

TENDER NO. SUR-TD-T-2026-14R**CENTRAL RAILWAY****ELECTRICAL DEPARTMENT****TENDER FORM****Pages 1 to 72****Name of the
work**

1) Electrification of Unwired pit lines/sidings of Solapur Division. 2) Electrical TRD portion of work in connection with the proposed construction of 2 lane ROB in lieu of LC-40 at km 387/3-4 and LC-42 at km 391/8-9 of Daund- Solapur section in Solapur Division. (Re-Invitation). (Re-Invitation)

CHECK LIST

- Document to be submitted by the tenderer for tender along with the tender. Tenders without these documents will be summarily rejected:-

S.N.	MANDATORY DOCUMENTS
1	PAN CARD
2	GST Registration Certificate
3	BID SECURITY as per clause of this Tender Document in requisite format.(As per Bid Security Clause of enclosed GCC)
4	Affidavit/Certificate as per Annexure-V of this Tender Document.(As per Annexure-V of enclosed GCC) and Annexure-V(A) 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.
5	Declaration for Non employment of retired gazette officers of Railway as per clause 16 of enclosed GCC.(Proforma D of this Tender Booklet)
6	The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / Company / Registered Society / Registered Trust / HUF / LLP etc. The tenderer(s) shall enclose the attested copies of the constitution of their concern as applicable mentioned below:
A	Sole Proprietor–Affidavit / Shop Act Registration for sole Proprietor.
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 the members to action behalf of HUF.
C	Company registered under Companies Act 2013 The copies of MOA (Memorandum of Association)/AOA (Articles of Association) of the company. A copy of Certificate of Incorporation A copy of Authorization/Power of Attorney issued by the Company (backed by their solution of Board of Directors) in favor of the individual to sign the tender on behalf of the company and create liability against the company.
D	LLP(Limited Liability Partnership): If the tender is submitted on behalf of a LLP registered under LLP Act-2008, the tenderer shall submit along with the tender: A copy of LLP Agreement A copy of Certificate of Incorporation A copy of Power of Attorney/Authorization issued by the LLP in favor of the individual to sign the tender on behalf of the LLP and create liability against the LLP
E	Participation of Partnership Firms in works tenders: The tenderer shall clearly specify that the tender is submitted on behalf of a Partnership firm. The following documents shall be submitted by the partnership firm, with the tender: A notarized copy of partnership deed.

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S.N.	MANDATORY DOCUMENTS
	A notarized or registered copy of Power of Attorney in favor of the individual to tender for the work, sign the agreement etc. and create liability against the firm.
F	Registered Society & Registered Trust: A copy of the Certificate of Registration A copy of Deed of Formation A copy of Power of Attorney in favor of the individual to sign the tender documents and create liability against the Society/Trust.
7	Valid Electrical Contractor License as per tender document.
8	Supporting documents for Technical Eligibility Criteria: as per tender document
9	Supporting documents for Financial Eligibility Criteria: as per tender document.
The above checklist for mandatory documents to be included in tender form. Tenders without those documents will be summarily rejected.	

Scope of Work

Tender No. SUR-TD-T-2026-14R

Name of Work: - 1) Electrification of Unwired pit lines/sidings of Solapur Division. 2) Electrical TRD portion of work in connection with the proposed construction of 2 lane ROB in lieu of LC-40 at km 387/3-4 and LC-42 at km 391/8-9 of Daund- Solapur section in Solapur Division. (Re-Invitation)

The brief scope of work is 1) Electrification of Unwired pit lines/sidings of Solapur Division. 2) Electrical TRD portion of work in connection with the proposed construction of 2 lane ROB in lieu of LC-40 at km 387/3-4 and LC-42 at km 391/8-9 of Daund- Solapur section in Solapur Division. (Re-Invitation).

The details of location are as per below:-

Engineer's Representative: For this work SSE/TRD/SUR will be the Engineer's Representative. Concerned SSE/TRD of the section will supervise and certify the work executed in respective jurisdiction and submit all relevant papers to Engineer's Representative for recording measurement. The work executed will be test checked by concerned ADEE/TRD or DEE/TRD for their respective jurisdictions.

Supply of material:-

Note: Contractor shall note that approval/extension of approval for items pertaining to traction installations, which are in the scope of CORE/RDSO, are being given for certain period. It is essential to ensure while purchasing any material from approved supplier, the approval/renewal of the supplier is valid. No order for procurement of materials should be given to any firms having expired validity of approval period.

The Contractor will ensure that they will supply all materials / items from only Approved Suppliers of RDSO/CORE as per RDSO specifications & drawings and original certificate for proof of procurement for purchase of materials from approved suppliers is to be submitted at the time of delivery/inspection of materials. Approval to be obtained from Sr.DEE/TRD/SUR if approved drawings needs to be changed as per site condition. Contractor will submit the delivery challan form in the office of Sr.DEE/TRD/SUR, indicating supplied quantity of material duly certified by concern SSE/TRD of the section that supplied material is received from approved supplier of RDSO/CORE.

The fittings which are available in forged type, for such fittings forged type fittings only shall be used.

Transportation of material:

The transportation & handling charges to bring the material at work site will be borne by the Contractor. If required, Contractor can supply & store materials at suitable/convenient place. However, the loading, transportation & unloading of Contractor supplied material from concerned Railway Depot to work site shall be done by the Contactor.

Railway supplied materials will be transported by Railways from depot to work site including loading & unloading.

Testing and Inspection of Material:-

Testing & inspection of materials / components / equipment's to be supplied against high value schedule items, will be carried out by M/s BITES at manufacturer's premises as per RDSO / CORE Tender specifications & drawings. Notwithstanding anything stated above, material / equipment in small quantity with order value up to Rs. 5 Lakh or any remaining items may be inspected by the Purchaser/Consignee at manufacturer's premises / Depot / Site, with prior approval of Sr.DEE/TRD/SUR . Testing & inspection report of material duly signed by Inspecting Official will be submitted by the Contractor at the time of delivery of material to Railway Representative. The Contractor, for accepting the material should ensure the assurance of quality and technical parameters. The contractor will also keep a liaison with MSEDCL for change over from overhead crossing to underground cable. The contractor will arrange requisite inspection with MSEDCL if required.

Completion period:-

The work shall be completed within **12 months** from the date of issue of letter of acceptance.

Quality of staff:

Properly skilled staff under the supervision of a qualified Supervisor or Engineer shall execute all the work. The Contractor on the demand by the Railway Engineer shall produce such evidence of qualification of his workmen/supervisors either at the time of award of contract or during execution of work.

Contractor will issue identity cards, duly signed by Railway representative to the labors engaged for execution of work. Contractor will solely responsible for safety & security of their labors which will be engaged for execution of work because the work will be carried out in 25 KV AC electrified section.

Guarantee: The Contractor shall give the guarantee for the period of 01 YEAR from the date of completion of work. Any rectification or repairs or replacement required, if any during the guarantee period shall be carried out by the Contractor free of cost within reasonable time, not exceeding two weeks. All the to & fro transportation charges, loading & unloading of the material will be borne by the Contractor during the guarantee period .No additional payment will be paid by the Railway for the same in the guarantee period.

On the day of taking over of the work the list of the items laying in yard is to be prepared jointly by Railway depot in-charge and the contractor representative. This list will be updated jointly whenever there is change in the inventory in the yard. Every day when shift is changing then the proper handover and taken over should be done and entry in the proper register.

Contractor representative will keep stock of the items laying outside in the depot yard and will be responsible for preventing any theft of these items. Similarly he will be responsible for preventing the theft of any materials under lock and key and seal of the supervisor. The cost of any shortage/ damage in outside item will be recovered from the contractor. In case of occurrence of theft or attempt of theft is made, contractor representative will cooperate in lodging FIR with local police/ RPF etc.

On duty contractor staff should have wear proper uniform along with identity card which will be issued by contractor. Every contractor staff should have their own mobile Number & he has to know the mobile number of depot in charge and TPC for communication and taking instructions from him & will act accordingly.

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Contractor shall visit the site in order to assess the quantum of work. The work has to be done as per scope of work and specification mentioned in tender booklet and IE rules. Any deviation from this shall be mentioned in the offer itself.

Contractor will take all precautions for his labor/workman. Railway will not be responsible for any mishap/accident during the execution of the work.

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1. The contract shall be governed by **Indian Railways Standard General Condition of Contract April 2022** as amended from time to time apart from the special conditions of Contract stipulated therein.
2. **PRICES:** Prices shall be net, for supply of materials for at site, inclusive of all taxes. The prices shall be firm for complete work & valid till work is completed.
3. **Period of completion:** - Work should be completed in stipulated time limit. i.e. **12 months** from the date of issue of letter of acceptance.
4. **Bid Security:** - Bid Security amount as mentioned in NIT Header shall be submitted by tenderer with offer. Mode of submission of Bid Security is as follows: -1) E-payment gateway on IREPS portal. 2) Bank Guarantee in favour of Sr.Divisional Finance Manager, Central Railway, Solapur in requisite format. Note: - For further Details for submission of Bid Security, enclosed GCC with Bid document should be referred.
5. **Eligibility Criteria:-** Tenderer shall possess Electrical Contractor's Registration with CPWD department or any State Govt.

(1) 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.

(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 fulfillment 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 lakh, 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 10.1:

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 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.

Definition of Similar Work: -" Execution of any 25 KV AC OHE Work"

2) 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 of GCC 2022, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet.

6. **Tenderer credentials:** - As per relevant clauses of enclosed GCC. For further Details regarding Tenderer Credentials, enclosed GCC with Bid document should be referred.

Note:-Tenderers are requested to submit all relevant documents with their offer. Checklist for the same is enclosed in the Bid document. Documents testifying tenderer previous experience and financial status should be produced along with the tender.

- Tenderer(s) who is / are not borne on the approved list of the Contractors of _____ Railway shall submit along with 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 along with bid are true and factual. Standard format of the certificate to be submitted by the bidder is enclosed as Annexure-V. 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.
7. Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.

8. The contractor shall upload any work done by him with Railways and his experience in carrying out such works. Contractor shall also upload copies of documents required to meet minimum eligibility criteria along with their offer.
9. **Documents to be Submitted Along with Tender:-**Applicable as per relevant clause of enclosed GCC. For further details regarding document to be submitted along with tender, enclosed GCC with the Bid document shall be referred. Checklist for the same is enclosed in the Bid document.
10. **Joint Venture (JV):-** The Joint Venture is not applicable for this tender as JV is only for tender cost more than 10 crores as per Railway Board's letter No.2002/CE-I/CT/73/JV pt.VIII dated 14/12/2012.Offer of (JV) firm will be rejected.
11. **Execution of Contract Documents:** - Applicable as per relevant clause of GCC. For further details regarding execution of contract Documents, enclosed GCC with the Bid document shall be referred.
12. **Partnership Deeds, Power of Attorney etc.:-**Applicable as per relevant clause of GCC. For further details, Partnership Deeds, power of Attorney, enclosed GCC with the Bid document shall be referred.
13. The tenderer whether sole proprietor / a company or a partnership firm / joint venture (JV) / registered society / registered trust / HUF 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 submit the tender, sign the agreement, receive money, co-ordinate measurements through contractor's authorized engineer, witness measurements, sign measurement books, compromise, settle, relinquish any claim(s) preferred by the firm and sign "No Claim Certificate" and refer all or any disputes to arbitration. The above power of attorney shall be submitted **even if** such specific person is authorized for above purposes through partnership deed / Memorandum of Understanding / Article of Association or such other document, failing which tender is liable to be rejected.
14. The documents mentioned in checklist should be uploaded by Tenderer with offer. Tenderer shall note that these are mandatory document to be uploaded with offer. In case any of the documents is not uploaded, their offer shall be rejected.
15. **Security Deposit:** Security Deposit will be governed as per relevant clause of enclosed GCC. For further details regarding security deposit, enclosed GCC with the Bid document shall be referred.
16. **Performance Guarantee:-**The performance guarantee will be governed as per relevant clause of enclosed GCC. For further details regarding performance guarantee, enclosed GCC with the Bid document shall be referred.
17. **Extension of Time in Contracts:** Applicable as per relevant clause of GCC. For further details regarding extension of Time in Contracts, enclosed GCC with the Bid document shall be referred.

18. **Modification to Contract to be in Writing:-** Applicable as per relevant clause of GCC, For further details regarding modification to contract, enclosed GCC with the Bid document shall be referred.
19. **Powers of Modification to Contract:-** Applicable as per relevant clause of GCC, For further details regarding powers of modification to contract, enclosed GCC with the Bid document shall be referred. **Note:-** Variation in Scheduled or Additional NS Quantity will be governed by Indian Railways Model SOP 2018 and may change accordingly from time to time if the Model SOP is Modified/Corrected/Changes)
20. **Valuation of Variations:-** Applicable as per relevant clause of GCC, for further details regarding Valuation of variations, enclosed GCC with the Bid document shall be referred.
21. **Price Variation Clause (PVC):-** PVC is applicable as per GCC clause 46A.
22. **Legal Charges:-** A Fee of Rs. 400/- per legal document like partnership Deed or Power of Attorney executed before or after the execution of the contract and will be recovered from the Contractor for obtaining legal advice from the Law Officer.
23. **Guarantee / Maintenance period-** The contractor shall give the guarantee for the period of one year from the date of completion of work. Any rectification or repairs or replacement during the guarantee period is required shall be carried out by the contractor free of cost within reasonable time, not exceeding two weeks. All the to & fro transportation charges, loading & unloading of the material will be borne by the contractor during the guarantee period. No additional payment will be paid by the Railway for the same in the guarantee period.
24. **Inspection of Material:-** Material having value above ₹5 lakhs is to be pre-inspected by RITES / RDSO. Contractor will offer full facilities for inspection of material by third party / railways representative at firms Work/Site on contractor's own expenses. However for ISI marked products material can be accepted on firms WTC as per Railway Board letter no. 2017/Trans/01/Policy/Pt-s dt.16/08/2018.
25. **TERMS OF PAYMENT:-** Payment schedule is indicated as follows:-

Item No of schedule	Supply at site	Erection & Completion
1.	---	100%
2.	---	100%
3.	---	100%
4.	---	100%
5.	70%	30%
6.	---	100%
7.	70%	30%
8.	---	100%
9.	70%	30%

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Item No of schedule	Supply at site	Erection & Completion
10.	70%	30%
11.	---	100%
12.	70%	30%
13.	70%	30%
14.	---	100%
15.	---	100%
16.	70%	30%
17.	70%	30%
18.	70%	30%
19.	70%	30%
20.	70%	30%
21.	70%	30%
22.	---	100%
23.	70%	30%
24.	70%	30%
25.	70%	30%
26.	70%	30%
27.	70%	30%
28.	---	100%
29.	---	100%
30.	---	100%
31.	70%	30%
32.	70%	30%
33.	---	100%
34.	---	100%
35.	---	100%
36.	70%	30%
37.	100%	---
38.	---	100%
39.	---	100%
40.	70%	30%
41.	---	100%
42.	100%	---
43.	100%	---
44.	100%	---

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Item No of schedule	Supply at site	Erection & Completion
45.	100%	---
46.	100%	---
47.	100%	---
48.	100%	---
49.	---	100%
50.	---	100%
51.	---	100%
52.	---	100%
53.	---	100%
54.	---	100%
55.	---	100%
56.	70%	30%
57.	100%	---
58.	---	100%
59.	---	100%
60.	---	100%
Power block charges @ 100% extra on erection charges		
61.	---	100%

100% payment for all schedule items shall be made after successful completion of work. The payment after recording & measurement by concerned SSE/TRD & jointly signed by contractor. Further test check by ADEE/TRD & certification from DEE/TRD/SUR & Sr.DEE/TRD/SUR is obtained. No advance payment will be made to the Contractor. The Payment shall be made by Sr.DFM/SUR through NEFT or RTGS. The statutory deductions (taxes etc.) shall be made from the Bill.

26. Income tax and works contract tax will be deducted from the bills as per extant rules
27. Contractor shall comply with the provisions of Contract labour (Regulation & Abolition) Act. 1970.
28. The payment to the contract labourers should be made through bank.
29. Necessary steps should be taken to deduct provident fund from payment made to contract labour and ensure that the same credited to their Provident fund account, Medical facilities from ESI, if applicable.
30. **Force Major Clause:** - Force Major Clause is applicable as per relevant clause of GCC. For further details regarding force Major Clause, enclosed GCC with the Bid document shall be referred.
31. Agency shall maintain proper records of all details, registers and such other requirements as contemplated by the provisions of all relevant status which inter alias includes and contract

labour, (Regulation & Abolition) act and rules, payment of Wages Act etc. and further shall comply with the statutory provisions thereof in filling returns, submitting forms etc. No liability of whatsoever type will be on the Railways. The agency will be fully responsible to obey all laws prevailing in the Solapur area.

32. The agency will observe all provisions of Employees State Insurance Act 1948 and the Employees Provident Fund Act, 1952 duly amended from time to time and shall pay the contribution/ subscription in accordance with the said acts in respect of the employees with the said company engaged by it or care taking personnel.
33. Subletting of contract will not be allowed. Otherwise the contract will be terminated and security deposit will be forfeited.
34. Railways reserve right to add more terms and conditions during contract period if found necessary.
35. General conditions of the contract of Railway, as amended from time to time are applicable for this contract. In the event of any contradiction being noticed between general conditions of the contract (GCC) and the special conditions of the contract (SCC), the later (i.e. SCC) shall prevail.
36. **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.
 - (a)The Contractor shall, in respect of all staff engaged by him or by his sub-contractor, indemnify and keep the purchaser at all times indemnified and protected against all claims made and liabilities incurred under Workmen's Compensations Act, the Factories Act and the Payment of Wages Act and rules made there under from time to time or under any other labour and Industrial legislation made from time to time.
 - (b)The Contractor shall indemnify and keep the Purchaser 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 Contractor, his sub-contractors, his agents or his staff during the execution of this contract irrespective of whether such liability arises under the Workmen's Compensation Act, or Fatal Accident Act or any other statute in force for the time being.
37. **Disaster Management:-** Vehicles and equipments of contractors working with railways can be provided/ asked to be deployed by Railway administration at its discretion in case of accidents/natural calamities involving human lives. In case it is seen that the contractors have shunned their responsibilities in case of disaster involving human lives, they may be levied penalties as decided by Railway administration or their contract can be rescinded as the requirement of Railway administration in such cases are for larger public interest.

38. The tenderer is required to read and understood the contents of the tender documents completely.
39. The tenderer shall have registration with state government and should have GST Registration.
40. The tenderer has to carry out the work with his own labour, tools, tackles and materials.
41. Tenderer has to follow the minimum wages act and other labour acts are in force time to time. He should be responsible for paying the wages to labour as per Government's minimum wages rates notified from time to time.
42. Tenderer have to pay wages to labour through Bank account only. If the labour does not have bank account, it should be opened under "Prime Minister's Jan DhanYojana".
43. Tenderer have to ensure "Life Insurance" to his labour / employee under Prime Minister's scheme.
44. The contractor shall maintain the site register with his supervisors who shall keep the record of work done and get the same jointly inspected and tested by Engineer's representative. Final inspection shall be done by Engineer's representative and ADEE/TR or Sr.DEE/TRD/SUR or his authorized representative. Copy of inspection report shall be submitted to this office.
45. Tenderer has to issue the identity card to each and every employee deputed by him indicating the name address and photograph and the details of it to be submitted to Railway administration on the prescribed Performa given herewith.
46. All electrical works shall be executed properly by skilled Wireman / Workmen under supervision of qualified supervisor having Supervisor's License OR Qualified Engineer. All work shall be executed as per extant IE rules.
47. **A)** Contractor is to abide by the provisions of payment of wages act & Minimum wages act in terms of clause 54 and 55 of Indian Railway General Condition 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 this 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 of 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 on 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 LOA's issued in his favour.
 - c) The contractor once registered on the portal shall provide details of his Letter of Acceptance (LOA) / Contract Agreement on Shramikkalyan portal within 15 days of issue of any LOA of 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.

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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 & payment made thereof after each wage period.

B) 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 payment made to them during the wage period in Railway's Shramikkalyan portal at www.shramikkalyan.indianrailways.gov.in till _____Month, Year."

48. If any contract is terminated under clause 62 of GCC on contractor's fault, then that contractor shall be temporarily debarred from participation in any tender in that division for one year, if so decided by the Tender Accepting Authority.

49. The tenderers shall submit a copy of certificate stating that all their statements/documents submitted along with bid are true and factual. Standard format of certificates 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) et. 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 by which they/he is qualifying the Qualification Criteria mentioned in the tender Document.

50. **Address:-** Relevant addresses for specified purposes in connection with the tender are given below:

a) **For Contract Execution/Tender Opening:-**

Senior Divisional Electrical Engineer, Central Railway, Solapur

Address: - Sr.Divisional Electrical Engineer's Office

New DRM Office Building, DRM office Compound

Near ModiKhana Police Chowki,

Railway lines, Solapur 413 001

b) **For Security Deposit/ Bid Security Deposit in Favour of: -**

Senior Divisional Finance Manager, Central Railway, Solapur

Address:- Sr.Divisional Finance Manager' Office,

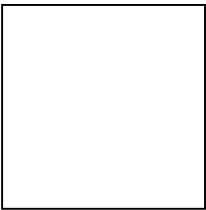
DRM office Compound,

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Near Modikhana Police Chowki,

Railway lines, Solapur 413 001

IDENTITY CARD



(Signature of Contractor on the
Photograph with his seal)

Sr. No. :-
Name of Establishment:-
Name of the employee :-
Age :-
Sex :-
Date of entry in service :-
Designation/ Nature of work :-
Department

Valid date of card

Countersignature of the concerned
Sr.Supervisor of Railway

Signature of Employee

Tender No. SUR-TD-T-2026-14R

Name of Work: - 1) Electrification of Unwired pit lines/sidings of Solapur Division. 2) Electrical TRD portion of work in connection with the proposed construction of 2 lane ROB in lieu of LC-40 at km 387/3-4 and LC-42 at km 391/8-9 of Daund- Solapur section in Solapur Division. (Re-Invitation).

To,

The President of India

Acting through the _____ 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 do 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 Start-up 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 _____ with _____ and 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 Tenderer(s)

Date:- _____

Address of the Tenderer(s):-

Reference-Para 6.1 of ITT

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 Security and 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.

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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)

Place:

Dated:

SEAL AND SIGNATURE
OF THE TENDERER

***The contents in Italics are only for guidance purpose. Details as appropriate are to be filled in suitably by tenderer.*

(This certificate is to given by attorney/authorized signatory/each member of Partnership firm / Joint Venture (JV) / Hindu Undivided Family (HUF) / Limited Liability Partnership (LLP) etc.)

I/W..... (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 fulfill 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 / CONSTITUENTPARTNER

Place:

Dated:

(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,, (here in after 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.

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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

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[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.

DECLARATIONFORMAT

As per GCC April 2022, Clause No.16 Employment / Partnership etc. of Retired Railway Employees.

Clause	CONDITIONS	WRITE YES/NOW WHICH IS APPLICABLE
16(a)	(i) Should a tenderer be a retired Engineer of the gazette rank or any other gazetted officer working before his retirement, whether in the executive or administrative capacity or whether holding a pensionable post or not, in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, OR	YES/NO In case where such Engineer or officer had not retired from government service at least 1 year prior to the date of submission of the Tender. THEN The tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.
	(ii) Should a tenderer being partnership firm /joint venture(JV)/registered society / registered trust etc. have as one of its partners are retired Engineer of the gazetted rank or any other gazetted officer working before his retirement, OR	
	(iii) Should a tenderer being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors.	
16(b)	In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and no win his employment.	YES/NO
		If yes then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by

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Clause	CONDITIONS	WRITEYES/NOWHICHISAPPLICABLE
		him in this behalf, to get associated with the tenderer.
16(c)	Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV)/registered society /registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of partner(s)/shareholder(s)having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway	YES/NO If yes then the tenderer at the time of submission of tender, will inform the Authority inviting tenders the details of such persons.
Note:-If information as required as per 16.a),b),c) above has not been furnished; contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.		

Date:

Signature

Place:

(Name of contractor/firm)

Tender No. SUR-TD-T-2026-14R

Name of Work: - 1) Electrification of Unwired pit lines/sidings of Solapur Division. 2) Electrical TRD portion of work in connection with the proposed construction of 2 lane ROB in lieu of LC-40 at km 387/3-4 and LC-42 at km 391/8-9 of Daund- Solapur section in Solapur Division. (Re-Invitation).

Item No. 1**Preparation of designs and drawings for overhead equipment.**

LOP: After site survey, contractor will submit two sets of the proposed layout plan, for approval and after approval of proposed layout plan; the work is to be started. After completion of work, the verified and corrected LOP drawings shall be supplied in four sets, one of which shall be transparencies of linen or film reproduction or any other durable material approved by the purchaser and also on the compact disc in "Autocad" supported approved version.

Cross Section Drawings: The price shall cover site survey, 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 showing guy rods, if any, indicating 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. In the preparation of drawings, care shall be taken to show all obstructions such as signal wires, point rods and their correct location in reference to track/tracks as well as underground obstructions like pipes, cables, etc. after collecting such information from the site.

Notes –

- (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.

Structure Erection Drawings: The contractor shall then submit structure erection drawings for each location 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 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.

As Erected Drawings: After completion of works, the verified and corrected drawings i.e. Lay out plan & SEDs, shall be supplied in four sets, one of which shall be plastic paper printing (75mic NJ EMF U to standard 90/95G), approved by the purchaser and also on the pen drive.

Notes For Measurements:

For the purpose of payment against these items, 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 Crossovers: 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.
- 6 Feeders and return feeders from grid sub-station to feeding station.
- 7 Payment against item is restricted to the extent of new and/or modification works only. The existing wired tracks shown in layout shall not be counted for the purpose of payment.
- 8 Before taking up the work Contractor shall submit four prints of each approved drawings.

This item will also be applicable independently in case of feeders/return feeders/conductors from grid sub-station to overhead equipment feeding stations or in a case of feeders/conductors running on independent structures (not supporting OHE) along or across tracks. In such a case the length of line to be considered for purpose of payment shall be measured by the distance between center of gantries of the grid sub-station and feeding stations, in case of feeder/return feeders/conductors line from grid sub-station, or 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 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 No. 2

Supply and installation of SWR boards and Flexi sheets (Fixed on De-column sheets) at nominated places.

The payment under this item will cover preparation of Sectioning Diagram of Station on a 4' X 3' size (approx.) flexi sheet of suitable thickness and fixed on a white Decolum plywood of 8 mm thickness and erecting the same at suitable location in the station master room or at any location nominated by Purchaser's engineer. Soft copy (in .pdf and in any suitable editable format) is to be submitted.

Item No. 3

Cement concrete for foundation and plinth in other than hard soil and rock.

Complete foundation material shall be supplied and used at site for new foundation work. The price shall also include the cost of cement, sand and ballast. The price shall cover casting of OHE structure & anchor foundations with grouting & muffing for all types of foundations used in 25 KV AC OHE design other than hard and rocky soil.

The price shall cover excavation and nominal reinforced concrete work for foundation including supply of steel for nominal reinforcement and all other materials including bending, binding, laying of the reinforcement, shoring wherever necessary for casting concrete including frame work where necessary, grouting & finishing the top of the foundation blocks. The price shall also include dismantling of all connected temporary arrangements, required back filling and removal of spoil. The price shall also cover concreting work required for repairing or raising of muff height of existing OHE structure.

The work of foundation of new OHE structures/anchor shall be carried out without PB/TB.

For reaching at each site along with material, Contractor has to make his own arrangement and all the charges will be borne by the Contractor.

The Contractor will carry out the foundation work at site as per RDSO's drawings **ETI/C/0058 or latest** and during execution of work if any dispute involved such as variation in quantity in respect of size mentioned in relevant RDSO drawing, approval of Sr.DEE/TRD/SUR is required before initiating the work. No additional work should be done without taking prior approval of competent authority in this regard.

Loading, unloading and transportation of foundation material and watering arrangements will be done by the Contractor.

After casting of every foundation curing for a period of minimum 7 days shall be done by the Contractor.

For casting of foundations, no material will be supplied by Railway. The cement used for foundation shall be ISI marked of reputed manufacturer.

For casting of foundation in black cotton soil, 6 mm dia MS rounds 10 Nos. with suitable binders of 6 mm dia 3 Nos. will be supplied and erected at the bottom of the foundation by the Contractor for each foundation at his own cost.

Concrete for foundations shall be nominal mix of grade M-15 as per IS 456 or latest version and for grouting, muffing, embedding of structures in foundations, normal mix concrete of M-20 grade as per IS 456 or latest. Proportion of mix will be as given in IS-456.

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The graded coarse aggregate 40 mm nominal size (Table 2 of IS 383: 1970 or latest) 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 or latest (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. The depth of the excavation shall be measured at site from the formation level to the maximum excavated point. The volume of casting of new foundation with grouting and muffing shall be calculated as per various volume charts of RDSO's.

All anchor blocks and foundation of structures shall be provided with concrete muffs. The top of the muffs shall be above the level of ground of the track formation and of adequate height of not less than 15 cm to afford reasonable protection during rainy season. Muff may be installed at the same time as per RDSO's Drawing No. - ETI/C/0007/68 MOD-E or latest when the structures are grouted.

Marking for casting of new foundations at site will be given by the concerned SSE/TRD of the section as per site feasibility & RDSO's guide lines. All the new foundations of various OHE structures at site shall be cast by the Contractor from the ground/rail level. The Contractor as per RDSO volume charts & anchor sketches shall carry out design and excavation of new foundations at site.

The prices shall be same for any shape or size of concrete blocks. In calculating the individual volume of concrete, fraction of a cubic meter beyond the third decimal shall be rounded off to the next nearest third decimal. The prices shall apply for concreting of all foundations for mast, gantries, portals anchor blocks for guy rods, and fencing uprights. For purposes of computation of volume of concrete, the volume of steel work embedded in the foundation block and muff shall be ignored. For purposes of computation of volume of concrete, the volume of concrete shall include the volume of sand and bitumen in sand cored foundation. However, for the purpose of computation, of quantity of cement utilized in sand core foundations, the volume of the sand bitumen used in core hole should be deducted from the total volume of the foundation.

For purposes of computation of volume of concrete the volume of each muff for all masts shall be taken as 0.02 m³ except for masts with balance weights and for each column of portal, each head span mast, 2 or 3 track cantilever masts, and special fabricated masts for which the volume of muff shall be taken as 0.08 m³ irrespective of the size and shape of muff, on a flat basis.

The prices shall also include the cost of concrete cable trenches and trench covers at the switching stations as well as embedment of drain pipes, where required.

The prices shall also cover the cost of diversion of masonry / earth drain wherever necessary for casting of foundations.

Testing of samples will be done as per IS-456 from any reputed laboratory or Govt. Polytechnic & Govt. Engineering College located in the respective section. The sample transportation and testing charges will be borne by Contractor. Contractor will submit authentic certificate of sample testing.

Note for measurement of foundation items:-

The depth of the excavation shall be measured from the formation level to the maximum excavated point. One sample i.e. 3 test cubes shall be taken randomly for every 25m³ or part thereof, concreting work. If the total volume is less than 25m³, at least one sample shall be taken for testing as per IS:456

Item No. 4

Cement concrete for foundation and plinth in hard soil and rock.

Complete foundation material shall be supplied and used at site for new foundation work. The price shall also include the cost of cement, sand and ballast. The price shall cover casting of OHE structure & anchor foundations with grouting & muffing for all types of foundations used in 25 KV AC OHE design hard and rocky soil.

The price shall cover excavation, construction of reinforced cement concrete mix of M-15 grade as per IS 456 or latest for the foundation and cable trench etc., supply and handling of all materials and accessories, temporary arrangements for excavation in hard soil, concrete / masonry drains/ walls and rock requiring use of chisel and hammer or requiring blasting, Shoring where necessary, casting concrete as per IS: 456 (Latest) and **RDSO drawing ETI/C/0058 or latest** for foundation including frame work where necessary, tamping the concrete, grouting of masts with concrete as per relevant RDSO drawing and finishing the top of concrete foundation or anchor blocks. The price also include 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 to safe place. The price shall also include the cost of cement, sand and ballast. The price shall also cover the cost of diversion of masonry/ earth drain wherever necessary for casting of foundation. Price shall also cover excavation of cutting etc. to make room for foundation, if required. The purchaser's Engineer shall certify where use of chisel and hammer or blasting is necessary. The Contractor shall arrange for supply of explosives and all tools and 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 foundation shall be paid under this item as the case may be. The price shall include the cost of cement. The blasting would be permitted in exceptional cases. To the extent possible rocky bed to be removed by pneumatic chisels only. Testing of samples will be done as per IS-456 from any reputed laboratory or Govt. Polytechnic & Govt. Engineering College located in the respective section. The sample transportation and testing charges will be borne by Contractor. Contractor will submit authentic certificate of sample testing.

Note for measurement of foundation items:-

The payable volume of the foundations under this item shall be 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. The depth of the excavation shall be measured from the finished ground level to the maximum excavated point. One sample i.e. 3 test cubes shall be taken randomly for every 25 Cub Mtr or part thereof, concreting work. If the total volume is less than 25 Cub Mtr, at least one sample shall be

taken for testing as per IS:456. The rail pieces of required size along with necessary fittings for transformer foundation will be supplied by Railways free of cost at site.

Item No. 5 & 6

Supply & erection of galvanized steel for structures.

The price shall cover cost of supply of various types of galvanized steel structures, individual traction masts, dwarf masts, portals uprights and booms, TTUs & TTBs, knee bracings and main masts and masts for LT supply transformer stations, etc., fabricated out of different sections of steel as per RDSO drawings and specifications. All the steel structures for carrying overhead equipment are to be fully galvanized after drilling and fabrication as per specification no ETI/OHE/13(4/84) with latest amendments. No painted structures are to be used. The price shall also include the application of cold galvanized paint in case of any damage to zinc coating. Zinc coating will be as per Railway Specifications for non-polluted zones.

The price shall cover cost of manual erection, alignment and setting before grouting of individual traction masts and main masts for LT supply transformer stations whether rolled or fabricated including those for head span. For erection of TTC / Portal booms only, crane will be provided as per details given in GCC para crane special.

Item No. 7 & 8

Supply & erection of galvanised small parts steel (SPS).

The price shall cover cost of supply of galvanized steel fabricated small parts steel work consists of DAs, super masts, suspension brackets for feeders, anchor fittings & stiffener angles, multiple cantilever cross arms, chairs, adopters and all types of backing angles etc as per relevant RDSO drawings and specifications. All the steel work is to be fully galvanized after drilling and fabrication as per RDSO Specification No. –ETI/OHE/13(4/84) with latest amendments. The price shall also cover cost of manual erection of small parts steel work on individual traction masts and main masts as per site requirements. The price shall also include the application of cold galvanized paint in case of any damage to zinc coating.

Zinc coating will be as per Railway Specifications for non-polluted zones.

Note for Steel work & SPS:-

(a) Cost of erection shall also cover supply of all types of hot dip galvanized nut bolts / washers required as per RDSO drawings.

(b) For the purpose of payment, the weights of individual traction mast, masts of head span and SPS shall be determined for each type on the basis of the payable weights per meter length given in tables of Railways excluding fasteners [for standard types]. For special types, the Purchaser will decide the payable weight per meter length at the time of approval of designs.

Supply, Erection, Testing & Commissioning Guy rod Assembly (9.7/9.3/5.35) of all sizes complete with all fitting.

The price shall cover supply and erection of guy rod assembly of various lengths for traction masts, feeder line towers or supports complete with mast guy rod fittings, guy rod with adjustments and part/s be grouted in the anchor block. The price shall not include the cost of supply and erection of a dwarf or stub mast with anchor plates drilled and welded in position, where required, for anchorage, and small parts steel work, complete with bolts and nuts etc., if any for attaching the mast guy rod fittings to the mast/structure which shall be paid for separately under the relevant item. Prices indicated against all other items should be exclusive of the price of supply and erection of guy rod, if any which will be paid for under this item.

NOTE:1. In case the Contractor desires to adopt a different design for guy rod assembly, the same shall be indicated by him in the Tender and the components required should be clearly listed under this item as deviation. The item needs to as per RDSO Specification: ETI/OHE/P/5000 or latest.

Item No. 10

Supply, fabrication and erection of single bracket / cantilever assembly suitable for conventional OHE including ST & BT insulator.

The price shall cover on a flat rate basis for supply of conventional type bracket assembly as per RDSO drawing no. ETI/OHE/G-02106, SHEET-1,3, Mod-C or latest version, on a traction masts or support or on a drop arm and shall include those on high/low rail level platforms, in the vicinity of turnouts, over bridges, overlaps, and at locations with reduced encumbrance or terminating wire as per RDSO's latest drawings. The price shall include the cost of supply of all components and bolts, nuts, if any, including galvanized steel tubes, inclined dropper wires etc. but excluding small parts steel work. 1050 mm long creepage distance porcelain Insulators shall be supplied by Contractor. The price shall cover fabrication of cantilever assembly as per SED and erection of all components including insulators, dropper wires, fasteners and small parts steel work, if any. The price shall also cover for supply & erection of additional fittings required for supporting an additional OHE on a single bracket assembly.

Note:-

- 1) Contractor will ensure that all types of bolts, nuts, flat & spring washers which are required for erection of new cantilevers assemblies as per RDSO drawing no. ETI/C/0073 or latest and specification no. ETI/OHE/18 (4/84) or latest on OHE structures shall be supplied by the Contractor at his own cost.
- 2) The fittings which are also available in forged type, for such fittings forged type fittings only shall be used.

Supply & erection of Overhead equipment i.e. contact & catenary (excluding cost of Supply of contact & catenary wires) jumper wire ,dropper wire ,contact/catenary clips fasteners and all other material required at turn out /overlaps/diamond crossings etc for commissioning of conventional OHE.

The price shall cover supply & erection of complete overhead equipment with all components and wire and conductors including contact wire, catenary wire droppers, all types of jumpers including anti-theft jumpers (50/65/105 sq mm) and terminating wires at turn outs/ overlaps/ diamond crossings/ cross overs etc., if any.(Excluding the cost of contact & catenary which will be supplied by Railways).

Provision of long cross type G-jumper on parallel run side instead of cross-over/turn out side as per RDSO drawing No ETI/OHE/G/02141 Rev 'C' or latest shall be ensured.

The price shall also cover supply of all components including dropper clips, parallel clamps for jumpering and splices (where their use is approved), dropper wire, jumper wire and terminating wire/small parts steel works complete with bolts and nuts etc. for attachment of number plates to mast/structure, if any. The price shall include provision of enameled /retro reflective number plates, enameled/retro reflective sigma boards on masts before stop signals, different types of boards required to be provided as per ACTM (caution/warning, DJ ON/OFF, DJ ON/OFF for memu, 500m, 250m neutral section boards, unwired section, engine stop board, power block limit board etc. on traction masts/ structures. Sigma marking/boards shall be provided before signals on OHE masts/structures as per Rly Board letter no 2001/Elect(G)/170/1 pt dt:07.05.2012 as decided by engineer. The price shall also include the cost of painting the setting distance of masts/structures, rail level on masts/structures, stenciling of symbol for direction of emergency telephone socket and Y marking at BWA locations as per temperature and local instructions. This price also includes supply and erection of different type caution boards on OHE structure.

Rly. Id No.	Description of components	Qty. for units
1	2	3
1040-2 or SK-534/1 & SK-575/2 or SK-576/1 & SK-535/2 or 1041-3	Contact wire parallel clamp small	As required
1180/SK-572/1 & SK-572/2	Contact wire dropper clip (107)	-do-
1192	Catenary dropper clip complete with bolts, nuts etc.	-do-
7501	Enameled number plates complete with 2 Galva. MS. Bolts m 10x35/30, nuts and lead washer for m 10 bolts but excluding SPS for attachment of number plate to masts/structures.	-do-
1110-2	Contact wire ending clamp	-do-

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1120	Catenary ending clamp	-do-
1140	Large span wire clamp (130)	-do-
5020-1 /5020-2	Adjuster	-do-
5030	Anchor double strap assembly	-do-
5191/5192	Compensating plate / Equalizing plate.	-do-

All the warning boards provided on OHE structure shall be retro reflective type as per latest Rly. Boards / RDSO guidelines. Similarly structure number plates on POHE mast at specific locations should be retro reflective types as per latest Rly. Boards / RDSO guidelines. Separate DJ close boards to be provided for MEMU/EMU wherever required for MEMU/EMU operation.

The price shall cover supply of all components required for a pull-off agreement to pull one equipment only including head span mast fittings complete with M.S. angle equalizing plate assembly, steady-arm, catenary wire dropper clip, contact wire swivel clip and fittings including solid core insulators. The price shall cover erection of all components including solid core insulators, small jumper wire, large jumper wire and conductors. The price shall cover supply and erection of all additional fittings required including the supply of required conductors/jumpers wires, in case the pull off pulls more than one equipment. The price shall cover final checking, adjustment and inspection of OHE by tower car.

Item No. 12

Supply and erection of Anticreep arrangement for OHE. (Catenary wire will be supplied by Rly.)

The price shall cover supply of all materials required for erection of anti-creep including adjusters, appropriate mast anchor fittings at its terminations on either side on structures including backing angle, if required, catenary ending clamps and fittings including 9-ton insulator assembly and small parts of steel, if any. The price shall cover erection of all materials including 9 ton insulator assembly & 65 Sq. mm catenary wire. The catenary wire will be supplied by Railway.

NOTE: 1. The price shall not include the cost of any additional cut-in or suspension insulator which will be paid for under relevant item of tender schedule.

2. In case the anti-creep extends beyond one span on either side of anti-creep center, payment for erection of extra length shall be paid additionally at the rate of 20% of the rate for 35, 36 & 37 for each extra span. The Insulators are to be tested by the contractor as per RDSO Specification /Procedure SMI No. TI/MI/0042 (Rev-o) before erection.

Item No. 13

Supply, Erection, Testing & commissioning of materials for double OHE termination of conventional OHE complete with 9T porcelain insulator 1050 mm CD.

The price shall cover supply of all material necessary for the termination of single conductor of Over Head Equipment or terminating wire on a Traction Mast or Structure using appropriate mast anchor fitting including porcelain insulators, clevis assembly, adjuster, anchor double strap, ending clamp for contact wire or terminating wire and fittings including mast anchor fitting, 9 tonne porcelain insulator and

terminating wire. The price shall cover supply & erection of all materials and components including 9 tonne porcelain insulator & terminating wire, if any.

Item No. 14

Splicing & extension of anchored overhead equipment.

Price shall cover per span basis splicing of terminated overhead equipment consisting of 65 sq.mm catenary wire and 107 sq.mm contact wire, extend the same to adjust the existing crossover/turnout/overlaps/insulated/un-insulated overlaps as per 25KV AC standard. Price also includes supply and erection of materials for dropper, dropper clips for contact and catenary wire for extended and modified portion of OHE. Price shall exclude the supply of catenary and contact wire which shall be supplied by purchaser. Price excludes supply and erection of section insulator, termination, modified bracket assembly which shall be paid under relevant item.

Item No. 15

Transfer of equipment from one mast or support to another including old bracket removal

The price shall cover transfer of overhead equipment to a new support from the old mast or support and consequent final adjustment to overhead equipment. The foundation, steel work and erection of cantilever assembly for the new mast or structure will be paid for under appropriate items. The cost also includes dismantling of existing bracket assembly/assemblies including insulators and SPS. The price shall also include the necessary adjustment of the OHE termination arrangement including regulating equipment, required due to consecutive transfer of OHE as per the new alignment. The dismantling of existing dropper assembly and provision of new droppers for leveling and to maintain proper OHE profile will be paid separately under the appropriate schedule item.

Item No. 16

Supply, Erection, Testing & commissioning of additional fittings at a turnout, diamond crossing & overlap.

The price shall cover on flat rate basis 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/bimetallic parallel clamp for jumper connections between two sets of overhead equipment conductor at a turnout, diamond crossings, overlaps or neutral section, but excluding jumper wire. The price shall cover erection of all materials including jumper wire, and all adjustments required at turnouts, crossings, overlaps and neutral sections. The price shall also cover erection of potential equalizer jumpers at insulated overlaps and neutral sections. The price shall not include extra bracket assemblies, overhead equipment, termination of overhead equipment and cut-in-insulators in the case of insulated overlaps and neutral section which will be paid for under respective items.

Note : A cross-over shall be paid for as 2 off of Item 18, special configuration of OHE commonly known as half overlap shall be paid for as 1 off under this item. This shall apply in case of half overlap used in changing over from regulated to unregulated equipment or unregulated to regulated equipment.

Item No. 17**Supply, Erection, Testing & commissioning of 9T solid core suspension porcelain insulator 1050 mm CD.**

The price shall cover supply and erection of 9T solid core suspension porcelain insulator 1050 mm CD insulator required for execution of work at the site of work or at the depot nominated by railways. The creepage distance of above insulators should be 1050mm i.e 20mm/kv. Note:- Insulator shall conform to RDSO Spec No. TI/SPC/OHE/INS/0070 (04/07) with A&C slip no. 01 & 02 (10/16) or latest.

Item No. 18**Supply and erection of long Creepage post insulator.**

The price shall cover supply and erection of long Creepage post insulator required for execution of work at the site of work or at the depot nominated by railways.

Note:- Insulator shall conform to RDSO Spec No. TI/SPC/OHE/INS/0070 (04/07) with A&C slip no. 01 & 02 (10/16) or latest.

Item No. 19**Supply, Erection, Testing & commissioning of 3 Pulley Regulating Equipment assembly complete with all fittings for conventional OHE (Ref RDSO Spec. NO. TI/SPC/OHE/ATD/0060 with A&C slip no. 1&2 or latest).**

The price shall cover supply & erection of 3 pulley type regulating equipment assembly complete with counter-weight assembly suitable for conventional type OHE, including 9 tonne adjuster, double strap assembly and normal/anti-theft guide tube assembly, stainless steel wire rope, required for the regulating equipment but excluding small part steel work, if any. The price shall also cover adjustment of the entire regulating equipment. The price shall not include supply / erection of termination, which will be paid for under appropriate item. Price shall include erection of anti-falling arrangement as per RDSO Drawing No. – TI/DRG/OHE/ATD/RDSO/00001/99/2 (Latest) & TI/DRG/OHE/ATD/RDSO/00009/06/0 (Latest). The anchor fittings required for erection of regulating equipment & anti-falling devise will be paid separately under appropriate item of SPS.

Item No. 20**Supply, Erection, Testing & commissioning of section insulator assembly conventional complete with all fittings and 9T porcelain insulator 1050 mm CD. (RDSO spec. No. ETI/OHE/27 (8/84) with A&C slip no.1 or latest.)**

The price shall cover supply & erection of all components required for a standard section insulator assembly, complete with solid core insulators (serving both the overhead equipment conductors (sectioning & 9 Tonne insulators), including special droppers for supporting the equipment and all terminal fittings for conductors, for the section insulator assembly and the 9 tonne insulator assembly on the catenary and dropper wires as required. The price shall cover erection and adjustment of all components including porcelain section insulator assembly, 9 tonne porcelain insulator on the catenary and droppers.

Item No. 21

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Supply and erection of a 25KV, 1250A rated single pole isolator assembly with earth heel.

The prices shall cover supply and erection of dual voltage single pole isolator switches 1250 Amps. Capacity conforming to specification no. ETI/OHE/16(1/94) Rev-2 or latest & Drg. No. pi/Drg/PSI/25-3150 Amp/ISOL/TE/30574/00 of approved make, complete with arcing horns, operating rods, operating rod Guides, mounting base including cost of supply of 25 KV Solid Core Post and Operating rod insulator. The price shall also cover supply and erection of a number plate of approved design for each isolator. The price shall not include supply and erection of small parts steel work complete with bolts and nuts etc. for support of isolators and for support of operating rods on gantries/ masts, and insulator to support jumper and jumper connectors. Extra for supply and erection of an earth contact assembly in an isolator The price shall be payable as extra for supply and erection of an earth contact assembly in any isolator.

The price shall cover the cost of supply and erection of 3x25 mm copper connections between the earth contact assembly and the structures.

Item No. 22

Slewing of OHE.

The price shall cover per span basis temporary slewing or lowering of erected OHE (adjusted and/or unadjusted to ground or shifting of structures for special works at the request of the purchaser and restoration and readjustment of the equipment after completion of special work. The price shall be per span or part thereof including anchoring spans.

Item No. 23

Supply & erection of single earth electrode with earth pit complete as per RDSO Drg. No. ETI/OHE/P/7020 or latest.

The price shall cover supply & erection of an earthing station as per RDSO Drg No. ETI/PSI/222-1(Latest) with a single pipe electrode. The location of new earthing station will be given by concern SSE/TD at site. 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 surrounding earth treated with charcoal and salt filling.

Item No. 24

Supply & Erection of Galvanized traction bond.

The price shall also cover supply of 40 x 6 mm GI flat with all nut, bolts, washer, lock nut and any other fasteners required for completing the bonding connection arrangement as per site bonding requirement. All the nut, bolts, washer, lock nut and any other fasteners required to be procured from RDSO/CORE approved supplier. The price shall include fabrication and erection of various types of traction bonds with fasteners. The bonds shall be made with GI flat size 40 x 6 mm and fabricated in accordance to the respective drawings for the type of bonds and erection of the same with 16 x 50 x 38 mm size GI fasteners at both ends and insulation sleeves to be provided wherever required, shaping of flats, drilling of holes size 17.5 mm (on rail & flats) and chamfering of holes. The price shall also cover removing of the existing bonds along with fasteners wherever replacement is involved.

Item No. 25**Supply & erection of GI Nut Bolt 16x50x38 mm.**

The price shall cover supply of GI nut bolt M-16x50x38, Punched washer A-18, spring washer B-16 as per Specification No. ETI/OHE/18 or latest, erection part covers drilling of holes in rail, structure & flat, fixing of above G.I. nut bolt along with washer with various type of bond/ structure.

Item No. 26**Supply of Caution / Warning / Sigma Board for OHE**

The price shall cover supply and erection of various types of enameled caution boards confirming to RDSO Specification No – ETI/OHE/33 (8/85) and respective drawing including mounting / clamping arrangement and nut, bolts, washers etc. The required brief particulars of caution boards are as follows-

Description	RDSO Drawing Number
Power Block Working Limit Board (Dead Section Caution Board)	ETI/OHE/P/7574, REV-B
Electric Engine Stop Board (Dead Section Caution Board)	ETI/OHE/P/7572, REV-B
Unwired Turnout Board (Dead Section Caution Board)	ETI/OHE/P/7573, REV-A
Restricted OHE Clearance Board (Caution Board for Special Location)	RE/33/436, REV-C
Sigma Board (Before Stop Signals)	RDSO/00038/12/0

The erection price covers erection of caution boards in approved manner as per the LOP/nominated.

Item No. 27**Supply, Erection, Testing & commissioning of Retro-reflective number plates on structures. RDSO Spec.No. ETI/OHE/P/7503.**

The price shall cover supply and erection of typical OHE structure number plate & Supply and erection of retro reflective structure number plate as per RDSO drawing No- ETI/OHE/33A (12/97), Rev-8(11/2012), excluding SPS but with nut & bolts etc. The erection price covers erection of complete number plate with SPS.

Item No. 28**Painting of Rail marking, New implantation, height & stagger on structure.**

This includes painting of adequate portion of OHE mast/upright with yellow color paint and writing of New Rail Level, new implantation, new height, new stagger with black color paint. The paint shall be of Asian Paint / Shalimar/ Nerolac or similar brand paint. For measurement purpose all the above work carried out on one upright / mast will be count as 01 No.

Item No. 29**Hiring of 15T crane on hourly basis.**

The job shall cover hiring of 15T capacity road crane with more than 10 mtr zip height. The requirement of crane is on need basis as on when required between in Solapur division. Payment will be made on Hourly basis. All tools & materials required for crane operation to be arranged by crane contractor.

Item No. 30**Hiring of JCB**

The job shall cover Hiring of JCB with more than 10 mtr zip height. The requirement of crane is on need basis as on when required in Solapur division. Payment will be made on hourly basis. All tools & materials required for crane operation to be arranged by crane contractor.

Item No. 31**Supply, Fabrication & erection of dropper assembly (conventional OHE) including removal of old dropper.**

The price shall cover Supply of Hard drawn round copper for dropper wire, diameter 5 mm as per IS:282:1982, Supply Contact wire Dropper clip (107) with locking wire as per RDSO Drawing no. RE/33/P/1181 Rev. G or latest & Supply 65 Sq.mm copper catenary dropper clip assembly consisting of catenary clip SS bolt M-10X30X35mm (10/16), spring washer B-10, Split pin 2.5X20mm, as per RDSO Drg. No. ETI/OHE/P/1192 Mod. C or latest. The price shall also cover fabrication, and erection of 5 mm dropper assembly including contact & catenary wire dropper clips with fasteners. The in-span droppers shall be made as per site encumbrance for each span and as per RDSO's design with the consultation of Railways site supervisor. The cost also includes dismantling of existing dropper assembly, wherever involved.

The price shall cover supply of all components including dropper wire, Contact & Catenary dropper clips, parallel clamps for anti-creep, jumper wire (C, G, F & antitheft jumper), splices wherever required but excluding Contact, Catenary wire which will be supplied by Railways. The price shall cover erection of all components, contact, catenary wires, droppers, jumper wire and terminating wires, if any. The price shall also include the cost of painting of the setting distance of masts/structures, contact height and rail level on masts/structures. The price shall not include termination of conductors, which will be paid under relevant item. Contractor shall use such jigs, fixtures and mechanisms (of his own), which would avoid kinks and twists in overhead conductors while manual erection under this item.

Item No. 32**Supply, erection, oil filtration & testing of 25KV/240V/25 KVA Auxiliary Transformer complete with accessories like 25kv DO fuse assembly, Anti-climbing device, jumper and its fittings, 9-tonne cut-in insulators, Earthing station etc**

The price shall include supply, of 25 kV/240V, 50Hz, single phase, oil filled 25 kVA Auxiliary Transformer. The transformer shall be purchased from RDSO/CORE approved supplier only and shall confirm to RDSO Spec. NoETI/PSI/15(8/2003) with CS no. 1 or latest. The AT shall have 250 grams breather and adjustable arcing horns to be provided on primary bushing side having horn gap setting vary between 125 to 250 mm. AT LV terminals to be connected with MCB with suitable connectors and cable (size 2x150 mm² Al.) along with gland and terminal lug. The price shall include supply and erection of cable size 2x150 mm² (of required length) to be connected between LT terminal & junction box. The price shall include supply of all components required to provide 25 kV Dropout fuse switch assembly including fuse wire on AT mast as per Drawing No. ETI/PSI/032 & specification no. ETI/PSI/14 (1/86) Rev.1 (4/87) for DO Fuse switch. This price shall include supply all the material required to provide the Anti-climbing device on the structure including cost of bolt, barbed wire net, nuts, angle clamps etc. as per Drawing No. ETI/PSI/037. This price shall also include supply of PG clamp, suspension clamp (RI-1160), single clevis (RI-1270) with other

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associated fittings necessary for Jumper connection between OHE, DO and AT HT terminal as per Drawing No. RE/42/CG/05521. The price shall include supply of Jumper Wire ,long creepage path solid core 9 tone porcelain Insulator (RI No. 6020-1,1050 mm CD) as per RDSO specification No. TI/SPC/OHE/INS/0070 (04/07) with A&C slip no. 01 & 02 (10/16) or latest with all required fasteners, fittings (contact or catenary ending cones). The price shall also include supply of all the material required for provision of additional Arcing Horn across 9T insulator as per RDSO drawing no. TI/SK/PSI/ARCHON/RDSO/00001/08/0 The price shall also cover the supply of an enameled number plate. The price shall also cover supply of material for earthing as per RDSO Drawing No. ETI/PSI/708 or latest.

Item No. 33**Providing LT junction box for AT**

The price shall also include supply and erection of LV termination box assembly as per drawing no ETI/PSI/0310. The size of box must be suitable for accommodating all the equipment suitable for 25KVA AT. The rating of all the busbar, switches, fuses, protective devices and indication connected in the box must be matched and suitable for 25KVA AT as per RDSO guidelines. After approval of the design the board must be erected at the place as directed by Railway representative.

Item No. 34**Providing 100mm diameter CI pipe under track by pushing method.**

The price shall cover for supply of CI pipe 100 mm diameter bore spigot & socket type, as per IS 1536/2001 or latest, under Railway track 1.5 mtrs below Rail formation level by pushing method (i.e. without affecting the formation of Railway track). i.e. by boring horizontally of suitable diameter hole under track with tools, tackles, manpower safely & securely.

Item No. 35**Providing LT cable marker**

The price shall cover for Supply of LT cable marker as per site requirement. The price shall also cover for fixing of LT cable marker as per site requirement.

Item No. 36**Provision of Auto Change over power panel for AT/ Local supply 150A.**

The price shall cover for supply & Erection of power panel with auto change over arrangement with heavy duty contactor etc. as per RDSO specification no TI/SPC/PSI/CLS/0020(12/02) with A&C slip No 1 to 4 or latest suitable for 25KVA AT. The price shall also cover for Fixing, Testing & Commissioning of complete power panel with auto change over arrangement with heavy duty contactor etc.

Item No. 37**Supply of 2 core 150sq.mm LT XLPE cable.**

The price shall include supply 2 core x 150 sq mm LT XLPE cable, XLPE insulated PVC outer sheathed cable with aluminium conductor suitable for rated voltage at 1100 volts grade and conforming to IS :1554 & IS:7098 Part-1/1988 with latest amendment, armouring type - single wire or armoured, shape of conductor stranded and shaped. Make:-Polycab, Finolex, KEI, Havells or Similar

Item No. 38 & 39**Excavation of trench and laying of cable in open yard as per specification & Excavation of cable across track/road, laying of cable in pipe as per specification.**

The cable laying shall be conforming to IS 1255/1983 or latest. The cable shall be laid by digging a trench in the ground and laying cables on a bedding of minimum 75 mm riddled soil or fine sand at the bottom of the trench and covering it with additional riddled soil or sand of minimum 75 mm. Warning cover for HT cable and warning cover/bricks for LT cable shall be provided as per standard code of practice. The cable trench shall be covered with RCC warning cover of size 450mm x 175mm x 37mm (18"x7"x1.5") or bricks. After that it shall be refilled properly up to the ground surface keeping a crown of 150mm (6") above the ground level. Cable marker should be provided at a spacing of 30 Mtrs. While terminating the cable on the wall, it shall be fixed with the help of 'J' hooks and secured properly on wall size of hook shall depend on size and weight of the cable. Minimum permissible bending radii:- The cable should not be bent to sharp radius. Wherever possible larger radii should be used. Minimum recommended bending radii are given below:-

Voltage rating	PVC and XLPE cable	
KV	Single core	Multi core
Up to 1.1	15 D	12 D
Above 1.1 to 11	15 D	15 D
Above 11	20 D	15 D

Note: - D is outer diameter of cable. Special precaution should be taken so as not to damage the cable. At joints and terminations bending radius for the individual cores should be above 12 times the diameter over the insulation.

Depth: - The desired minimum depth of laying from ground surface to the top of cable is as follows:-

Cable up to 11 KV rating : - 0.9 Mtrs.

22 KV to 33 KV rating : - 1.05 Mtrs.

Cable at road crossing : - 1.00 Mtrs.

Cable at Railway level crossing (measured from bottom of sleepers to the top of pipe) :- 1.2 Mtrs.

Note: - Where digging up to required depth is possible due to hard rock etc. except track/road crossing the

depth may be reduced with provision of suitable GI pipe/HDPE/DWC as per site condition and decision taken by Railway Representative. No extra payment for towards cost of pipe shall be made in such cases

Item No. 40**Supply and fixing of RCC hume pipe 150 mm dia 2 mtrs long with one collar as per specification.**

The price shall cover supply & erection of Reinforced Cement concrete (RCC) pipes shall be of 150 mm dia and 2 m long with suitable collar. Jointing of pipes with collars shall be done with cementing. The pipes shall be laid in ground 1.2 Mtrs below rail formation level. The track crossing work shall be done under the supervision of concerned Section Engineer (P.Way).

Item No. 41**Provision of horizontal drilling for track crossing**

The price shall cover provision of horizontal drilling for track crossing. The track crossing work shall be done under the supervision of concerned Section Engineer (P.Way).

Item No. 42**Supply of Industrial Heavy Duty Portable Welding Machine.**

The price shall cover supply of Industrial Heavy Duty Portable Welding Machine ARC 250-Amps with standard accessories electrode holder with Earth & Working clamp with 1.5 mtr cable and euro connectors, Specification :Voltage-230V, Dimension 375x155x232mm approx., Current-250A, Body-Steel and Fiber, Weight-Approx 7 Kg. Make: Toshan, Ador or Similar.

Item No. 43**Supply of Battery powered crimping tool, Crimping Force 50 kiloNewton.**

The price shall cover supply of Battery powered crimping tool, Crimping Force 50 kiloNewton with specifications as mentioned below. Accepted make:- Bosch or Similar

Specification	Sub-Specification	Value
Dimensions	Width	60 millimeter
	Length (with battery)	250 millimeter
	Depth	90 millimeter
	Weight	3 kilogram
Performance Parameter	Crimping Size	32 mm ²
	Head Rotates	180 degree
	Stroke	40 millimeter
	Crimping Force	50 kiloNewton
	Operating Pressure	100 bar
	Crimping Tool Cycle	15 second
	No. of Crimps per Charge	30
Battery Additional Features	Charging Time	60 minute
	Battery Type	Li-ion batteries
	Battery Capacity	4 Ah
	Battery Voltage	18 Volt
	Accessories	Battery, Charger
	Features	Simple and safe: Automatic retraction after operation
	Hydraulic Oil	Shell Tellus T15
Environmental Factor	Vibration	< 2.5 m/s ²
	Sound Level	70 dBA at 1 meter
	Operating Temperature	-20°C to 40°C

Item No. 44**Supply of Portable Rail drilling machine.**

The Price shall cover the supply of Portable Rail drilling machine. Accepted make:- Noor Engineering Works or Similar

Specification	Details
Machine Description	The machine comprises of an integrated driving engine with drilling unit coupled together, conforming to RDSO Specification No. TM/SM/3 dated 24.04.1991.
Engine	Honda Engine GX 160 or Husqvarna Engine HH163MP
Overall Weight	65 kg (Approx.)
Men Required for Operation and Transportation	2 persons
Tolerance for Diameter and Positioning	±0.7 mm
Operating Duration	2 to 5 minutes (including fixing and removal)
Fuel Consumption	10 holes per litre of fuel
Drill Spindle Rotation	60–90 r.p.m
Recommended Spares	Complete Tool Kit, Trolley, etc.
Drilling Capacity	Capable of drilling holes up to 40 mm diameter in any rail. Drill bits required should conform to IS: 5103. Drill bit not supplied with the machine.
Performance Note	Holes up to 40 mm diameter can be drilled within 2–4 minutes. A sturdy fabricated clamping device is provided for a firm grip on different rail sections.

Supply of Portable DG Set 3 KVA, 1 Phase.

The Price shall cover the supply of Portable DG Set 3 KVA, 1 Phase. Accepted make:-Kissan Shakti or Similar.

Specification	Sub-Specification	Value
Welding Generator	Minimum Welding Rod Diameter	2.5 millimeter
	Open Circuit Voltage	95 Volt
	Weld Output	Constant Current (CC)
	Rated Voltage (Welding Generator)	45 Volt
	Generally Confirming to	As per IS 2365 (latest)
	Compatible Welding Processes	Shielded Metal Arc Welding (SMAW)
	Maximum Welding Rod Diameter	6.3 millimeter
	Rated Speed (rpm)	1500
	Modes of Operation	Single Mode
	Welding Generator Type	Brushless
	Maximum Welding Current	400 Ampere
	Insulation Class (as per IS 2635)	Class F
	Minimum Welding Current	50 Ampere
	Generic Mounting Type	2 Wheel Mounted
Single Phase Auxiliary Unit	Power Factor	0.8
	Rated Output (kVA)	4–4.5 kVA
	Rated Frequency (Hz)	50 Hertz
	Rated Voltage	240 Volt
Three Phase Auxiliary Unit	Power Factor	0.8
	Rated Voltage	415 Volt
	Rated Frequency (Hz)	50 Hertz
	Rated Output (kVA)	10 kVA
Engine	Fuel	Diesel
	Lube Oil	API Class CC or Higher
	Engine Power (BHP @ Rated Speed)	≥ 40 BHP
	Engine Safety Protection	Auto shut-off on low lube oil pressure & high coolant temperature
	Noise Level (at 7m)	72 dB
	Lube Oil Volume	6 liter
	Fuel Tank Capacity	≥ 70 liters
	Make & Model	EICHER / SIMPSON / Equivalent
	Cooling Water Volume	2 liter
	Rated Engine Speed (RPM)	1500

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Specification	Sub-Specification	Value
	Starting Method	Battery
	Type of Engine Cooling	Air Cooled
	Number of Cylinders	4
	Engine Conforming to	IS 10002 (Latest)
Dimension & Mass	Width	610 millimeter
	Dry Weight	800 kilogram
	Length	2000 millimeter
	Height	1000 millimeter
Additional Information	Accessories Included	Flexible welding cable with insulated electrode holder & plug set, earthing cable with clamps, protection mask with colored glass, chisel for slag removal, copper control cables
	Equipment covering with suitable canopy & locking arrangement to protect from rain and dust	Yes
	Lockable front cover, canopy, and padlock arrangement for both	Provided
	Control Panel Includes	Engine Oil Pressure Gauge, Battery/Voltmeter, Engine Coolant Temperature Gauge, Engine Control Switch, Starting Aid Switch
Certification and Standards	ISO Certification of Manufacturer	ISO 9001:2015
	Certificates	NA
	Noise & Emissions	Conforming to CPCB norms (Latest)
Test Reports	Copies of Test Reports / Certificates to be Furnished	Yes
	Availability of Test Report from Central Govt / NABL / ILAC Accredited Lab	Yes
	Test Report Number and Date	KIW101/24 DTD 2.2.24

Supply of Hand Held Brush Cutter Battery Powered Electric Motor Brush Cutter with Cutting Blade/ Circular Saw Attachment.

The price shall cover Supply of Hand Held Brush Cutter Battery Powered Electric Motor Brush Cutter with Cutting Blade/ Circular Saw Attachment (Specifications as mentioned below). Accepted Make :-MAKITA or Similar

Specification	Sub-Specification	Value
Type	Type of Machine	Brush Cutter with Cutting Blade/ Circular Saw Attachment
	Power Source	Battery Powered Electric Motor
	Speed Control	Variable Speed
	Transmission	Centrifugal Clutch
Prime Mover With Plug In Type Electric Motor	Electric Motor Power (HP)	0 horsepower
	Motor Speed in RPM	500
	Power Rating (Watt)	NA
	Cable Length (Maximum extension cord length)	0 meter
Prime Mover With Battery Powered Electric Motor	Battery Chemistry	Li-Ion
	Battery Conforming Specification	Low Maintenance free to IS:14257 for high cranking performance
	Availability of Test Report for Battery	Yes
	Voltage of each Battery (Volt)	18
	Number of Batteries required for operation	1
	Number of Batteries supplied	2
	Battery Capacity (Ah)	3
	Battery Charging Time	35 minute
	Battery Run Time	360 minute
	Battery Charger inclusive in the scope of supply	Yes
Shaft Dimensions	Shaft Material	Aluminium
	Shaft Type	Straight Shaft
	Shaft Configuration	Single
	Shaft Length (mm)	1900 to 1949
	Shaft Diameter	26 millimeter
Generic	Tool-free changing of the attachments	No
	Castor Wheels provided to the feed head	No
	Handle Type	Bike Style
	Type of Harness	Single Shoulder Strap
Performance	Cut Width / Diameter (Maximum) in mm	345 to 349
	Nylon feed head attachment inclusive	Yes
	Feed head of Line Trimmer	Bump / Tap & Go Type
	Number of Lines	Double

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Specification	Sub-Specification	Value
	Line inclusive in the scope of supply	No
	Length of the Line Provided in the Spool	0 meter
	Line Diameter	0 millimeter
	Line Feed	Manual
Nylon Feed Head Attachment	Blade Cutter attachment inclusive	Yes
	Blade Material	Hardened Steel
	Blade Type	3 tooth blade
	Number of 2 teeth Blades	0
	Number of 3 teeth Blades	1
	Number of 4 teeth Blades	0
	Number of 8 teeth Blades	0
	Circular Saw attachment inclusive	No
	Number of Circular Saw Blades	0
	Circular Saw Material	NA
	Diameter of the Circular Saw (mm)	NA
	Number of Teeth in Circular Saw	0
	Feed head of Blade Cutter / Circular Saw attachment	NA
	Other Accessories inclusive	Debris guard
	Overall Dimensions (mm x mm x mm)	6
	Maximum Operating Weight	4.7 kilogram
Warranty	Warranty on Equipment	2 year
	Warranty on Prime Mover	2 year
	Warranty on Battery	2 year

Supply of Impact Torque Wrench along with two Batteries (5.0 AH), Fast Charger (18V) and Storage case.

The price shall cover supply of Impact Torque Wrench along with two Batteries (5.0 AH), Fast Charger (18V) and Storage case with specifications mentioned below. Accepted Make: BOSCH or Similar

Sr.No	Description	Feature
1	No-load speed (1st level)*	0-800 rpm
2	No-load speed (2nd level)*	0-1300 rpm
3	No-load speed (3rd level)*	0-1750 rpm
4	Sound Pressure Level (dB)	<110
5	Tool holder	3/4 Square Drive inch
6	Maximum Fastening Torque	1600 Nm
7	Breakaway Torque	2200 Nm
8	Torque Stages	3
9	Torque adjustment range min/max (1st level)	0-600 Nm
10	Torque adjustment range min/max (2nd level)	0-1100 Nm
11	Torque adjustment range min/max (3rd level)	0-1600 Nm
12	Impact rate (1st level)*	0-1550 bpm
13	Impact rate (2nd level)*	0-2200 bpm
14	Impact rate (3rd level)*	0-2350 bpm
15	BITURBO	Yes
16	Auto Bolt Release (ABR) mode	Yes
17	Battery Voltage	Procore 18V batteries
18	Electronic Speed Selection	3 Speed
19	No. of Batteries	2 Batteries (3.0 AH)
20	Battery Charger inclusive in scope of supply	Yes
21	Carrying Case inclusive in scope of supply	Yes

Item No. 48

Supply, Erection, Testing & commissioning of cable avoidance tool kit or cable detector suitable for detecting and route tracing of buried cable, pipe etc. with all accessories necessary for detector of cable pipe meter.

The price shall include the Supply, Erection, Testing & commissioning of cable route locator/tracer set suitable for detecting underground power supply cable with LCD graphic display active/passive modes and depth range up to 15 m, the set shall be consisting of the following (1) receiver seek tech line locator/cable avoidance tool-1 no. (2) trans meter/signal generator complete with earth stake and connection leads-1 no. (3) inductive signal clamp, make: Rycom, pathfinder or similar.

Item No. 49**Transportation of release material.**

The price shall include loading and transportation of released materials, such as dismantled masts, brackets, and other OHE-related items, to the respective depot as directed by the concerned depot in-charge.

Item No. 50**Supply & spreading of stone metal 25mm in substation.**

The price shall be per cu. m. and shall cover supply and spreading of uniformly graded ballast of size 20 mm, in the outdoor switch yard after completing all the works and leveling the switch yard area, but before commissioning of the installation. The gravel/ballast shall be of good quality and free from any dust and dirt. Prior approval of ballast shall be taken from the purchaser for the gravel samples. The gravel / ballast shall be spread out uniformly to a depth of 100 mm over the area indicated by the purchaser's Engineer. The scope of work also covers cleaning, leveling and then spreading of ballast within the area of existing installation. The work also covers cost of providing good quality brick lining to the perimeter of the area.

Item No. 51**Removing of Electrical TRD Bonds and Erection of the bonds as per RDSO drawings & specifications.**

The price shall cover Removing of Electrical TRD bonds (including galvanized nut-bolt-washer (plain and spring type) of size 16 x 50 mm with check nut etc) during Engineering machine work for Maintenance of Tracks and erection of the same after engineering machine work as per RDSO Drawing and specifications. The work is to be carried out in co-ordination of Engineering Department. Correctness of Location of bonding hole is to be ensured. Holes for erection of bonds to be done by drilling machines only. Welding machine should not be used to make holes for erection of bonds. Chamfering must be done after making the holes for erection of bonds.

Item No. 52**Measurement of Height on each dropper in one span. Measurement of stagger & implantation on structure before & after the Engineering track related work.**

Measurement of Height on each dropper in one span, measurement of stagger & implantation on structure before and after the Engineering track related work. In case of curve, Measurement of super elevation on structure before and after the Engineering track related work. This includes measurement of height, stagger and implantation of OHE with the help of Fiber/wooden gauge, D.O Rod, non-metallic measuring-tape before and after Engineering/OHE work, under power block. The reading should be recorded in the register made for this purpose in following format-

Location/Dropper No	Line	Height in Mtr		Stagger in mm		Implantation in Mtr	
		Before	After	Before	After	Before	After

Sign of contractor

Sign of OHE/Supervisor

Sign of P/Way/Supervisor

Permit to work for this work if required will be given by Railway competent staff. Adequate No of Discharge rod, Height gauge, D.O.Rod, Measuring Non-Metallic tape along with tools and tackles should be arranged by the contractor including its transport from site to nominated depot. Only non-metallic measuring tape will be used for the measurement. Stagger and height should be measured on each dropper of one span. Implantation of OHE structures should also be measured and recorded.

Item No. 53**Stencilling of rail level, implantation, MRL, ERL telephone sockets & location number etc. (with paint)**

This includes painting of adequate portion of OHE mast/upright with yellow color paint and writing of New Rail Level, new implantation, new height, new stagger with black color paint. The paint shall be of Asian Paint/ Shalimar/ Nerolac brand paint. For measurement purpose all the above work carried out on one upright/mast will be count as 01 No.

Item No. 54**Modification of catenary wire with false contact wire (contact wire will be supplied by railway).**

The price shall cover erection of PG clamp, jumper, catenary ending cone, contact and catenary ending clamp, anchor double strap assembly and dropper. The contact wire will be supplied by railway.

Item No. 55**Change of encumbrance / redropping of spans.**

The price shall cover change/modification required to be carried out in an encumbrance of a span, the price shall also cover removal of an existing dropper, provision of a new dropper and adjustment of an existing dropper of a span including the catenary / contact wire ending clamp.

Item No. 56**Supply & Erection of copper jumper (all types of "G" jumper).**

The price shall cover supply of annealed stranded copper conductor - Jumper wire (160 sq mm unit weight 1.504 kg/meter (length each jumper- as per site requirement), required for the work, as per latest RDSO's Specification No. TI/SPC/OHE/JMP/0941, RDSO Spec. TI/IN/0059 or latest revision at the site of work or at the depot nominated by railways

Item No. 57**Supply of heat shrinkable straight through joint kit**

The price shall cover supply & erection of Reinforced water barrier heat shrinkable straight through joint kit for 3 x 240 sq.mm. Aluminum core, XLPE insulated, unscreened, 3.3 kV (E) cable. IS for test requirement and test method -IS 13573.

Acceptable Make -Raychem, REPL / Xicon & Cabseal or Similar

Item No. 58**Dismantling of 25 KV/230V, 10 KVA LT supply transformer including its accessories.**

The price covers Dismantling and shifting of AT with DO fuse, jumper etc. excluding structure as per RDSO specifications and as per instructions and under supervision of Railway's authorized Supervisor.

Item No. 59**Dismantling of existing control & distribution Panel with auto change over Switch, for CLS supply, complete with box, including disconnection of cable connection.**

The price covers dismantling of existing control & distribution Panel with auto change over Switch, for CLS supply, complete with box, including disconnection of cable connection. as per RDSO specifications and as per instructions and under supervision of Railway's authorized Supervisor.

Item No. 60**Transporting and supply and installation of concrete (RCC) route indicators at intervals of 50 meters as per technical specification.**

The Price shall cover supply & erection of transporting and supply and installation of concrete (RCC) route indicators at intervals of 50 meters as per technical specification. They should be standard RCC with letters on one side "CR" and the other side "TRD Cables" as per drawing SK12/10 of RVNL SC. Inspection by Consignee.

Item No. 61**Power block charges @ 100 % extra on erection charges.**

The price shall cover 100% extra charges of erection rates of items number mentioned in tender schedule, for erection of such equipment under power block (Shut off traction power). The price payable under this item shall be extra over the erection rates of the items referred therein, provided such work is not called for on account of non-compliance with specifications, and/or approved drawing and instruction given by the purchaser from time to time. Where the price under this item are applicable, the contractor shall finalize quantities of various items of work to be done under power block jointly with Engineer's representative prior taking the work in hand. The 100% extra for erection will be given only if erection is done in power block and therefore sometimes may not be for full schedule quantity.

Explanatory Notes Foundations

Scope: This chapter deals with the designs of foundations & anchor blocks for traction structures carrying overhead equipment (including those on bridges), structures at switching stations and other concrete work. It also deals with the specification for concrete.

Design of foundation:

- a) **Soil Pressure:** The proposed foundations for OHE modification are required in the already electrified area having OHE structures at approximate interval of 50 mtrs. Therefore normally, details of type of soil are already available. The same information can be utilized for design of foundation. **OR**
- b) For design of foundations for traction structure 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) should be followed. In addition, at every 250 m 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 foundations for masts and gantries at switching stations and booster stations, the Contractor shall determine the type and allowably 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.
- c) **Structure carrying overhead equipment:** Foundation 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, new pure gravity sand-filled core foundations, or foundations with cast-in-site reinforced concrete piles, or cantilever type foundation with counter-weights or guyed foundations may be adopted.
- d) **On Bridge Piers:** Complete design of foundation for traction structures on bridges to suit different locations and local conditions shall be prepared and submitted by the Contractor along with detailed calculation, justifying the design for purchaser's approval will be furnished by the Purchaser.
- e) **Masts and Fabricated Structures at Switching Stations Fencing:** Foundations for the masts of gantries at switching stations shall be of the pure gravity type, the base of which shall rest on consolidated soil.
- f) 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 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-site or the Purchaser may adopt reinforced concrete foundation as desires.
- g) **Typical Design:** Typical designs and drawings of side bearing and new pure gravity and side gravity type foundations etc., employment schedules for standard foundations for traction structures for various locations and types are as per standard RDSO drawings.
- h) **Special Foundations:** In the case of foundations at locations not covered by the employment schedules furnished by 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

drawing no. ETI/C/0062 Mod 'A') 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 foundations will be final.

- i) **Equipment Pedestals:** Pedestals for interrupters and LT supply transformers where required, shall be of mass concrete with the base resting on consolidated soil.
- 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 unconsolidated soil is more 0.5 m the cable trench shall be made of reinforced cement concrete of approved design supported at suitable intervals on concrete pillars.

Bearing pressure: The following allowable bearing pressures may generally be expected for kinds of soil. The information is given for guidance only.

Average good soil in banks and cuttings	11,000 Kg/sq. m
Murum soil in cuttings	22,000 Kg/sq. m
New Banks and bad soils bank & cuttings	5,500 Kg/sq. m

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 case of dry black cotton soil, the soil should be subjected to bearing pressure as close as possible but not exceeding 16, 500 kg/sq. m the depth of the foundation block being not less than 2.8 mtr. In the case of wet black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 8000 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.

Concrete: Concrete for foundations shall be nominal mix of grade M-15 as per IS 456 or latest version. Concrete for grouting, mugging, embedding of structures in foundations shall be normal mix concrete of M-20 grade as per IS 456 or latest version. A proportion of mix given in IS 456 or latest.

Size of grading and aggregates: The graded coarse aggregate 40 mm nominal size (Table 2 of IS 383: 1970 or latest) 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 or latest (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.

Sand cored foundations: After erection of masts in sand cored foundations, the core hole of the foundation blocks shall be filled with dried sand & 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.

Sinking of concrete shells: Where the water table is high, one or more sections of reinforced concrete shells may have to sunk before casting concrete. The size of each shell shall be 1200 mm outside dia. x 50 mm thick x 600 height reinforced with 6 mm ($\frac{1}{4}$ ") dia. rods spaced 150 mm apart, both longitudinally & circumferentially.

Type of foundation in black cotton soil: The foundations in dry black cotton soil should be of type BC or NBC as per RDSO drawings/designs.

Structures

Scope: This chapter deals with the design of steel structures and steel work for overhead equipment, switching stations, booster transformer stations and LT supply transformer stations and the specification for steel mast and pre-stressed concrete trial mast.

Types: Structures and gantries may consist of any or more of the following types:

- i) Broad flange beams.
- ii) Rolled Steel joists.
- iii) Fabricated steel structures like B/K/150, 175, 200, 225, 250, TTC/G/O/N/R portals structures.

Structure/uprights shall generally be embedded in concrete foundation blocks; in special cases structures may be secured by means of holding down bolts.

Steel Structures: Design 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 or its latest version. The thickness of smallest steel section used shall be 5 mm for galvanized members. All steel structures and small part steel for carrying overhead equipment are to be fully galvanized after drilling and fabrication as per specification no. ETI/OHE/13(4/84) & to the latest amendments and no painted structures are to be used.

Minimum average weight of zinc coating on all steel structures and small part steel shall be 1000 gm/sq. m

Cantilever masts:

- a) For purpose 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 OHE (1.60 Kg/m for each conventional and 1.32 Kg/m for each composite OHE)
 - ii) Weight of bracket supporting the OHE (60 Kg/normal bracket)
 - iii) Weight of a man (60 Kg)
 - iv) Weight of feeder, return conductor or other special equipment wherever they occur as per RDSO
 - v) Weight of earth wire (0.32 Kg/m)
 - vi) The affect of eccentricity of vertical and horizontal loads on the bracket due to variation in temperature.
 - vii) Radial forces on the mast, due to stagger, curvature, anchorage, etc.
 - viii) Winds load perpendicular and parallel to the track. The wind pressure adopted shall be taken as per RDSO latest guidelines.
 - ix) Weight of the mast upright itself; and
 - x) Any other load or loads that may occurs due to the special location of the structure
- 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 load shall not exceed 8 cm. and the mast shall be so erected that it becomes reasonably vertical after application of permanent loads; and
 - ii) Additional deflection under maximum wind pressure shall not exceed 8cm at the level of the contact wire.
- c) **Torsion:** The torsion rotation of the mast due to permanent load shall not exceed 0.1 radian.
- d) **Typical Design:** The typical design of a traction mast is included in the set of standard drawings. Employment schedules for standard masts for various locations and types are as per standard RDSO drawings.

Anchor mast:

- a) Mast 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 Mast: 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 design.

Head spans:

- a) Load: The loads to be considered shall be as detailed as far as applicable and at their worst combination.
- b) Sag for Head Span wire: The sag for the head span wire shall be approximately one-tenth (1/10) of the span.
- c) Minimum Tension in Cross Span and 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.

Portals:

- a) General: - Portals shall be of fabricated steel of standard types to RDSO designs/drawings.
- b) Load: - The loads shall be as detailed as applicable.

Structures on bridges:

- a) The structures may be either cantilever mast or portal (hinged or fixed at base) depending on the type & condition of bridge pier capping. As far as possible cantilever mast grouted in foundation on pier will be used. Where this is not possible cantilever mast with holding down bolts or suitable portals (hinged or fixed at base) may be adopted.
- b) (b) Designs of structures on bridges to suit different locations and local conditions will be furnished to the Contractor by the purchaser. In case of bolted structure on bridge piers Contractor has to submit the detail design for base arrangement for approval of purchaser.

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.

Setting of structures:

- a) The setting is the distance from the center line of the track, on straight or curve to the face of the mast/structure of fitting located on mast.
- b) On straight and outside of curve, the standard setting shall be as per the relevant RDSO drawing. Wherever this distance cannot be provided specific approval of Purchaser shall be obtained before erection. Setting of portal upright, overlap/turnout structures, anchoring structures and other masts carrying more than one OHE will be as per RDSO/HQ guidelines wherever possible.
- c) Extra clearance in curves: - The minimum setting of structures on curves shall be determined by adding to the above minimum figures an extra clearance as per RDSO's guidelines.
- 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 center under the worst conditions of wind.

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- e) Structures on Platform: - The setting of structures on platforms will be not less than 4.75 m.
- f) Structures near Signals.
- g) In the vicinity of signals, structures shall be located in a manner, which shall ensure good visibility where necessary; the setting shall be as per RDSO drawings/designs.
- h) Setting of Structures: - The value of setting of masts/structures shall be painted on each mast/structures. The figures shall be 25 mm in size in white on a red background. In addition, the track level shall also be marked on the mast/structure by a horizontal red painted stroke.
- i) General: -
 - 1. This specification provide for fabrication, galvanization and supply of structures as mentioned in Schedule for supporting traction overhead equipment of permanent way and distribution lines of the Central Railway. The Contractor shall carryout the manufacture and supply the structures as mentioned in schedule of rates and quantity.
 - 2. The work shall be strictly in accordance with the following standard specification, rules and codes of practice. All steel used for manufacture shall be as prescribed below:
 - a) Quality of steel - IS 2062 Grade - A
 - b) Fabrication etc. - IS 800
 - c) Electric Arc Welding - IS 816
 - d) Galvanization - RDSO Specn. No.ETI/OHE/13(4/84) or latest
 - 3. Latest edition of the above codes/specifications with correction slips issued from time to time shall be applicable to the work except to the extent it is modified

Numbering of structures carrying OHE: All structures shall be numbered in accordance with the numbering given in the approved overhead equipment layout plans. Number plates shall be provided on each mast or structure as per RDSO standards.

Checking of steel work: The fabricated steel work will be inspected and passed by a Railway Engineer but such passing shall in no way relieve the Contractors from the responsibilities under the contract.

Steel work for switching stations and gantries:

- a) Horizontal members of main as well as auxiliary gantry carrying isolators switches, insulators, potential transformers etc. shall be made from steel sections viz. channels, angles and small joints, single or fabricated. They shall preferably be attached to masts by means of clamps to avoid drilling of mast section.
- b) For purpose of design, all possible loads, which may occur in the worst combination, shall be considered. The loads shall include the following: -
 - i) Weight of insulators, instrument transformers, isolator switches, bus bars and their accessories
 - ii) Loads caused by feeders, along and across tracks, return feeders etc.
 - iii) Loads caused by anchorage due to guying of anchored masts (where applicable)
 - iv) Pull or push on the structure due to anchorage and radial tension (where applicable)
 - v) Wind load on the different structures, conductors and equipment. The wind pressure shall be taken as per relevant IS specification
 - vi) Weight of man working on the structures
 - 1) Weight of structure itself
 - 2) Erection of loads
 - 3) Any other load or loads which may occur due to special equipment wherever they occur

- c) Tension of conductors: - For purpose of designs, the maximum tension of different conductors, without wind load, shall normally be as under: -
- i) Maximum tension in the incoming feeder from traction sub-station to the auxiliary gantry at the feeding posts under worst conditions. 600 Kgf.
 - ii) Maximum tension in the cross feeders at switching stations under worst conditions.
 - 1) For spans less than 18 m100 Kgf.
 - 2) For spans more than 18 m200 Kgf.
 - iii) Maximum tension in longitudinal feeders running parallel to the track at the switching stations under worst conditions – 1500 Kgf.
 - iv) Tension in anchored OHE case of sectioning and paralleling stations. -200Kgf.
- d) Deflection of Gantry Masts: - Deflection under the permanent loads (as an average temperature of 35 deg. C without wind) at the top of the fabricated structures of mast shall be limited to the one eightieth (1/80th) of its height above foundation.
- e) Anchor mast :- 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 not be permitted.
- f) 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 or auxiliary gantry preferably by means of clamps to avoid drilling of mast section.
- g) Uprights and Fencing Posts: - Uprights carrying operating handles of isolators and fencing posts shall be made from steel sections, viz. channels, angles or joints, either single or fabricated.

Steel section and specification: The rolled steel joists, plates, channels, flats, angles and other rolled steel sections and rivets if any used in execution of the contract shall be of quality Grade – A and shall conform to IS 2062: 1992 or its latest revision for structural steel. The steel sections shall be free from blisters, scales, laminations or other such defects. No filling or plugging of defective steel section will be permitted. No joints either welded or bolted type shall be provided in any of the members.

Drawings and designs:

- a) The structure shall be fabricated from rolled steel section plates and bars generally in accordance with the RDSO's drawings.
- b) The dimensions shown in the structure drawings are in metric system. In the event of equivalent metric size steel sections being not available, the Contractor may use the nearest rationalized size of steel sections with the prior approval of Central Railway. When the use of alternate steel sections are approved, the resulting increase in weight up to 5 % on overall quantum of work is permitted, for which payment will be made by the Purchaser. Over and above 5 % increase in overall weight permitted as above, in case of any increase in weight is involved, it will be to the account of the Contractor. The Purchaser will not be liable to make payments on this account.

Workmanship: Unless otherwise approved the main angles, channels and joists used in the fabrication of structures shall be as shown in the drawing and all holes shall be drilled to templates. The back angles and light steel sections may be sheared to gauge and shall be accurately drilled or punched to templates. All parts shall be carefully cut and holes shall be cut and holes accurately drilled so that when the members are in position the holes shall be truly opposite each other for accurate assembly of the various sections. For the purpose of calculating structure weight, the actual length used in fabricating the structures will be taken into consideration which excludes wastages, if any, while cutting/shearing the rolled steel sections.

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The drilling, punching, cutting and bonding of all fabricated steel work shall be such as to prevent any possibility of irregularity occurring to introduce difficulty of erection of steel assembly in the field.

Built members shall, when finished, be true and free from all kinds of twists or open joints and the material shall, when finished, be true and free from all kinds of twists or open joints and the material shall not be defective or strained in any way. All latticework on the main structures shall be riveted/welded together; Main members should be bolted together. No rivets or bolts shall be used in tension, except where specifically approved by the Railway. No bolt hole shall be more than 8 mm larger than the diameter of the bolt.

Dispatch of structures:

- a) The manufactures shall assemble the complete structure in a horizontal position before dispatch from their works as may be required by the Railway for inspection.
- b) The structure shall be dispatched in sections of approved sizes and where possible shall be bundled with similar sections and tied securely for safe transit. As far as possible, full capacity of the wagon should be utilized to avoid under loading.

Setting of structures: The value of setting of mast/structures shall be painted on each mast/structures. In addition track level should also be marked on steel structures.

* * * *

Inspection and testing

Scope: This Chapter deals with the inspection and testing of completely erected overhead equipment and LT supply transformer stations.

Overall performance: The overall performance of the overhead equipment should be such as would permit collection of current by electric rolling stock with full load, at speeds upto and including the maximum specified for the design of overhead equipment, smoothly, with out mechanical shocks prejudicial sparks and without undue heating in the case of other equipments.

General tests on OHE: As soon as a section is ready for inspection and testing, the Contractor shall advise the Purchaser in writing. Tests to be carried out by the Purchaser will be done in the presence of the Contractor's representative and shall include the following apart from other reasonable tests that the Purchaser may like to conduct with a view to ensure, himself of the soundness of the equipments and their erection in strict compliance with the specifications.

Insulation: The strength of the insulation and the di-electric strength of the entire equipment as installed shall be tested with a 2500 V Megger, if it is new work.

Tests on the continuity: The electrical continuity of the line and the existence of bad contacts, if any, will be tested with a Megger, if it is new work and not modification.

Electrical impedance: The electrical impedance of individual of elementary sections in relation to one another shall also be tested with a Megger.

Switches: All isolators shall be tested for smooth and trouble free operation.

Tension devices: All automatic tensioning devices installed shall be tested for sensitive functioning and adjustment.

Stager and height: The stagger and height of contact wire over the entire section of completed overhead equipment and the clearances available shall be measured and the measurement shall be checked as per RDSO's approved drawings and designs. These measurements shall be carried out at low speed with a vehicle or device to be arranged by the Purchaser, the movement of which will follow the track levels as closely as possible. Tolerance that will be permitted on the dimensions indicated in the approved drawings.

The actual position of the two contact wires, relative to each other, at overlaps and turnouts shall also be checked. Special attention shall be paid to a smooth movement of pantographs under section insulators, particularly those that are likely to be frequently traversed.

Note:- Please adhere the RDSO guidelines vide No. TI/OHE/GA/2017 dt. 17/05/2017

Mechanical behavior: The mechanical behavior of the entire equipment shall be tested at various speeds under normal pantographs pressure without energizing the overhead equipment, if installation is completely new.

Earthing:

- a) Clearance between out-of-run wires, wire and earth wires, earth of over line structure and signals shall be checked.
- b) Earth resistance shall be measured separately for each earth electrode. In the case of inter-connected earth electrodes, the net resistance of the inter-connected electrodes shall also be measured.

* * * *

Erection and installation of equipments

Scope: This chapter deals with the methods of erection and installation of traction equipment, including casting of foundations and erection of structure.

Method of erection: All work shall be done in accordance with methods of erection and installation of equipment approved by the Purchaser. In the case of LT supply transformer stations, standard methods adopted for erection and installation of electrical equipments shall be adopted.

Sectioning: The entire equipment shall be erected in accordance with the finally adopted sectioning diagram and in such a way so as to facilitate sectioning which may be required in future and which will be indicated by the Purchaser.

Inspection: All erection and installation work shall be subject to inspection by the Purchaser to ensure that the work is done in accordance with the specification, approved designs and drawings and is of the best quality suitable for the purpose.

Measurements: All measurements for location of structures and foundations shall be made with the aid of steel tapes. On curves, these measurements shall be taken on the outer rail of the middle track in the case of odd number of tracks and on the inner rail of the first outer track from the center of the formation in the case of an even number of tracks. Structures on curves shall be located in the radial off set of the location as determined.

Bolts, nuts etc: All bolts, nuts, locknuts, screws, locking plates and split/cotter pins etc. shall be properly tightened and secured and the Contractor shall carry-out systematic inspection of this aspect of work after all adjustments to overhead equipment are completed and prior to offering completed sections of equipments to the Purchaser for inspection and testing.

Damage to galvanizing/painting: In loading, transport and erection, all galvanized/painted materials shall be handled with care to avoid damage to galvanizing/painting. If galvanizing/painting is damaged in spite of all care taken, the damaged part of component shall be put up for inspection, to obtain permission from the Purchaser to carry out repair.

Rectification at site: In case of modification, which would damage the protective coat, repair 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/OHE/13 (4/84) with A & C slip of 5/86 or latest or any other method approved by the Purchaser.

Foundation:

- a) **Location:** The location of each foundation or anchor blocks shall be set out correctly in accordance with approved structure cross-section drawings or foundations layout drawings, as the case may be, in the presence of the Purchaser's representative.
- b) **Methods of installation:** The Contractor shall adopt mechanized method (concrete mixer) for installation of foundation in the station areas with five lines or more. The Contractor may adopt either manual or mechanized method for installation of foundations in the other areas. He may erect traction masts or structures in the same operation as casting of foundations or blocks and grout them separately. In any case, the method of casting of foundation blocks and erection of masts or structures shall be subject to the approval of the Purchaser.
- c) **Excavation:** Normally, excavation of soil for foundations on anchor blocks along side the track may be done up to length of 1 to 1.2 m and depth of 0.8 to 1 m without shoring, provided and excavated hole is concreted immediately and not left over night. Shoring shall otherwise be done unless the hole is refilled with soil and tamped. In case the length of excavation is 1 to 1.2 m and depth of excavation for

foundations and anchor blocks along side the tracks is more than 0.8 to 1 m, the excavation may be undertaken only after certification by the Purchaser's representative to be safe and concrete is cast on the same day. Shoring shall be done to the satisfaction of the Purchaser's representative. All waterlogged locations will come under the purview of this para. In poor soil or ash banks, no excavation shall be done without adequate shoring and piling. For large foundations and waterlogged locations shoring shall be done in accordance with drawings submitted by the Contractor and approved by the Purchaser shoring/shuttering of the pits should be provided effectively to the satisfaction of the Purchaser.

- d) Core hole covers should be provided promptly on casting of foundation (within 48 hour) and their edges cemented to the foundation blocks. Prior to doing so, water should be filled in the core holes so as to assist in curing. The date of casting should be inscribed on the foundation block. In case of platform areas and level crossing, the core holes should be filled with sand before provision of core hole covers so as to prevent any injury to rail users even if the core hole cover gets damaged or is displaced. The track ballast should be restored to its original form promptly after casting of the foundation block. The excavated earth should be removed well clear of the area so as to avoid the mixing up with the track ballast or any obstruction to the track drains. In case of cuttings, the earth drains should be thrown well away from the shoulders so that there is no risk of its flowing back to the drain during the rains.
- e) Concreting: All concreting or grouting shall be done in accordance with tender technical specification. The concrete shall be poured and tamped properly in accordance with the method approved by the Purchaser. The Contractor shall arrange to provide concrete testing samples for tests as per specified intervals to determining crushing strength after 7 days or 28 days curing as required.
- f) Anchor Blocks: All anchor blocks and foundations of structures carrying overhead equipment shall be provided with concrete muffs. The top of these muffs shall be above the level of ground of the track formation and of adequate height of not less than 15 cm to afford reasonable protection during rainy weather. Muffs may be installed at the same time the masts are grouted or after the masts/structure is loaded with equipment. The top of such foundations shall be given a slope of 1 in 50 towards the edge to ensure that water does not collect at the base of the structure of the framework of the equipment.
- g) Suitable grooves or niches shall be provided in the foundation blocks, wherever required at the time of casting to enable embedment of earth strips etc., to avoid the necessity of chipping of concrete.
- h) Conduits for cables should be embedded in the foundation blocks, wherever required to avoid consequent chipping off and breaking of the foundation blocks.

Mast and structure erection:

- a) In case of traction masts or structures are erected in cored foundations, till such time they are grouted, they shall be properly wedged to prevent them leaning towards the track and endanger safety of moving vehicles. In case traction masts or structures are erected, simultaneously with the casting of the foundations, the Contractor shall provide suitable temporary supports approved by the Purchaser. The masts shall be embedded in the foundation blocks for the correct length specified in the approved drawings.

Note: Masts/uprights should be grouted on the same day they are dropped in the foundations.

- b) Reverse Deflection: All traction masts and structures shall be erected with the correct reverse deflection so that they become reasonably vertical after they are loaded. The method of erection of

masts with the correct reverse deflection shall be submitted to the Purchaser for approval.

- c) **Infringement to Standard Dimensions:** In erection, care shall be taken to ensure that no part of the traction mast, structure or any fitting located on such mast or structure infringes the Schedule of Dimensions 1676 gauge printed in metric units in 1973..
- d) **Alignment of Masts at Gantries:** The main masts of gantries shall be carefully aligned to enable easy and good assembly of fabricated steel work.

Overhead equipment:

- a) A suggested method for erection of traction overhead equipment, which would ensure good speed, and quality erection. The Contractor, may, however follow other methods, which they consider would speed up, and ensure good quality work, subject to the approval of the Purchaser. Any wiring method should take into consideration appreciable stretch of the catenary and contact wires in the initial days after they are string and put under tension.
- b) **Bracket Tubes:** In the erection of bracket assemblies, it shall be ensured that the free length of the bracket tube beyond the catenary suspension bracket is at least 150 mm to facilitate adjustment during maintenance.
- c) **Stay Arms:** The choice of stay arms shall be such that their adjuster are capable of adjustments of minimum of 90 mm in either direction except as otherwise relaxed.
- d) **Insulators:** Before insulators are used in bracket assemblies or dispatched to work site for erection from the OHE Stores/Depot, they shall be tested as specified for routine mechanical test. No chipped or cracked insulators shall be installed. All insulators shall be cleaned before erection.
- e) **Stringing of catenary:** Care shall be taken to avoid kinking or bird caging of the catenary wire in stringing and subsequent operations. While stringing, the wire shall be suspended from pulley blocks hung from the suspension clamp eye of bracket assemblies. The pulleys shall be fitted with ball bearing and shall be of the swiveling type to permit free movement in all directions to prevent damage to the strands of the wire. The design shall also be such that it will prevent slipping off of the wire during stringing operations. The designs of the pulley shall be submitted to the Purchaser for approval. After initial stringing of the catenary, it shall be maintained at the 'no load tension' for a minimum duration of 48 hours before the pulley blocks are removed and the catenary is clamped to suspension clamps of bracket assemblies. Shorter periods may, however, be allowed by the Purchaser.
- f) **Stringing of contact wire:** Care shall be taken to avoid formation of kinks, twists and damage to contact wire in stringing and subsequent operations. While stringing the contact wire, it shall be suspended from pulleys hung from dropper fitted to the catenary in their final position. In curves, the contact wire shall be run in pulleys located at traction masts or supports, corresponding to the approximate final position of the wire.
- g) **Location of droppers:** Droppers shall be correctly positioned in each span to ensure correct level of contact wire as per dropper chart applicable to the span.
- h) **Auto – tensioning device:** The auto-tensioning device shall be erected with the correct height of the counter weight above rail level with corresponding distance between the pulleys of the device for a temperature of 35 deg. C before it is connected to the overhead equipment and put into action. The installation of the devices shall be such as to permit free, easy and unobstructed movement of the counter-weight.
- i) **Cut-in-Insulators:** All insulators in out of run shall be so positioned that they are away from the swept zone of the pantographs and will not foul with them. The live parts of these insulators shall also be so

located that they are at least 2 m away from the structures other than those supporting traction overhead equipments.

- j) **Section Insulators:** All section insulators shall be so located that they are beyond the swept zone of the pantograph running on adjacent tracks and there is not unusual sag due to the same. Where section insulators are installed, the contact plane of the runners of the insulators as well as those of overhead equipment connected to it shall be parallel to the track plane.
- k) **Anti - wind clamp:** Anti-wind clamp shall be provided as per RDSO's standard drawing.
- l) **Connections:** All jumper connections including anti-theft jumpers shall be made properly with parallel clamps and finished neatly without any loose wire or cables. The length of flexible jumper shall be adequate to avoid any disturbance to overhead equipment to restraint in the relative movement of conductors but the jumpers should not be excessively long. The end of jumpers shall be tinned including the portion inside the first parallel clamp.
- m) **Separation between OHE:** In erection, the physical separation required between overhead equipments and bracket assemblies on the same structure, as insulated overlaps shall be ensured.
- n) The gradient of the contact wire on either side of over line structures with restricted clearances shall be correctly adjusted and adequate clearance maintained between the over line structure and live equipments.
- o) **Adjustment at turn-outs, etc.:** Careful adjustment of equipment shall be made on equipment at turn-outs, cross over, diamond crossings, overlaps in special locations, for position of bracket assemblies stay arms and height of contact wire to ensure that pantographs of electric rolling stock on the run will not foul with any parts of the bracket assemblies and changeover of the contact wire is effected smoothly.
- p) For wiring in large yards, the Contractor shall, prior to the execution of works, submit to the Purchaser's Engineer for his approval the sequence of stringing of catenary and contact wires to arrange for proper crossing of wires. Endeavor will be made to arrange for traffic blocks to suit approved sequence of wiring.

Isolators: Isolator switches shall normally be so mounted that when the switches are operated, the operator faces the directions of the motion of trains. The operating handles and contact blades shall be correctly aligned for easy operation.

Bus bar and connections: Bus bars and connections shall be neatly shaped and bent to give a good appearance.

Tolerance: The permissible tolerance in dimensions for erection from those included in the appropriate drawings or schedules for different items are given below:

- a) **Measurements:** The span length shall not vary more than +/- 50 mm as measured along the appropriate rail. The cumulative error of measurement of all spans in a kilometer shall be not more than 1000 mm.
- b) **Setting of structures:** The setting of structure shall not be less than that included in the appropriate cross - section drawings, specially those with the minimum setting of 2.8 m plus curve allowance will be permitted subject to minimum specified value if the structure is not located in between tracks.
- c) **Height of contact wire:** +/- 20 mm will be permitted on the height of contact wire at points of supports as shown in the relevant structures erection drawings, except under over line structures where no tolerance will be permitted.
- d) **Stagger:** Generally +/- 20 mm will be permitted for stagger.

- e) Dropper length: ± 15 mm will be permitted for dropper length.
- f) Dropper location: ± 100 mm will be permitted for dropper locations.

Supplementary instructions: Further working instructions will be issued if considered necessary by the purchaser should be considered that the standard of work of the Contractor required to be improved.

Wiring procedure: This section deals with the wiring procedure, which may be adopted for erection of normal overhead equipment. The following procedure for erection of overhead equipment has been formulated with a view to ensure that –

- a) Bracket assemblies (brackets) and regulating equipment are correctly installed in their final position.
- b) The conductors are correctly tensioned, and
- c) The need for final adjustment of overhead equipment immediately before energisation and commissioning is virtually eliminated.

Erection of brackets: After the brackets are fabricated correctly in the Contractor's depot, in accordance with the approved structure erection drawings, and provided with indelible labels or/painted marking indicating the intended locations for each bracket, they are removed to the site of work and erected on traction masts or supports. The brackets are swiveled to position straight angles to the track and secured in that position by means of steel wires tied to similar brackets located on the opposite side of the track or other suitable means.

Stringing of catenary: The catenary is initially terminated in the ending clamp of the temporary arrangement at one end of tension length. The catenary is then paid out from the reel of the wiring and run on pulley blocks hung from the suspension clamp eyes of brackets until the terminating point at the other end of the tension length is reached.

Tensioning of catenary: The catenary is strained upto the stringing tension corresponding to the 'equivalent' span of the tension length and the ambient temperature at the time of stringing with the aid of dynamometer, and terminated at the tension point. For this, the ambient temperature shall be deemed to be the temperature registered by a thermo-meter tied to a length of catenary wire 3 to 4 meters long, laid flat on the top platform, on one of the wagons of the wiring train. Subsequently the tension in the wire is checked by measurement of sag with the help of leveling gauge attached to suspension points and to the catenary at mid span by a ladder working party. The sag shall be measured in two spans, each preferably greater than 54 meters, and situated on either side of anti-creep and the termination points. The value of sag measured by this method should be within 5 % of the critical value for the corresponding stringing tension, and the temperature at the time of this measurement. In case the discrepancy is more, the tension should be adjusted again and sag rechecked as above. After the sag is checked the catenary is terminated at the ending fitting of the temporary arrangement at the terminating point.

In order to restrict the duration of traffic blocks to the minimum, in the first block, the catenary is strained to the stringing tension with the aid of dynamometers and the catenary is terminated. In a subsequent block, the sag is checked and the tension readjusted with ladders, if necessary.

Clamping the catenary: - The catenary is clamped on the brackets placed at right angles to the track.

Droppering: - Droppers are fitted to the catenary at the correct locations. At the contact wire ends these droppers may be provided with small pulleys or hooks to set as temporary supports when the contact wire is strung. Hooks made of scrap contact wire, suspended from the catenary wire, may also be used as temporary supports.

Stringing of contact wire: - The contact wire is initially terminated in the contact wire-ending clamp of the temporary arrangement at one end of the tension length. The wire is then paid out from the reel put on the wiring and supported on the pulleys hung from droppers or on hooks until the terminating point at the other end of the tension length is reached. In curves, the contact wire shall be registered or pulleys located at traction masts or supports corresponding to the approximate final position of the wire. The axes of these pulleys should be more or less vertical.

Tensioning of contact wire: - The contact wire is strained to a tension on approximately 1.2 times the tension corresponding to the ambient temperature and terminated in the ending clamp of the temporary arrangement.

Final adjustment: - The entire installation is left in this condition as long as it is possible, preferably for a period not less than 15 days. The temporary pulleys are removed and the conductors terminated in the permanent ending fittings, compensating plates, insulators and turn buckles. The equalizer plate is kept vertical or at a slightly inclined position (by 2 or 3 cm the contact wire being shorter than the catenary) and the position of the regulating equipment is checked in relation to, the temperature at the time. The contact wire is clipped on to droppers (in the vertical position) and on the steady arms. Contact wire height at the bracket is adjusted as also the stagger and register arm clearance.

Concluding remarks: - If the above method is followed with care, no further adjustment may be needed.

Tender No:-SUR-TD-T-2026-14R

Name of Work:- 1) Electrification of Unwired pit lines/sidings of Solapur Division. 2) Electrical TRD portion of work in connection with the proposed construction of 2 lane ROB in lieu of LC-40 at km 387/3-4 and LC-42 at km 391/8-9 of Daund- Solapur section in Solapur Division. (Re-Invitation).

Sr. No.	Description	Unit	Qty	Rate Rs		Amount
				Supply	Erection	
1	Preparation of designs and drawings for overhead equipment.	TKM	4.00	0.00	22095.51	88,382.04
2	Supply and installation of SWR boards and Flexi sheets (Fixed on Decolumn sheets) at nominated places	Sq. ft.	380.00	0.00	917.11	3,48,501.80
3	Cement concrete for foundation & plinth in other than hard soil & rock	Cum	340.00	0.00	6454.06	21,94,380.40
4	Cement concrete for foundation & plinth in hard soil & rock.	Cum	50.00	0.00	8942.82	4,47,141.00
5	Supply of galvanized steel for structures	MT	27.00	126494.25	0.00	34,15,344.75
6	Erection of galvanized steel for structures	MT	36.00	0.00	8349.72	3,00,589.92
7	Supply of galvanized small parts steel (SPS).	MT	12.00	118997.89	0.00	14,27,974.68
8	Erection of galvanized small parts steel (SPS).	MT	22.00	0.00	7278.36	1,60,123.92
9	Supply, Erection, Testing & Commissioning Guy rod Assembly (9.7/9.3/5.35) of all sizes complete with all fittings.	Each	19.00	10026.71	1156.14	2,12,474.15
10	Supply, fabrication and erection of single bracket / cantilever assembly suitable for conventional OHE including ST & BT insulator.	Each	80.00	21949.47	858.80	18,24,661.60
11	Supply & erection of Overhead equipment i.e. contact & catenary (excluding cost of Supply of contact & catenary wires) jumper wire ,dropper wire ,contact/catenary clips fasteners and all other material required at turn out / overlaps / diamond crossings etc for commissioning of conventional OHE.	KM	2.00	0.00	92149.86	1,84,299.72
12	Supply and erection of Anticreep arrangement for OHE. (Catenary wire will be supplied by Rly.)	Each	2.00	23902.67	1608.87	51,023.08

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Sr.	Description	Unit	Qty	Rate Rs		Amount
13	Supply, Erection, Testing & commissioning of materials for double OHE termination of conventional OHE complete with 9T porcelain insulator 1050 mm CD.	Each	2.00	10394.79	1879.94	24,549.46
14	Splicing & extension of anchored overhead equipment.	Nos	5.00	0.00	4662.12	23,310.60
15	Transfer of equipment from one mast or support to another including old bracket removal	each	60.00	0.00	3423.75	2,05,425.00
16	Supply, Erection, Testing & commissioning of additional fittings at a turnout, diamond crossing & overlap.	Each	4.00	3862.03	543.68	17,622.84
17	Supply, Erection, Testing & commissioning of 9T solid core suspension porcelain insulator 1050 mm CD.	Each	20.00	5056.15	505.61	1,11,235.20
18	Supply and erection of long Creepage post insulator.	Each	20.00	8633.58	1145.41	1,95,579.80
19	Supply, Erection, Testing & commissioning of 3 Pulley Regulating Equipment assembly complete with all fittings for conventional OHE (Ref RDSO Spec. NO. TI/SPC/OHE/ATD/0060 with A&C slip no. 1&2 or latest)	Each	4.00	72276.03	3279.10	3,02,220.52
20	Supply, Erection, Testing & commissioning of section insulator assembly conventional complete with all fittings and 9T porcelain insulator 1050 mm CD. (RDSO spec. No. ETI/OHE/27 (8/84) with A&C slip no.1 or latest.)	Each	4.00	50293.24	3603.17	2,15,585.64
21	Supply and erection of a 25KV, 1250A rated single pole isolator assembly with earth heel.	Each	4.00	71910.43	4730.99	3,06,565.68
22	Slewing of OHE	Span	100	0.00	5421.23	5,42,123.00
23	Supply & erection of single earth electrode with earth pit complete as per RDSO Drg. No. ETI/OHE/P/7020 or latest	Nos.	40.00	3908.73	2701.33	2,64,402.40
24	Supply & Erection of Galvanized traction bond.	mtrs	1200.00	311.54	56.74	4,41,936.00
25	Supply & erection of GI Nut Bolt	Nos.	700.00	32.80	13.11	32,137.00

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Sr.	Description	Unit	Qty	Rate Rs		Amount
	16x50x38 mm.					
26	Supply and Erection of caution/warning/Sigma Board for OHE	Each	185.00	1507.88	223.91	3,20,381.15
27	Supply, Erection, Testing & commissioning of Retro-reflective number plates on structures. RDSO Spec.No. ETI/OHE/P/7503	Each	180.00	809.46	125.40	1,68,274.80
28	Painting of Rail marking, New implantation, height & stagger on structure.	Each	100.00	0.00	68.59	6,859.00
29	Hiring of 15T crane on hourly basis	hour	28.00	0.00	1482.87	41,520.36
30	Hiring of JCB	hour	30.00	0.00	1554.41	46,632.30
31	Supply, Fabrication & erection of dropper assembly (conventional OHE) including removal of old dropper.	Span	40.00	4526.06	654.59	2,07,226.00
32	Supply, erection, oil filtration & testing of 25KV/240V/25 KVA Auxiliary Transformer complete with accessories like 25kv DO fuse assembly, Anti-climbing device, jumper and its fittings, 9-tonne cut-in insulators, Earthing station etc	Nos.	4.00	257024.25	13455.89	10,81,920.56
33	Providing LT junction box for AT	No	10.00	0.00	17681.85	1,76,818.50
34	Providing 100mm diameter CI pipe under track by pushing method.	metre	200.00	0.00	3259.41	6,51,882.00
35	Providing LT cable marker	No	10.00	0.00	240.32	2,403.20
36	Providing Auto Change over power panel for AT/ Local supply 150A	No	4.00	136425.29	0.00	5,45,701.16
37	Supply of 2 core 150sq.mm LT XLPE cable	metre	3500.00	249.19	0.00	8,72,165.00
38	Excavation of trench and laying of cable in open yard as per specification.	metre	3500.00	0.00	69.63	2,43,705.00
39	Excavation of cable across track/road, laying of cable in pipe as per specification.	metre	1000.00	0.00	60.68	60,680.00
40	Supply and fixing of RCC hume pipe 150 mm dia 2 mtrs long with one collar as per specification.	Nos.	100.00	464.74	43.48	50,822.00
41	Provision of Horizontal drilling for track crossing.	metre	100.00	0.00	2972.29	2,97,229.00
42	Supply of Industrial Heavy Duty Portable	Nos	2.00	8700.00	0.00	17,400.00

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Sr.	Description	Unit	Qty	Rate Rs		Amount
	Welding Machine.					
43	Supply of Battery powered crimping tool, Crimping Force 50 kilo Newton.	Nos	2.00	31185.00	0.00	62,370.00
44	Supply of Portable Rail drilling machine.	Nos	2.00	37048.29	0.00	74,096.58
45	Supply of Portable DG Set 3 KVA, 1 Phase	Nos	1.00	495999.00	0.00	4,95,999.00
46	Supply of Hand Held Brush Cutter Battery Powered Electric Motor Brush Cutter with Cutting Blade/ Circular Saw Attachment.	Nos	2.00	53100.00	0.00	1,06,200.00
47	Supply of Impact Torque Wrench along with two Batteries (5.0 AH), Fast Charger (18V) and Storage case.	Nos	2.00	34810.00	0.00	69,620.00
48	Supply, Erection, Testing & commissioning of cable avoidance tool kit or cable detector suitable for detecting and route tracing of buried cable, pipe etc. with all accessories necessary for detector of cable pipe meter.	Nos.	3.00	313762.00	0.00	9,41,286.00
49	Transportation of release material	MT-KM	200.00	0.00	22.12	4,424.00
50	Supply & spreading of stone metal 25mm in substation.	Cum	200.00	0.00	1611.23	3,22,246.00
51	Removing of Electrical TRD bonds and erection of the bonds as per RDSO Drawing and specifications.	Nos.	100.00	0.00	44.81	4,481.00
52	Measurement of Height on each dropper in one span. Measurement of stagger & implantation on structure before & after the Engineering track related work.	Span	50.00	0.00	1459.49	72,974.50
53	Stenciling of rail level, implantation, MRL, ERL telephone sockets & location number etc. (with paint)	Each	100.00	0.00	63.58	6,358.00
54	Modification of catenary wire with false contact wire (contact wire will be supplied by railway).	Mtr	150.00	0.00	326.21	48,931.50
55	Change of encumbrance / redropping of spans.	Span	60.00	0.00	1905.18	1,14,310.80
56	Supply & Erection of copper jumper (all types of "G" jumper)	Nos.	20.00	8741.46	672.42	1,88,277.60

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Sr.	Description	Unit	Qty	Rate Rs		Amount
57	Supply of heat shrinkable straight through joint kit	Nos.	20.00	2815.01	0.00	56,300.20
58	Dismantling of 25 KV/230V, 10 KVA LT supply transformer including its accessories.	Nos.	2.00	0.00	8186.26	16,372.52
59	Dismantling of existing control & distribution Panel with auto change over Switch, for CLS supply, complete with box, including disconnection of cable connection.	Nos.	1.00	0.00	1861.03	1,861.03
60	Transporting and supply and installation of concrete (RCC) route indicators at intervals of 50 meters as per technical specification.	No	100.00	0.00	1220.22	1,22,022.00
61	Power block charges @ 100 % extra on erection charges					0
1	Erection of galvanized small parts steel (SPS).	MT	14.00	0.00	7278.36	1,01,897.04
2	Erection, Testing & Commissioning Guy rod Assembly (9.7/9.3/5.35) of all sizes complete with all fittings.	Each	4.00	0.00	1156.14	4,624.56
3	Erection of single bracket / cantilever assembly suitable for conventional OHE including ST & BT insulator.	Each	20.00	0.00	858.80	17,176.00
4	Transfer of equipment from one mast or support to another including old bracket removal	Each	20.00	0.00	3423.75	68,475.00
5	Erection of dropper assembly (conventional OHE) including removal of old dropper.	Span	20.00	0.00	654.59	13,091.80
6	Slewing of OHE	Span	50.00	0.00	5421.23	2,71,061.50
7	Modification of catenary wire with false contact wire (contact wire will be supplied by railway).	Mtr	150.00	0.00	326.21	48,931.50
8	Change of encumbrance / redropping of spans.	Span	60.00	0.00	1905.18	1,14,310.80
9	Erection of copper jumper (all types of "G" jumper)	Nos.	20.00	0.00	672.42	13,448.40
	Total cost Rs					2,14,90,357.56

END OF TENDER BOOKLET