partners of partnership firm/LLP/etc.

ANNEXURE-V(A)

Reference -Para 6.1 of ITT of GCC April 2022

(This certificate is to be given by attorney/authorized signatory/each member of Partnership firm/Joint Venture (JV)/ Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc.)

I/We.....(Name), attorney/authorized signatory of the
 (constituent firm/constituent partner) and member/partner of the
 (tendering firm) hereby solemnly affirm and state as under:

1. I/we certify that(constituent firm/constituent partner) is/are not blacklisted or debarred by Railways or any other Ministry/ Department of Govt. of india from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/member of the partnership firm/LLP/JV/Society/Trust.

2. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with india and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed).

SEAL AND SIGNATURE
 OF THE CONSTITUENT FIRM/CONSTITUENT PARTNER

Place:

Date:

REVISED MODEL FORM OF BANK GUARANTEE BOND FOR PERFORMANCE GUARANTEE

1. In consideration of the President of India (hereinafter called "the Government") having agreed to exempt----- (hereinafter called " the said Contractor(s)") from the demand, under the termsandconditionsofanAgreementdated-----madebetween-----and----- for ----- (hereinafter called "the said Agreement"), of Security deposit for the due fulfillment by the said contractor(s) of the terms and conditions contained in the said Agreement, on production of a Bank Guarantee for Rs.--- ------(Rupees----- only). We ----- (indicate the name of the Bank) (hereinafter referred to as the Bank) at the request of ----- (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs.----- against any loss / damage caused to or suffered or would be caused to or suffered by the Government by reasons of any breach by the said contractor(s) of any of the terms or conditions contained in the saidAgreement.
2. We ----- (indicatethenameoftheBank)do herebyundertaketopaytheamounts due and payable under this guarantee withoutany demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the contactor(s) failure to perform the said Agreement. Any such demand made on the bankshall beconclusive asregards the amount due and payable by the Bank under this guarantee shall be restricted to an amount not exceedingRs.--.
3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s)/supplier(s) in any suite or proceeding pending before any court or Tribunal relating thereto our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liabilityfor paymentthereunder and the contractor(s) / supplier(s) shall have no claim against us for making such payment.
4. We, ----- (indicate the name of bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till ----- Office/Department)Ministry of----- -----certifies
that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made onus in writing on orbeforethe-----we shall be dischargedfrom
all liability under this guarantee thereafter.
5. We, ----- (indicate the name of the Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreementor to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relived from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance act or omission on the part of the Government or any indulgence by the Government to the said Contractor(s) or any such matter or thing whatsoever which under the law relating to the sureties would, but for this provision, have effect of so relievingus.
6. This guarantee will not be discharged due to the change in the constitution ofthe bankor theContractor(s) /Supplier(s).
7. We, ----- (indicate the name of the bank) lastly under take not to revoke this guarantee during its currency except with the previous consent of the Government inwriting.

Dated: the-----dayof ----- 20

For.....

Indicate name of the bank

(Bid Security)***Bank Guarantee Bond from any scheduled commercial bank of India****(On non-judicial stamp paper, which should be in the name of the Executing Bank).***Name of the Bank: -----**

President of India,
 Acting through,
 Railway,

Beneficiary: Railway

Date:.....

Bank Guarantee Bond No.:**Date:-----**

In consideration of the President of India acting through----- (*Designation & address of Contract Signing Authority*), Railway,, (hereinafter called "The Railway") having invited the bid for_____through Notice inviting tender (NIT) No._____, We have been informed that *[Insert name of the Bidder]*..... (**hereinafter called "the Bidder"**) intends to submit its bid (hereinafter called "the Bid") .

WHEREAS, the Bidder is required to furnish Bid Security for the sum of *[Insert required Value of Bid Security]*, in the form of Bank Guarantee, according to conditions of Bid.

AND

WHEREAS,*[Insert Name of the Bank]*, with its Branch*[Insert Address]* having its Headquarters office at..... *[Insert Address]*, hereinafter called the **Bank**, acting through*[Insert Name and Designation of the authorised persons of the Bank]*, have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned *[Insert name(s) of authorized representatives of the Bank]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway full amount in the sum of *[Insert required Value of Bid Security]* as above stated.
2. The Bank undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the Bidder and without the Railway being required to show grounds or give reasons for its demand of the amount so demanded.
4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.
5. The Bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway and the Bidder, will in any way absolve the Bank from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway at any time.
6. This guarantee will remain valid and effective from.....*[insert date of issue]*till.....*[insert date, which should be minimum 90 days beyond the expiry of validity of*

Bid]. Any demand in respect of this Guarantee should reach the Bank within the validity period of Bid Security.

7. The Bank Guarantee is unconditional and irrevocable.
8. The expressions Bank and Railway herein before used shall include their respective successors and assigns.
9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758.
10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

IFSC CODE	SBIN000RAIL
IFSC TYPE	BRANCH
BANK NAME	STATE BANK OF INDIA
BRANCH NAME	RAIL
CITY NAME	NAVI MUMBAI
ADDRESS	SECTOR-11, CBD BELAPUR, NAVI MUMBAI
DISTRICT	NAVI MUMBAI
STATE	MAHARASHTRA
BG ENABLED	YES

11. The Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date

Place.....

.....

Bank's Seal and authorized signature(s)

[Name in Block letters]

[Designation with Code No.].....

[P/Attorney] No.

Witness:

1 Signature, Name & Address & Seal

2 Signature, Name& address & Seal

Bank's Seal

*[P/Attorney]*No.

Note: All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.

Annexure –VIB

Reference -Para 10.2 & 17.15.2 of Tender Form (SecondSheet) ofAnnexure I of ITT

Each Bidder or each member of a JV must fill in this form separately:

NAME OF BIDDER/JV PARTNER:

<u>Annual Contractual Turnover Data for the Previous 3/4 Years</u> <u>(Contractual Payment only)</u>			
<u>Year</u>	<u>Amount</u> <u>Currency</u>	<u>Exchange</u> <u>Rate</u>	<u>Indian National</u> <u>Rupees</u> <u>Equivalent</u>
<u>Average Annual Contractual Turnover for last 3 years</u>			

1. The average annual contractual turnover shall be calculated as an average of “total contractual payments” in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
2. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
3. Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

SEAL AND SIGNATURE OF THE BIDDER

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor’s reports. _____

(Signature of Chartered Accountant)

Name of CA: _____

Registration No: _____

(Seal)

FORM 17**INDEMNITY BOND**

1. This deed of Indemnity is executed on the day of _____ by M/s: _____, which expression includes his successors and assignees, in favour of the President of India acting through Deputy Chief Electrical Engineer/Gati Shakti the Purchaser, South Central Railway, Secunderabad (herein after called the 'Railway').
2. Whereas the parties hereto have entered into an agreement vide acceptance letter/Agreement No. _____ dt _____ for the purpose of executing the said contract until such time the materials herein after mentioned are fully erected or otherwise and handed over to the Railway.
3. Whereas we, M/s: _____ are required to hold in custody for and on behalf of the Railway in trust give here the list of items for the purpose of executing the said contract until such time the materials are duly erect and or handed over to Railway.
4. Whereas we, M/s: _____ are required to furnish an Indemnity Bond.
5. Now by this Indemnity Bond we hereby undertake that we hold in my custody for and on behalf of the President of India and his property in trust of the said materials handed over to us for the purpose of execution of the said contract until such time the materials are duly erected or otherwise handed over to the Railway.
6. We shall be entirely responsible for the safe custody and protection of the said materials against all risks till they are duly erected and or otherwise delivered to the concerned depots or to any other Officer as he may direct otherwise, and shall Indemnify the Railway against any loss, damage or deterioration in respect of the said materials which are in my possession.
7. The said materials shall at all times to open for inspection by any authorized officer of the Railway.
8. Should any loss or damage or deterioration occur or refund becomes due, the President of India shall be entitled to recover from us compensation for such loss or damage or deterioration the amount is to be refunded without prejudice to any other remedies available to Railway and also by deduction from any sum due or any sum which at any time hereafter may become due to us for this work or under any other contract with any other department of the Railway.
9. The value of the above materials for the purpose of indemnity Bond that can be claimed under this Indemnity Bond shall not exceed Rs. _____/- (Rupees _____ only).
10. In the event of any loss or damage or deterioration as aforesaid the assessment of such loss or damage or deterioration, the assessment of compensation therefore would be made by the President of India or by his authorized Nominee and the said assessment shall be final and binding upon us.
11. In witness whereof we, M/s: _____ have executed this Indemnity Bond on the date, month and year final written at _____ dated this _____.

CONSIGNEE INSPECTION TEST REPORT
(PCEE/SC L. No.E.252/TRD /Policy Vol.VII) dated 01.06.2021

1. Contract /PO No & date :
2. Name of the work/ item:
3. Firm/contractor name & address :
4. Indenter :
5. Consignee :
6. Item/Store Received Date :
7. Date of inspection :
8. Certified that the item/Stores noted below have been inspected and the results of the inspection are as under:

Sl. no.	Item No. as per schedule	Description of material	unit	Qty as per Agt.	Qty. already passed	Qty. now passed	Result of inspection	DMTR sl.no & date	Remarks if any

Note: 1. Test certificates of OEM/Accredited laboratory shall be ensured wherever applicable. Further the details of checking/testing done by Consignee where applicable should also be enclosed.

2. Guarantee/Warranty should also be ensured while conducting the inspection by consignee.

Name, Designation of custodian of stores

Name, Designation of Inspecting supervisor

Name, Designation of Inspecting officer

INSPECTION CLAUSE OF SCHEDULE ITEMS LIST	
Authority: PCEE/SC L No.E.29/P/Vol.XI Dt.27.09.17 & 04.10.2018)	
(Ref : Special Conditions of Contract Clause No. 38.0 of Tender Document - Quality Assurance of Materials)	
Tender No. <u>C/E /29/GSU/ELEC/03/2026-27</u>(etender No. <u>CE- 29-GSU-ELEC-03-2026-27</u>)	
1) Proposed New Bypass Line at Latur Road Bypass line for connecting Latur road- Parli vajjnath/Kurduwadi main line for OHE arrangements.2) Proposed New Bypass Line at Parli Vaijanath station for connecting Parli vajjnath- Latur Road & Parli vajjnath - Parbhani Main lines for OHE arrangements.	
** The inspection clause of the Schedule items are based on the supply item value i.e Rs. 5.0 Lakhs and above RITES /RDSO inspection and less than Rs.5.0 Lakhs Consignee inspection. If the tenderer quoted percentage applied on the Consignee inspection supply item value, is exceeding Rs. 5.0 Lakhs and above, RITES inspection will be get automatically applicable and vice versa.	
