CENTRAL ORGANISATION FOR RAILWAY ELECTRIFICATION, ALLAHABAD

TENDER
FOR

"Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase, AC Electrification including OHE & TSS as Composite Electrical Work"

in

Gadag (Excl.)- Hotgi (Excl.) section

Tender Paper No. ELCORE/OHE & TSS/Group – 258(Mod-1)

Price: **Rs. 25,000/-** **Jan-2019**

Modifications in this Tender Paper

Para No.	As Existing earlier	As Modified in this Tender
12.1 of Preamble	(A) The tenderer must have successfully completed any of the following during last 07 (seven) years, ending last day of month previous to the one in which tender is invited: Three similar works costing not less than the amount equal to 40% of advertised value of the tender, OR Two similar works costing not less than the amount equal to 50% of advertised value of the tender, OR One similar work costing not less than the amount equal to 80% of advertised value of the tender. Note: in case of composite works, separate completed works of minimum required values for each component can also be considered for fulfillment of technical eligibility criteria.	(A) The tenderer should have completed during last 07 (seven) years, ending last day of month previous to the one in which tender is invited - <u>(i) For OHE portion:</u> *(a)* at least one work involving construction of 25 kV OHE of value at least equal to 40% of Advertised Tender value of OHE work. or *(b)* at least one work involving construction of 25 kV OHE for a minimum of 40% of total TKM of the OHE work. or *(c)* one single Transmission/ Distribution line work of voltage equal to or more than 66 kV for a minimum value of 40% of Advertised Tender value of work and also should have experience of having completed at least 50 TKM of OHE work or similar nature work from a single completed work/single on-going work. AND <u>(ii)For TSS portion:</u> One similar work of substation of 66 kV or above for a value 40 % of the value of TSS component of work. *Note:(i) The work of OHE will be considered completed if Provisional Acceptance Certificate/Physical Completion Certificate has been issued for OHE works in all the sections under the contract.(ii) The work of Substation will be considered completed if Provisional Acceptance Certificate/Physical Completion Certificate has been issued for all the TSS(s) under the contract.*

12.1 (A) (ii) of Preamble	**Definition of TSS Works :-** Work of Design, Supply, Erection, Testing & commissioning of new Sub-station of 110 kV or higher voltage. or Work of up gradation/ Augmentation of existing substation of 110 kV or higher voltage, comprising at least commissioning of Power Transformer, Control Switchgear and control panel etc.	**Definition of TSS Works :-** Work of Design, Supply, Erection, Testing & commissioning of new Sub-station of **66 kV** or higher voltage. or Work of up gradation/ Augmentation of existing substation of **66 kV** or higher voltage, comprising at least commissioning of Power Transformer, Control Switchgear and control panel etc.
14.15.1 (b) of Preamble	The technical eligibility for each component of work, shall be satisfied by either the 'JV in its own name & style' or 'lead member of the JV'. Each other member of JV shall have technical capacity of minimum 10% of the cost of any component of work OR The technical eligibility for major component of work, shall be satisfied by either the 'JV in its own name & style' or 'lead member of the JV' and technical eligibility for other components of work, shall be satisfied by either the 'JV in its own name & style' or 'any member of the JV'. Each other member of JV shall have technical capacity of minimum 10% of the cost of any component of work	A Note has been inserted at the end of para 14.15.1(b) as under :- Technical Capacity of other members of JV shall be considered as satisfied, if Provisional Acceptance Certificate/Physical Completion Certificate for any component of the tendered composite work, has been received for the corresponding component of work from a single/composite completed work OR single/composite ongoing work.
12.3 & 14.15.3 of Preamble	Bid Capacity	Applicable for this Tender

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PREAMBLE

Tender Paper No**. ELCORE/OHE &TSS/Group–258(Mod-1)**

1. SCOPE OF WORKS:

The tender document consisting of works related to "Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase, AC, Electrification Works including OHE & TSS as Composite Electrical Work" in Gadag (Excl.)- Hotgi (Excl.) section in Gr. 258 of Hubli Division of South Western Railway under RE Project Secunderabad, Total 284 RKM/ 611 TKM.
All sidings, additional lines in yard, works subsequent to yard remodeling etc which may come up in the section during the execution of contract are also covered in the scope upto the stipulation in clause 1.2.34.

(a) **OHE Works**: Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, AC, Single phase, Traction Overhead Equipments, Switching Stations, Booster Transformer Stations and LT Supply Transformer Stations including foundations, structures, all Ancillary Equipments.

(b) **TSS Works:** Design, Supply, Erection, Testing & Commissioning of **132/25** kV Single Phase AC, 50 Hz, Traction Sub-Stations (TSS), Feeding Post, Shunt Capacitor banks tentatively located at Mallapur, Navanagar, Basavanabagewadi road, Vijayapura/ Aliyabad&Latchyan (All TSS with Double Transformers). Traction Sub Station, Feeding Post and Shunt Capacitor bank sites, if required, may be shifted to other suitable locations.

(c) **SCADA Works:** -DELETED-

Estimated cost of the tendered work, in totality is ₹2,35,75,30,288.93

Breakup is as under:-

(a)	**OHE Works**	Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, AC, Single phase, Traction Overhead Equipments, Switching Stations, Booster Transformer Stations and LT Supply Transformer Stations including foundations, structures, all Ancillary Equipments and Non SOR items	₹ 2,17,55,42,518.88
(b)	**TSS Works**	Design, Supply, Erection, Testing & Commissioning of **132/25** kV Single Phase AC, 50 Hz, Traction Sub-Stations (TSS), Feeding Post, Shunt Capacitor banks tentatively located at Mallapur, Navanagar, Basavanabagewadi road, Vijayapura/ Aliyabad&Latchyan (All TSS with Double Transformers). Traction Sub Station, Feeding Post and Shunt Capacitor bank sites, if required, may be shifted to other suitable locations.	₹18,19,87,770.05
(c)	**SCADA Works**	-DELETED-	-
		Total	**₹ 2,35,75,30,288.93**

(i) The work proposed to be awarded on a composite basis is inclusive of supply of all the materials (Except Catenary Wire, Contact Wire, Booster Transformers & Traction Transformer, which will be supplied by Railway required for execution of this work). Transmission lines for making traction Power available to Railway TSS are excluded from the scope.

This tender complies with Public Procurement Policy Order 2017 dated 15.06.2017.

(a) Local Content: The minimum local content shall be 50%.
(b) Margin of Purchaser Preference: The Margin of Purchaser Preference shall be 20%.

(ii) For schedule items/Non SOR items, Standard Schedule of Rates (SOR)/Non SOR items has been given. Tenderer are required to quote single percentage rate above/at par/below (SOR for schedule items/ Non SOR items).

2. FOREIGN EXCHANGE:

No foreign exchange and/or import license will be released/ provided to the Contractor in connection with this contract.

3.DOCUMENT COST &EARNEST MONEY:

(a) Tenderers are allowed to make payments against this tender towards tender document cost and earnest money only through only payment modes available ON IREPS portal LIKE net banking, debit card, credit card etc. Manual payments through Demand draft, Banker cheque, Deposit receipts, FDR etc. are not allowed.Offers received without this amount of Earnest Money shall be summarily rejected. Earnest money in any form and amount other than as described above shall not be entertained, even if written somewhere else in the tender papers.

(b) The tenderer shall be required to deposit earnest money with the tender for the due performance with the stipulation to keep the offer open till such date as specified in the tender, under the conditions of tender. The earnest money shall be as under:

Value of the Work	**Earnest Money Deposit (EMD)**
For works estimated to cost up to ₹ 1 crore	2% of the estimated cost of the work
For works estimated to cost more than ₹ 1 crore	₹ 2 lakh plus ½% (half percent) of the excess of the estimated cost of work beyond ₹ 1 crore subject to a maximum of ₹ 1 crore

Note:

(i) The earnest money shall be rounded to the nearest ₹100. This earnest money shall be applicable for all modes of tendering.
(ii) Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of earnest money deposit detailed above.

(c) It shall be understood that the tender documents have been issued to the tenderer and the tenderer is permitted to tender in consideration of stipulation on his part, that after submitting his tender he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to the Engineer. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Railway.

(d) If his tender is accepted this earnest money mentioned in sub clause (a) above will be retained as part security for the due and faithful fulfillment of the contract in terms of Clause 16 of the Standard General Conditions of Contract. The Earnest Money of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.

(e) For details see Part-I, Chapter-I, at para 1.1.5.

4. SECURITY DEPOSIT (For details see Part-I, Chapter-II, at para 1.2.17)

5.1 Care in Submission of Tenders:

(a) (i) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in Clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer.

(a)(ii) Tenderers will examine the various provisions of The Central Goods and Services Tax Act, 2017(CGST)/ Integrated Goods and Services Tax Act, 2017(IGST)/ Union Territory Goods and Services Tax Act, 2017(UTGST)/ respective state's State Goods and Services Tax Act (SGST) also, as notified by Central/State Govt. & as amended from time to time and applicable taxes before bidding. Tenderers will ensure that full benefit of Input Tax Credit (ITC) likely to be availed by them is duly considered while quoting rates.

(a)(iii) The successful tenderer who is liable to be registered under CGST/IGST/UTGST/SGST Act shall submit GSTIN along with other details required under CGST/IGST/UTGST/SGST Act to railway immediately after the award of contract, without which no payment shall be released to the Contractor. The Contractor shall be responsible for deposition of applicable GST to the concerned authority.

(a)(iv) In case the successful tenderer is not liable to be registered under CGST/IGST/UTGST/ SGST Act, the railway shall deduct the applicable GST from his/their bills under reverse charge mechanism (RCM) and deposit the same to the concerned authority.

(b) When work is tendered for by a firm or company, the tender shall be signed by the individual legally authorized to enter into commitments on their behalf.

(c) The Railway will not be bound by any power of attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contract. It may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Contractor.

5.2 The tenderers shall submit a copy of **notarized affidavit** on a non-judicial stamp paper stating that all their statements/documents submitted alongwith bid are true and factual. Standard format of the affidavit to be submitted by the bidder is enclosed as **Annexure-V.** Non submission of notarized affidavit 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 Qualifying Criteria mentioned in the Tender Document.

5.3 DEVIATIONS:

All the tenderers may please note that the offers seeking modified terms and conditions by way of deviations mentioned under either Memorandum or Deviation schedule for instance, higher mobilisation advance, or any modification in respect of mobilisation advance, On account/ progress payment, recovery rate, insurance warranty, extension in completion period , facilities to be provided by the Purchaser or any reimbursement of taxes etc. are liable to be rejected without assigning any reason thereto and the decision of the Railway

Administration in this regard will be binding on all the tenderers. It should be specifically noted that the prices shall be FIRM inclusive of all taxes and duties.

6. SUPPLY OF MATERIALS BY THE PURCHASER :

All materials required for completion of the work shall be supplied by contractor except the materials mentioned in Annexure-4 of the tender papers, will be supplied by Railways.

7. BOOSTER TRANSFORMERS

-DELETED-

8. DESIGN SPEED

The traction overhead equipment for main line is made suitable for maximum speed of 160 km/h. **{Refer Para 2.1.10(b) of Part-II Chapter-I, (Section-2)}**

9. TYPE OF OHE TO BE PROVIDED:

(i) Regulated conventional all copper OHE with 65 sqmm Cadmium-Copper Catenary and 107 sqmm grooved HDBC Contact wire.
(ii) Regulated tramway type OHE with 107 sqmm grooved hard drawn bare Copper Contact wire and 7/2.10 mm Briddle wire.

10.1 PERIOD OF COMPLETION

The entire work including commissioning of OHE and TSS works shall be completed within **30 (Thirty) Months** from the date of issue of the 'Letter of Acceptance' to the tenderer.

10.2 VALIDITY OF OFFER :-**60 (Sixty) days** from the date of opening of tender.

11. TENDER BID

This is a 'Two packet e-tendering with **e-reverse auction**. The Tender bid shall be uploaded on IREPS site (www.ireps.gov.in) in two packets which as under :

Packet-"A" - Prequalification Bid (Eligibility/Qualifying elements) of tender bid.
Packet-"B" - Technical, Commercial (Price elements) of the tender bid.

The details can be seen at para 1.1.7 & 1.1.28 (Part-I, Chapter-I).

12. ELIGIBILITY CRITERIA

12 ELIGIBILITY CRITERIA

12.1 Technical Eligibility Criteria:

(A) The tenderer should have completed during last **07 (seven)** years, ending last day of month previous to the one in which tender is invited -

(i) For OHE portion:

(a) at least one work involving construction of 25 kV OHE of value at least equal to 40% of Advertised Tender value of OHE work.

or

(b) at least one work involving construction of 25 kV OHE for a minimum of 40% of total TKM of the OHE work.

or

(c) one single Transmission/ Distribution line work of voltage equal to or more than **66 kV** for a minimum value of 40% of Advertised Tender value of work

and

also should have experience of having completed **at least 50 TKM** of OHE work or similar nature work from a single completed work/single on-going work.

AND

(ii) For TSS portion:

One similar work of substation of **66 kV** or above for a value 40 % of the value of TSS component of work.

Note:(i) The work of OHE will be considered completed if Provisional Acceptance Certificate/Physical Completion Certificate has been issued for OHE works in all the sections under the contract.(ii) The work of Substation will be considered completed if Provisional Acceptance Certificate/Physical Completion Certificate has been issued for all the TSS(s) under the contract.

(ii) 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. Any work or set of works shall be considered to be a separate component, only when cost of the component is more than ₹ 2 crore each.

Definition of SIMILARWork:-

'Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase, AC, Electrification Works including OHE & TSS'

Definition of OHE Works :-

Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, AC, Single phase, Traction Overhead Equipments, Switching Stations, Booster Transformer Stations and LT Supply Transformer Stations including foundations, structures and all Ancillary Equipments.

Definition of TSS Works :-

Work of Design, Supply, Erection, Testing & commissioning of new Sub-station of **66 kV**or higher voltage.

or

Work of up gradation/ Augmentation of existing substation of **66 kV**or higher voltage, comprising at least commissioning of Power Transformer, Control Switchgear and control panel etc.

12.2 Financial Eligibility Criteria

The tenderer must have received contractual payments in the previous three financial years and the current financial year upto the date of opening of tender, at least 150% of the advertised value of the tender. The tenderers shall submit Certificates to this effect which may be an attested Certificate from the concerned department / client and/or Audited Balance Sheet duly certified by the Chartered Accountant etc.

12.3 Bid Capacity: The tender/technical bid will be evaluated based on bid capacity formula detailed as Annexure-II of Part-I, Chapter-I.

12.4 For SCADA Works : - DELETED-

13. Tenderer's Credentials:-

13(a) Documents testifying tenderer previous experience and financial status should be producedalongwith the 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) Certificates which may be an attested Certificate from the client, Audited Balance Sheet duly certified by the Chartered Accountant etc 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 notarized affidavit on a non-judicial stamp paper 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 affidavit to be submitted by the bidder is enclosed as Form-28. Non submission of a copy of notarised affidavit 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 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 thereunder.

(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 Earnest Money Deposit besides banning of business for a period of upto five years.

13(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. Earnest Money Deposit (EMD), Performance Guarantee and Security Deposit available with the railway shall be forfeited. In addition, other dues of the contractor, if any, under this contract shall be forfeited and agency shall be banned for doing business for a period of upto five years

13(**c)** - List of works completed in the last seven qualifying financial years (as the case may be/as applicable) giving description of work, organization for whom executed, value of contract at the time of award, date of award, date of scheduled completion of work, date of actual start, actual completion, total payment received and final value of contract should also be given in respective FORMs.

13 (d)-Work load:- The tenderers shall furnish the list of works on hand indicating description of work, contract value, value of balance work yet to be done, date of award and date of scheduled completion of work in respective FORMs. Besides, they shall also advise the details of unfinalised tenders (with cost and completion period) in which they have quoted.

Note: (i) Supportive documents/certificates from the organization with whom they worked/ are working should also be enclosed.
(ii) Certificate from private individuals for whom such works are executed / being executed shall not be accepted.
(iii) Tenderer shall submit all the documents in support of minimum eligibility criteria/credential along with the Tender. No documents in support of minimum eligibility criteria/credentials will be accepted/ entertained after opening of the tender.

13(e) -Engineering Organisation: - The tenderers should have adequate engineering organizations required for the execution of the work. List of Personnel Organisation available on hand and

proposed to be engaged for the tendered work shall be furnished in forms as mentioned in respective FORMs**.**

13(f)- Construction machinery:- The tenderers should have all the construction machinery, tools & plants, vehicles etc, required for the satisfactory execution of tendered work. List of plant & Machinery available on hand (own) and proposed to be inducted (own and hired to be given separately) for the tendered work in as mentioned in respective FORMs.

14.Participation of Joint Venture (JV) Firms in Works tender :

Joint Venture shall be considered only for tenders where advertised estimated cost of the work is more than Rs. 10 Crores (Rupees Ten Crores) only.

14.1 Separate identity/name shall be given to the Joint Venture.

14.2 Number of members in a JV shall not be more than three, if the work involves only one department (say Civil or S&T or Electrical or Mechanical) and shall not be more than five, if the work involves more than one Department. One of the members of the JV shall be its Lead Member who shall have a majority (at least 51%) share of interest in the JV. The other members shall have a share of not less than 20% each in case of JV with upto three members and not less than 10% each in case of JV with more than three members. In case of JV with foreign member(s), the Lead Member has to be an Indian firm/company with a minimum share of 51%.

14.3 A member of JV shall not be permitted to participate either in individual capacity or as a member of another JV in the same tender.

14.4 The tender form shall be purchased and submitted only in the name of the JV and not in the name of any constituent member.

14.5 Earnest Money Deposit (EMD) shall be deposited by JV or authorized person of JV through e-payment gateway or as mentioned in tender document.

14.6 A copy of Memorandum of Understanding (MoU) duly executed by the JV members on a stamp paper, shall be submitted by the JV alongwith the tender. The complete details of the members of the JV, their share and responsibility in the JV etc. particularly with reference to financial, technical and other obligations shall be furnished in the MoU. (The MoU format for this purpose shall be finalized by the Railway in consultation with their Law Branch and shall be enclosed alongwith the tender).

14.7 Once the tender is submitted, the MoU shall not be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Earnest Money Deposit (EMD) shall be liable to be forfeited.

14.8 Approval for change of constitution of JV shall be at the sole discretion of the Railway. The constitution of the JV shall not be allowed to be modified after submission of the tender bid by the JV, except when modification becomes inevitable due to succession laws etc. and in any case the minimum eligibility criteria should not get vitiated. However, the Lead Member shall continue to be the Lead Member of the JV. Failure to observe this requirement would render the offer invalid.

14.9 Similarly, after the contract is awarded, the constitution of JV shall not be allowed to be altered during the currency of contract except when modification become inevitable due to succession laws etc. and minimum eligibility criteria should not get vitiated. Failure to observe this stipulation shall be deemed to be breach of contract with all consequential penal action as per contract

conditions.

14.10 On award of contract to a JV, a single Performance Guarantee shall be submitted by the JV as per tender conditions. All the Guarantees like Performance Guarantee, Bank Guarantee for Mobilization Advance, Machinery Advance etc. shall be accepted only in the name of the JV and no splitting of guarantees amongst the members of the JV shall be permitted.

14.11 On issue of LOA (Letter of Acceptance), the members of the JV to whom the work has been awarded, shall form a legal entity if not already formed, which shall have the same shareholding pattern, as was declared in the MOU/JV Agreement submitted alongwith the tender. This entity shall be got registered before the Registrar of the Companies under 'The Companies Act -2011' (in case of Company) or before the Registrar/Sub-Registrar under the 'Registration Act, 1908' (in case of Partnership Firm) or under 'The LLP Act 2008' (in case of LLP). A separate PAN shall be obtained for this entity. The documents pertaining to this entity including its PAN shall be furnished to the Railways before signing the contract agreement for the work. In case the tenderer fails to observe/comply with this stipulation within 60 days of issue of LOA, contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit the full amount of the Earnest Money Deposit and other dues payable to the Contractor under this contract. This Joint Venture Agreement shall have, inter-alia, following Clauses:

14.11.1 Joint And Several Liability - Members of the JV to which the contract is awarded, shall be jointly and severally liable to the Railway for execution of the project in accordance with General and Special Conditions of Contract. The JV members shall also be liable jointly and severally for the loss, damages caused to the Railways during the course of execution of the contract or due to non-execution of the contract or part thereof.

14.11.2 Duration of the Joint Venture Agreement - It shall be valid during the entire currency of the contract including the period of extension, if any and the maintenance period after the work is completed.

14.11.3 Governing Laws - The Joint Venture Agreement shall in all respect be governed by and interpreted in accordance with Indian Laws.

14.12 Authorized Member - Joint Venture members in the JV MoU shall authorize one of the members on behalf of the Joint Venture to deal with the tender, sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint measurement of work done, to sign measurement books and similar such action in respect of the said tender/contract. All notices/correspondences with respect to the contract would be sent only to this authorized member of the JV.

14.13 No member of the Joint Venture shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other members and that of the Railway in respect of the said tender/contract.

14.14 Documents to be enclosed by the JV alongwith the tender:

14.14.1 In case one or more of the members of the JV is/are partnership firm(s), following documents shall be submitted:

(a) A copy of the Partnership Deed,

(b) A copy of consent of all the partners or individual authorized by partnership firm, to enter into the Joint Venture Agreement on a stamp paper,

(c) A copy of Power of Attorney (duly registered as per prevailing law) in favour of the individual to sign the MOU/JV Agreement on behalf of the partnership firm and create liability against the firm.

14.14.2 In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:

A copy of notarized affidavit on Stamp Paper declaring that his/her Concern is a Proprietary Concern and he/she is sole proprietor of the Concern OR he/she is in position of "KARTA" of Hindu Undivided Family (HUF) and he/she has the authority, power and consent given by other partners to act on behalf of HUF.

14.14.3 In case one or more members of the JV is/are companies, the following documents shall be submitted:

(a) A copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement,

(b) A copy of Memorandum and Articles of Association of the Company.

(c) A copy of Authorization/copy of Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender, sign MOU/JV Agreement on behalf of the company and create liability against the company.

14.14.4 All the Members of JV shall certify that they are not blacklisted or debarred by Railways or any other Ministry / Department / PSU (Public Sector Undertaking) of the Govt. of India/State Govt. from participation in tenders/contract on the date of opening of bids either in their individual capacity or as a member of the JV in which they were/are members.

14.15 Credentials & Qualifying Criteria**:** Technical, financial eligibility and Bid capacity of the JV shall be adjudged based on satisfactory fulfillment of the following criteria:

14.15.1 Technical Eligibility Criteria (‘a’ or ‘b’ mentioned hereunder)**:**

(a) For Works without composite components

The technical eligibility for the work as per para 12.1 above, shall be satisfied by either the ‘JV in its own name & style’ or ‘lead member of the JV’. Each other member of JV shall have technical capacity of minimum 10% of the cost of work.

(b) For works with composite components

(i) The technical eligibility for each component of work as per para 12.1 above, shall be satisfied by either the ‘JV in its own name & style’ or ‘lead member of the JV’. Each other member of JV shall have technical capacity of minimum 10% of the cost of any component of work.

OR

(ii) The technical eligibility for major component of work as per para 12.1 above, shall be satisfied by either the ‘JV in its own name & style’ or ‘lead member of the JV’ and technical eligibility for other components of work as per para 12.1 above, shall be satisfied by either the ‘JV in its own name & style’ or ‘any member of the JV’. Each other member of JV shall have technical capacity of minimum 10% of the cost of any component of work.

Note:(a) Technical Capacity of other members of JV shall be considered as satisfied, if Provisional Acceptance Certificate/Physical Completion Certificate for any component of the tendered composite work, has been received for the corresponding component of work from a single/composite completed work OR single/composite ongoing work.

(b) The Major component of the work for this purpose shall be the component of work having highest value. In cases where value of two or more component of work is same, any one work can be classified as Major component of work.

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

14.15.2 Financial Eligibility Criteria

The JV shall satisfy the requirement of "Financial Eligibility" mentioned at para 12.2 above. The "financial capacity" of the lead partner of JV shall not be less than 51% of the financial eligibility criteria mentioned at para 12.2 above. The "financial capacity" of each of other partners (excluding lead partner) shall not be less than 10% of the financial eligibility criteria mentioned at para 12.2 above.

The arithmetic sum of individual "financial capacity" of all the members shall be taken as JV's "financial capacity" to satisfy this requirement.

Note: Contractual payment received by a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying compliance of the above mentioned financial eligibility criteria in the tender under consideration.

14.15.3 Bid Capacity

The JV shall satisfy the requirement of "Bid Capacity" requirement mentioned at para 12.3 above. The arithmetic sum of individual "Bid capacity" of all the members shall be taken as JV's "Bid capacity" to satisfy this requirement.

15.Participation of Partnership Firms in works tenders:

15.1 The Partnership Firms participating in the tender should be legally valid under the provisions of the Indian Partnership Act.

15.2 The partnership firm should have been in existence or should have been formed prior to submission of tender. Partnership firm should have either been registered with the Registrar or the partnership deed should have been notarized prior to date of tender opening as per the Indian Partnership Act.

15.3 Separate identity / name should be given to the partnership firm. The partnership firm should have PAN / TAN number in its own name and PAN / TAN number in the name of any of the constituent partners shall not be considered. The valid constituents of the firm shall be called partners.

15.4 Once the tender has been submitted, the constitution of the firm shall not be allowed to be modified / altered / terminated during the validity of the tender as well as the currency of the contract except when modification becomes inevitable due to succession laws etc., in which case prior permission should be taken from Railway and in any case the minimum eligibility criteria should not get vitiated. The re-constitution of firm in such cases should be followed by a notary certified Supplementary Deed. The approval for change of constitution of the firm, in any case, shall be at the sole discretion of the Railways and the tenderer shall have no claims what-so-ever. Any change in the constitution of Partnership firm after opening of tender shall be with the consent of all partners and with the signatures of all partners as that in the Partnership Deed. Failure to observe this requirement shall render the offer invalid and full EMD shall be forfeited.

If any Partner/s withdraws from the firm after opening of the tender and before the award of the contract, the offer shall be rejected. If any new partner joins the firm after opening of tender but prior to award of contract, his / her credentials shall not qualify for consideration towards eligibility criteria either individually or in proportion to his share in the previous firm. In case the tenderer fails to inform Railway beforehand about any such changes / modification in the constitution which is inevitable due to succession laws etc. and the contract is awarded to such firm, then it will be considered a breach of the contract conditions liable for determination of the contract under Clause 62 of General Conditions of Contract.

15.5 A partner of the firm shall not be permitted to participate either in his individual capacity or as a partner of any other firm in the same tender.

15.6 The tender form shall be submitted only in the name of partnership firm. The EMD shall be deposited by partnership firm through e-payment gateway or as mentioned in tender document. The EMD submitted in the name of any individual partner or in the name of authorized partner (s) shall not be considered.

15.7 One or more of the partners of the firm or any other person (s) shall be designated as the authorized person (s) on behalf of the firm, who will be authorized by all the partners to act on behalf of the firm through a "Power of Attorney", specially authorizing him / them to submit & sign the tender, sign the agreement, receive payment, witness measurements, sign measurement books, make correspondences, compromise / settle / relinquish any claim (s) preferred by the firm, sign "No Claim Certificate", refer all or any dispute to arbitration and to take similar such action in respect of the said tender / contract. Such "Power of Attorney" shall be notarized / registered and submitted along with the tender.

15.8 On issue of Letter of Acceptance (LOA) to the partnership firm, all the guarantees like Performance Guarantee, Guarantee for various Advances to the Contractor shall be submitted only in the name of the partnership firm and no splitting of guarantees among the partners shall be acceptable.

15.9 On issue of Letter of Acceptance (LOA), contract agreement with partnership firm shall be executed in the name of the firm only and not in the name of any individual partner.

15.10 In case the Letter of Acceptance (LOA) is issued to a partnership firm, the following undertakings shall be furnished by all the partners through a notarized affidavit, before signing of contract agreement.

(a) Joint and several liabilities:

The partners of the firm to which the Letter of Acceptance (LOA) is issued, shall be jointly and severally liable to the Railway for execution of the contract in accordance with General and Special Conditions of the Contract. The partners shall also be liable jointly and severally for the loss, damages caused to the Railway during the course of execution of the contract or due to non-execution of the contract or part thereof.

(b) Duration of the partnership deed and partnership firm agreement:

The partnership deed/partnership firm agreement shall normally not be modified/altered/ terminated during the currency of contract and the maintenance period after the work is completed as contemplated in the conditions of the contract. Any change carried out by partners in the constitution of the firm without permission of Railway, shall constitute a breach of the

contract, liable for determination of the contract under Clause 62 of the General Conditions of Contract.

(c) Governing laws: The partnership firm agreement shall in all respect be governed by and interpreted in accordance with the Indian laws.

(d) No partner of the firm shall have the right to assign or transfer the interest right or liability in the contract without the written consent of the other partner/s and that of the Railway.

15.11 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) A copy of partnership deed.

(b) A copy of Power of Attorney (duly registered as per prevailing law) in favour of the individual to tender for the work, sign the agreement etc. and create liability against the firm.

(c) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India / any State Govt. from participation in tenders / contracts as on the date of opening of bids, either in their individual capacity or in any firm in which they were / are partners. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract.

15.12 **Evaluation of eligibility of a partnership firm:**

Technical and financial eligibility of the firm shall be adjudged based on satisfactory fulfillment of the eligibility criteria laid down in Clause 12 above by the partnership firm.

16.

16.1 **PREBID MEETING:** - Deleted –

16.2**LAST DATE FOR SUBMISSION OF TENDERS AND DATE OF OPENING OF TENDERS:**

Tender is invited on e-tendering portal of CRIS. Tender offers shall be submitted on www.ireps.gov.in. All the details are available on the website. Tender submitted in any other mode other than through www.ireps.gov.in shall be summarily rejected.

17. ADDRESSES:

The list of addresses, to which correspondence and documents relating to the contract, should be sent is as under :-

(i) For all policy, Contractual and Commercial matters:-

(a) Prior to the award of contract.

The Chief Administrative Officer
Railway Electrification
Allahabad -211001

or his successor/nominee (whose address will be intimated in due course)

(b) After award of contract:

The Chief Project Director
Railway Electrification,
Secunderabad,

(ii) For Security Deposit:

The Sr. AFA,
Railway Electrification,
Secunderabad,
or his successor/nominee (whose address will be intimated in due course)

(iii) For matters relating to particular design working drawing:-

The Chief Project Director,
Railway Electrification,
Secunderabad,
or his successor/nominee (whose address will be intimated in due course)

(ii) For matters relating to basic design and drawings for fittings, components equipments and prototype tests:-

The Director General (TI)
Research Designs & Standard Organisation,
Manak Nagar, Lucknow 226011.

(v) Matters relating to progressing of field work, scheduling of quantities and submission of bills.

The Chief Project Director,
Railway Electrification,
Secunderabad

orofficers nominated by him.

QUANTITIES APPROXIMATE

Quantities given in various Schedule-1, Section-1 to Section-11 in FORM-5 under column quantity are only the approximate quantities of various items of the work.

19 (a). (i) Standard Schedule of Rates (For OHE Works):

Schedule-1, Section-1 to 5 of the tender papers lists out the standard schedule of rates for various items, categorised under five sections namely General, Concrete, Ferrous, Non-ferrous and insulators. Based on these standard rates, the total contract value has been worked out in Schedule-1, Section-1 to 5. Schedule-3 lists out the rates under five sections namely General, Concrete, Ferrous, Non-ferrous and insulators at which "On-account payments will be released to the successful tenderer. The tenderers are advised to quote only single percentage each below/at par/above against each section of the S.O.R. in Form-“1B”, Sheet-1 & 2 (Summary of prices). The percentage so quoted will be loaded to the rates given in corresponding sections of the Schedule-1, Section-1 to 5 as well as Schedule-3, Section-1 to 5 to arrive at the rates payable to the contractor against these schedules. The offers where more than one percentage has been given for different items for OHE Work of Schedule-1, Section-1 to 5 shall liable to be rejected.

(ii) Rates of Non SOR : (Schedule-1, Section-6& 7)

The rates given in Schedule-1, Section-6& 7are the rates for Non SOR items. The tenderer are advised to quote only single percentage, below/at par/above against each section, for the Non SOR items in Form-“1B”, Sheet-1 & 2 (Summary of prices). The actual payment to be made against any item of Schedule-1, Section-6& 7 shall be derived after loading the Non SOR prices with the tenderer’s quoted percentage. The offers where more than one percentage has been given for different items for Non SOR items of Schedule-1, Section-6& 7 shall liable to be rejected.

19 (b)(i)Standard Schedule of Rates (for TSS Works):

The unit prices given against various items of works in Schedle-1, Section-8 to 10 of the tender paper are standard schedule of rates (SOR). The tenderer are advised to quote only single percentage each below/at par/above against each section of the S.O.R. in Form-"1B", Sheet-3 (Summary of prices). The actual payment to be made against any item of Schedule-1, Section-8 to 10, shall be derived after loading the SOR prices with the tenderer's quoted percentage. The offers where more than one percentage has been given for different items of work in one section of Schedule-1, Section-8 to 10 shall liable to be rejected.

19(b)(ii)RATES OF NON SOR ITEMS (FOR TSS Works)

The rates given in schedule-1, Section-11(Part-A, Part-B & Part-C) contain rates for non SOR items. The tenderer are advised to quote only single percentage each below/at par/above against each section of the Non SOR in Form-"1B", Sheet-3 (Summary of prices). The actual payment to be made against any item of Schedule-1, Section-11, shall be derived after loading the Non SOR prices with the tenderer's quoted percentage. The offers where more than one percentage has been given for different items of Work in each section of Schedule-1, Section-11 shall liable to be rejected.

19 (c) RATES OF NON SOR ITEMS (FOR SCADA Works) -DELETED-

19 (d) RATES OF NON SOR ITEMS (For Electrical General work portion) -Deleted-

20. INDIAN RAILWAYS STANDARD GENERAL CONDITIONS OF CONTRACT:

'Indian Railways Standard General Conditions of Contract-Nov'2018 issued by Railway Board shall be applicable to the contract. This may be obtained by the tenderer/contractor on payment from any Divisional Railway Manager's office of concerned Railway.

In case of any difference between provisions of GCC Nov'2018 and any condition contained in this tender document, the provisions of GCC- Nov'2018 will prevail, unless stated otherwise.

21.COST OF TENDER DOCUMENT:

Details available at IREPS site (www.ireps.gov.in).

22. PERFORMANCE GUARANTEE:

The procedure for obtaining Performance Guarantee is outlined below:

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

In all other cases, if the Contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract is liable to be terminated. In case contract is terminated railway shall be entitled to forfeit Earnest Money Deposit and other dues payable against that contract. In case a tenderer has not submitted Earnest Money Deposit on the strength of their registration as a Startup recognized by Department of Industrial Policy and Promotion (DIPP) under Ministry of Commerce and Industry, DIPP shall be informed to this effect.

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

(b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% of the contract value:

(i) A deposit of Cash;

(ii) Irrevocable Bank Guarantee;
(iii) Government Securities including State Loan Bonds at 5% below the market value;
(iv) Deposit Receipts, Pay Orders, Demand Drafts and Guarantee Bonds. These forms of Performance Guarantee could be either of the State Bank of India or of any of the Nationalized Banks;
(v) Guarantee Bonds executed or Deposits Receipts tendered by all Scheduled Banks;
(vi) Deposit in the Post Office Saving Bank;
(vii) Deposit in the National Savings Certificates;
(viii) Twelve years National Defense Certificates;
(ix) Ten years Defense Deposits;
(x) National Defense Bonds and
(xi) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favour of FA&CAO (free from any encumbrance) may be accepted.

(c) The Performance Guarantee shall be submitted by the successful bidder after the Letter of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the Contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.

(d) The value of PG to be submitted by the Contractor will not change for variation upto 25% (either increase or decrease). In case during the course of execution, value of the contract increases by more than 25% of the original contract value, an additional Performance Guarantee amounting to 5% (five percent) for the excess value over the original contract value shall be deposited by the Contractor. On the other hand, if the value of contract decreases by more than 25% of the original contract value, Performance Guarantee amounting to 5% (five percent) of the decrease in the contract value shall be returned to the Contractor. The PG amount in excess of required PG for decreased contract value, available with Railways, shall be returned to Contractor as per his request duly safeguarding the interest of railways

(e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the Contractor has completed the work in all respects satisfactorily.

(f) Whenever the contract is rescinded, the Performance Guarantee already submitted for the contract shall be encashed in addition to forfeiture of Security Deposit available with railway.

(g) The Engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of:

(i) Failure by the Contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.
(ii) Failure by the Contractor to pay President of India any amount due, either as agreed by the Contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.
(iii) The Contract being determined or rescinded under clause 62 of the GCC.

23. e-Payment

Tenderers are required to submit their bank details in the proforma given in FORM-24 to facilitate e-payment vide NEFT/RTGS, if any.

24. Whenever the contract is rescinded contractor shall return all the material to Railways which either Railway has supplied to him or for which he has taken any payment (including ONA) from Railways.

25. Bank Guarantees against Security Deposit, Performance Guarantee, Mobilisation Advance and On Account payment, to be submitted by the contractor should preferably be sent to the concerned authorities directly by the issuing Bank under Registered Post (AD).

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PART-I
CHAPTER-I

1. PART-I

1.1 CHAPTER-I

INSTRUCTIONS TO TENDERERS & CONDITIONS OF TENDERING
FOR OHE, TRACTION SUB-STATION AND SCADA WORKS

PART I

CHAPTER I

INSTRUCTIONS TO TENDERERS & CONDITIONS OF TENDERING.

TENDER PAPERS : 1.1.1

The instructions to Tenderers and conditions of Tendering, special conditions of Contract, Prices, Payment and Explanatory Notes, specification, standard General Conditions of contract (GCC) of Indian Railways as amended/corrected upto latest correct slips, schedule of approximate quantities and forms for Tenders, included in part-I to V shall, hereafter, be collectively referred to as the Tender papers.

The intending Tenderer is advised to study the Tender Papers carefully. The Tenderer shall also acquaint himself with the local conditions, means of access to the site of work, nature of work and all other matters pertaining thereto.

The submission of Tender shall be deemed to have been done after careful study and examination of the Tender papers with a full understanding of the implications thereof.

INTERPRETATIONS : 1.1.2

The following terms wherever occurring in the Tender Papers and wherever used throughout the execution of the work shall, unless excluded by or repugnant to the context, have the meaning attributed thereto as follows :

"CONTRACT"
Means the Contract resulting from the acceptance by the Purchaser of this Tender either in whole or in part.

"CONTRACTOR"
Means the person, firm or company whether incorporated or not who enters into the contract with the Railway and shall include their executors, administrators, successors and permitted assigns.

"CONTRACTOR'S AGENT"
Shall mean the person or persons authorised under a duly executed power of Attorney to take all actions relating to the work, as could be taken by the Contractor himself. In the case of a firm of Contractors, the Agent shall have the same powers as that of the Managing Director of the firm.

"CONTRACTOR'S REPRESENTATIVE"
Shall mean a person in supervisory capacity who shall be so declared by the Contractor and who shall be authorised under duly executed power of Attorney to receive materials issued by the Purchaser to the Contractor for the works. He shall be responsible for proper execution of works at each or all places and shall take orders from Purchaser's Engineers and carry out the same.

"ENGINEER"
Shall mean the Divisional /District Engineer/Electrical Engineer or the Executive Engineer in executive charge of the Railway Electrification works and shall include the superior officers of the Railway Electrification Project. He is responsible for ensuring that all field works covered by the contract are carried out in accordance with approved designs, drawings and specifications and conditions of contract as agreed to. He is also responsible for prices and terms of payment.

"EQUIPMENT"
Means all or any equipment considered necessary by the Purchaser's Engineers for the satisfactory operation, as a whole, of the Installations, including structures, foundations etc.

"GENERAL MANAGER"

Means the officer in Administrative charge of this Railway Electrification and shall mean and include the officers to whom the functions are delegated. His postal address shall be intimated to the successful Tenderers in due course.

"MONTH"-
Means any consecutive period of thirty days.

"MATERIALS"
Means all equipments components, fittings and other materials including raw materials required to complete the work.

"PURCHASER"
Means the President of India acting through his accredited officers or any one of them. The General Manager, In-charge of this Railway Electrification (whose address will be intimated in due course) shall be deemed to be one of such accredited officers.

"PURCHASER'S ENGINEERS"
Means the Engineers appointed by the Purchaser, as indicated in Part-III of the Tender Papers who will decide all matters relating to design, manufacture, installation and commissioning of the plant and equipment at site.

"RAILWAY"
Means the Railway(s) in whose territorial jurisdiction the work is to be carried out and includes the Government of India, Ministry of Railways (Railway Board) and/or General Manager of the Railway concerned.

"SUB-CONTRACTOR"
Means an individual or a firm of Contractor or a company registered under Indian Company Act or an approved supplier of materials to whom the Contractor sublets portions of the contract after obtaining specific prior approval of the Purchaser in writing to sub-letting of contract.

"SITE"
Means the areas to be taken up by the permanent works, together with any other area or areas as shall be determined by the Purchaser's Engineers, which may be placed at the disposal of the Contractor for the purpose of the contract and also such area or areas used for store yards, works yards or workshop in proximity of the works as the Purchaser' Engineers may have authorised as an extension of the site, irrespective of the terms and conditions under which they are occupied by the Contractor.

"TENDERER"
Means and includes any firm of Engineers or Contractors or any company or body, corporate or otherwise, who submit the Tender which has been invited.

"WORK OR WORKS"
Means all or any of the items of the work for which the Tenderer/Contractor has Tendered/contracted according to the specifications, drawings and annexures hereto annexed or to be implied there from, or incidental thereto or to be hereafter specified or required in such explanatory instructions and drawings, being in conformity with the original specifications, drawings, annexures and schedules, and also such instructions and drawings additional to the aforementioned as may from time to time be issued by the Purchaser's Engineer during the progress of the contracted work.

"WRITING"
Includes all matters written, typewritten or printed either in whole or in part.

GENERAL : 1.1.3

(a) All documents to be submitted in connection with this TENDER SHALL BE WRITTEN IN ENGLISH AND IN INK and then uploaded to www.ireps.gov.in

(b) --- DELETED --

(c) **METRIC**

Dimensions, weights etc. SHALL BE QUOTED IN METRIC system. The term "tonne"=1,000 kg. shall be used to indicate a metric tone (M.T).

(d) The definitions of the technical terms used will be the same as given in the international electro technical vocabulary.

CLARIFICATIONS : 1.1.4

Any clarification required by the Tenderer may be obtained from the Chief Administrative officer, Railway Electrification, Allahabad or his successor/nominee (whose address will be intimated in due course).

EARNEST MONEY : 1.1.5

(a) The tender must be accompanied by a sum of ₹ 1,00,00,000.00 as Earnest Money deposited in cash through e-payment gateway or as mentioned in tender documents, failing which the tender shall not be considered. Any firm recognized by Department of Industrial Policy and Promotion (DIPP) as 'Startups' shall be exempted from payment of Earnest Money on submission of Registration Certificate issued by appropriate authority.

(b) Tenderers shall hold the offer open for the validity period as mentioned in Item No. 10.2 of 'PREAMBLE', it being understood that the tender documents have been sold/issued to the tenderer and the tenderer has been permitted to tender in consideration of the stipulation on his part that after submitting his tender, he will not resile from the offer or modify the terms & conditions thereof, in any manner not acceptable to the Chief Administrative officer, RE/Allahabad or his successor/nominee. Should the tenderer fail to observe or comply with the foregoing stipulation the entire earnest money amount shall be forfeited by the Railways.

(c) In the case of successful Tenderer, the earnest money deposit mentioned above will be retained as part of Security for the due and faithful fulfillment of the contract in terms of clause 1.2.17. The earnest money of other tenderers, shall save as here in before provided, be returned to them, but the Rly. Shall not be responsible for any loss or depreciation that may happen there to while in their possession, nor be liable to pay interest there on.

(d) The total earnest money shall be forfeited without prejudice to other rights and remedies available if the Contractor fails to execute the agreement or start the work within a reasonable time (to be determined by the Chief Administrative officer, Railway Electrification, Allahabad or his successor/nominee) after the notification of the acceptance of his/their tender.

(e) In case Contractor submits the Term Deposit Receipt/Bank Guarantee Bond towards full Security Deposit, the Railway shall return the Earnest Money so retained to the Contractor.

Minimum Eligibility Criteria : 1.1.6

As per para 12 of preamble.

FORM OF TENDER : 1.1.7

The Tender Bid shall be submitted online on www.ireps.gov.in along with the entire mandatory documents required.

(a) **Tenders not uploaded in proper FORMS as indicated below are liable to be rejected.**

All FORMs shall be uploaded strictly as per sequence indicated on www.ireps.gov.in and shall be properly indexed.

(b) (i) Documents to be uploaded with Prequalification Bid (**Eligibility/Qualifying Elements) (Packet – "A")** shall consist of the following:-

Sl. No.	Descriptions	Remarks
1.	Offer letter only.	FORM - 1A
2.	Alternative Proposal of the Tenderer.	FORM - 4
3.	Tenderer's Scheme of Work and Time Schedule for OHE and TSS Works.	FORM - 10, Sh.1 to 4.
4.	Tenderer's Credentials with details as per Sheet-1 to 5 for OHE	FORM - 12A, Sh.1 to 5
5.	Tenderer's Credentials with details as per Sheet for TSS	FORM - 12B
6.	Tenderer's Credentials with details as per Sheet for SCADA (Deleted)	FORM - 12C
7.	Tenderer's Credentials with details for Bid capacity	FORM-12D
8.	Technical Data for Equipments, Components & Materials To be uploaded by the Tenderer for TSS.	Annexure-5B
9.	Bank details in the proforma to facilitate e-payment vide NEFT/RTGS, if any.	FORM - 24
10	FORMAT FOR AFFIDAVIT TO BE uploaded BY TENDERER ALONGWITH THE TENDER OFFER	FORM - 28
11.	All related documents required to upload with notary Attestation as under:-	Required to upload
	(i)Regarding Power of Attorney, who has signed the tender Documents.	
	(ii)Power of Attorney, documents regarding constitution of firm and other associated legal documents.	
12.	A copy of Tender Papers along with A & C Slips, if any, duly Signed by the Tenderer, on each and every page in token of his having studied the Tender Papers carefully, shall be attached with the Tender Offer.	

Notes:- -- Deleted --

(b) (ii) Commercial (Price elements) of the tender bid (Packet-B) shall be quoted on IREPS Website.

(c) - Deleted -

(d) **Alternative proposals**

Should the Tenderers have alternative proposals for basic arrangements, typical designs and specifications drawings for components and materials (See Para 1.1.10) which the Tenderer considers would improve the operating performance of the equipment or would reduce the cost of the equipment, he shall incorporate them in the Tender for consideration by the Purchaser **Form-4**. He shall clearly indicate in detail the technical and /or financial advantages which would accrue to the Purchaser, specifically for each alternative proposal suggested by him.

PRICE : 1.1.8

This is a works Contract. The prices to be paid for supply and erection of various items of work or for materials and other amount payable, shall be in accordance with accepted schedules or prices or rates as governed by the terms and conditions of payment included in Part-I, Chapter-IIIA, IIIB & IIIC for OHE, TSS & SCADA - Prices and Payment.

1.1.9 -Deleted-

SPECIFICATIONS AND DRAWINGS : 1.1.10

(a) The Tenderer shall follow the standard general arrangement drawings and other drawings and specification relating to the equipment, components and fittings specified in the Tender paper. A list of standard drawings and specifications is enclosed as in Annexures in Part-IV. Copies of the above standard drawings are available for inspection in the drawing office of the Chief Electrical Engineer, Railway Electrification, Allahabad or his successor/ nominee (whose address will be intimated in due course). If the Tenderer so desires he may purchase full sets of drawings and specifications from the office of the Chief Electrical Engineer, Railway Electrification, Allahabad/or his successor/ nominee (whose address will be intimated in due course), on payment. However, if the Tenderer desires to purchase individual drawings and specifications he may do so from the office of the Chief Administrative officer, Railway Electrification, Allahabad.

(b) **Meaning and intent of specifications and drawings** -

If any ambiguity arises as to the meaning and intent of any portion of the specifications and drawings or as to execution of quality of any work or material or as to the measurements of the works, the decision of the Engineer Incharge shall be final subject to appeal (within seven days of decision being intimated to the Contractor) to the Chief Administrative officer, Railway Electrification who shall have the power to correct any errors, omission or discrepancies in the specifications, drawings, classification of work or materials, and whose decision in the matter in dispute or doubt shall be final and conclusive.

Milestone for stages of completion for work (Schedule of work) : 1.1.11

(a) For the purpose of different stages for completion, entire section shall be sub-divided as per following table in terms of its length in “TKM” and period for completion in “Months”:

	1st stage of completion	2nd stage of completion	3rd stage of completion	4th stage of completion
Time period for completion of each stage, if “T” is the total period of completion in months	06 months	$\frac{T-6}{3}$	$\frac{T-6}{3}$	$\frac{T-6}{3}$
Length in TKM for each stage if “L” is the total length of section in TKM	15% of L	30% of L	40% of L	15% of L
Cumulative length in TKM for at each stage of completion	15% of L	45% of L	85% of L	100% of L
1.1.11 (b) Time period for above stages of completion shall be binding upon the contractor subject to fulfilment of obligations of the Purchaser defined under para 1.2.18 Scheme of Work, para 1.2.21, 1.2.27, 1.2.28 and 1.2.37 etc.				

1.1.11 (c) Each stage of completion may have the margin of ±10% of sectional length in TKM to accommodate the block section or its yard.
1.1.11 (d) In case of non-completion of any stage of work, action shall be taken for that stage as per provision of para 1.2.44 of the tender document. For the purpose of applicability of para 1.2.44, value for particular stage of completion shall be determined on pro-rata basis according to the following formula:
(Total contract value as per LOA for OHE portion of work/Total TKM of the section)×No. of TKM in particular stage of completion
1.1.11 (e) Completion period for the particular TSS shall be taken as the period of completion for that OHE portion of work which is in the feeding zone of that particular TSS. Completion of stage of each TSS shall be separate. If contractor fails to complete the work of a particular TSS, action shall be taken as per the provision of para 1.2.44 of the tender document. For the purpose of applicability of para 1.2.44, value for completion of each TSS shall be determined on pro-rata basis according to the following formula:
(Total contract value as per LOA for TSS portion of work)/(Total TSS in the tender)
1.1.11 (f): In case contractor is failed to achieve the target of completion of a particular stage as defined in para 1.1.11(a) but able to achieve the cumulative target within the target date of subsequent stage, then the amount so withheld under para 1.1.11(d) for that particular stage shall be released.
1.1.11 (g) Here the word “completion” shall have the following meaning for this clause only:
I. as defined in para1.2.46 II. Work of the section shall be completed to the extent that same is ready for the CRS inspection to the satisfaction of Purchaser III. However, PAC i.e. Provisional Acceptance certificate for the part section or complete section (as the case may be) shall be issued only after completion of all the work as defined under para 1.2.46

SIGNING OF TENDERS : 1.1.12

(a) Any individual or individuals signing the Tender or other documents connected there with should specify whether he is signing

(i) As a sole proprietor of the concern or his attorney or
(ii) As a partner or partners of the firm or,
(iii) For the firm per procreation, or
(iv) As a Director, Manager or Secretary in the case of a limited Company.

(b) In the case of firm not registered under the Indian Partnership act, all the partners or the Attorney duly authorised by all of them should sign the Tender and all other connected documents. A copy of the document empowering the individual or individuals to sign should also be sent with the Tender In any case, the Tenderer should disclose his constitution fully and copies of all necessary legal documents in support thereof should be submitted with the Tender and originals thereof should be produced as and when called for.

(c) Should the Contractor be a partnership firm and in the event of the Contract becoming inoperable due to the death of its partner or partners, the Purchaser shall have the right to enter into a separate Agreement with the surviving partner or partners of the firm to continue the execution of the work under the terms and conditions of this agreement.

(d) Power of Attorney should be executed by the competent Authority of Firm/Company and notarized on proper value of Non-Judicial stamp paper of concerned state and same should also be accepted by Attorney holder. Signature of executants should also be verified by Notary on same date and place.

TENDERER'S ADDRESS : 1.1.13

Every Tenderer shall state in the Tender his postal address fully and clearly. Any communication sent to the Tenderer by post at his address shall be deemed to have reached the Tenderer duly and in time notwithstanding the fact that the communication did not reach the Tenderer at all or in time for whatever reason. Important documents shall be sent by Registered Post and Fax.

ERASURE OR ALTERATION : 1.1.14

No erasure or alteration in the text of the Tender Papers is permitted and any such erasure and /or alteration will either be disregarded or render the whole Tender void at the option of the Purchaser. Any correction made in rate for work shall be initialed by the Tenderer in ink and dated.

RESULT OF TENDER : 1.1.15

No tender shall be deemed to have been accepted unless such acceptance has been notified in writing to the successful Tenderer by the Purchaser.

PURCHASER NOT BOUND TO ACCEPT ANY TENDER : 1.1.16

The Purchaser shall not be bound to accept the lowest or any Tender or to assign any reason for non-acceptance or rejection of a Tender. The work load on tenderers shall only be considered at this stage. The Purchaser reserves the right to accept any Tender in respect of the whole or any portion of the work specified in the Tender Papers or to sub-divide the work among different Tenderers or to reduce the work or to accept any Tender for less than the tendered quantities without assigning any reason whatsoever.

TENDER AN AGREEMENT : 1.1.17

The fact of the submission to the Purchaser of a Tender shall be deemed to constitute an Agreement between the Tenderer and the Purchaser whereby such Tender shall remain open for acceptance either in part or in full, or as may be modified by negotiation, by the Purchaser for a period mentioned in Item No.10.2 of 'PREAMBLE' from the date on which Tenders are opened, during which period the Tenderer shall not withdraw his offer nor amend, impair or derogate therefrom. The Earnest Money deposited in accordance with Para 1.1.5 above shall be forfeited if the Tenderer unilaterally withdraws, amends, impairs or derogates from the Tender in any respect within the said period mentioned in Item No.10.2 of 'PREAMBLE'. The Tenderer shall be deemed to have agreed as aforesaid in consideration of his Tender being considered by the Purchaser in terms hereof provided the same has been duly submitted and is otherwise in order. When the successful Tenderer is notified in writing at his address given in the Tender within the said period mentioned in Item No.10.2 of 'PREAMBLE' that his Tender has been accepted by the Purchaser either in whole or in part, he shall be bound by the terms of agreement constituted by Purchaser until a formal Contract has been executed between him and the Purchaser in replacement of such Agreement as provided for in para 1.2.16.

TENDERS CONFIDENTIAL : 1.1.18

The Tenderer (whether his tender be accepted or not) shall treat the contents of his tender as private and confidential. He shall treat the prices quoted by him as strictly confidential till the tenders are opened (See Para 1.1.23).

CANVASSING AND BRIBERY : 1.1.19

(a) No Tenderer shall canvass any Government official or the Purchaser's Engineers in respect of this or any other Tender. Contravention of this condition will involve rejection of the Tender. This clause shall not be deemed to prevent the Tenderer from supplying the Purchaser any information asked for by him.

(b) Any bribe, commission, gift or advantage given, promised or offered by the Tenderer, or his partner, Agent or servant or any one on his or their behalf, to any officer, servant, representative or Agent of the Purchaser or any person on his or their behalf, in relation to the obtaining of this or any other contract with the Purchaser, shall, in addition to the criminal liability he may incur under the Prevention of Corruption Act (1908), subject the Tenderer to the cancellation of this and all other Tenders. Any question or dispute as to the commission of any offence under the present clause shall be decided by the Purchaser, in such manner and on such evidence or information as may be thought fit and sufficient, and his decision shall be final and conclusive in the matter.

(c) Employment/Partnership etc. of Retired Railway Employees:

(i) Should a tenderer be a retired Engineer of the gazetted 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 should a tenderer being partnership firm / company / joint venture (JV) / registered society / registered trust etc have as one of its partners a retired Engineer or retired gazetted officer as aforesaid, or should a tenderer being an incorporated company have any such retired Engineer or retired officer as one of its directors or should a tenderer have in his employment any retired Engineer or retired gazetted officer as aforesaid, the full information as to the date of retirement of such Engineer or gazetted officer from the said service and 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 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, or to take the employment under the Contractor, 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. Tenders without the information above referred to or a statement to the effect that no such retired Engineer or retired gazetted officer is so associated with the tenderer, as the case may be, shall be rejected.

(ii) Should a tenderer or Contractor being an individual on the list of approved Contractors, have a relative(s) or in the case of partnership firm/ company / joint venture (jv) / registered society / registered trust etc. one or more of his shareholder(s) or a relative(s) of the shareholder(s) employed in gazetted capacity in the Engineering or any other department of the railway, the authority inviting tenders shall be informed of the fact at the time of submission of tender, failing which the tender may be disqualified/rejected or if such fact subsequently comes to light, the contract may be rescinded in accordance with provision in clause 62 of standard general conditions of contract.

(d) The Contractor shall not, if he is a retired Government Engineer of Gazetted rank, himself engage in or employ or associate a retired Government Engineer of Gazetted rank, who has not completed one year from the date of retirement, in connection with this contract in any manner whatsoever without obtaining prior permission of the President and if the Contractor is found to have contravened this provision it will constitute a breach of contract and administration will be entitled to terminate the contract and forfeit Earnest Money Deposit (EMD), Performance Guarantee (PG) and Security Deposit (SD) of that contract.

INDIAN LABOUR AND MATERIALS : 1.1.20

(a) The Tenderer shall utilise Indian labour including supervisory staff, for the execution of this contract to the maximum possible extent.
(b) The Tender shall be prepared on the basis that all the materials required to complete the works including those indicated in schedule 3 are procured from indigenous sources in full.

TENDERER'S CREDENTIALS : 1.1.21

The Tender shall upload his credentials all details as required as per eligibility/ qualifying criteria as given in para 12 of the preamble of this tender for OHE & TSS works separately **(see FORM-12A, Sheet-1 to 5, FORM-12B,FORM-12C & FORM-12D at Part-V of Tender Paper)**.

SUBMISSION OF TENDER : 1.1.22
Details of Tender Notice, Tender document and corrigendum issued from time to time along with eligibility criteria are available on the web site https://www.ireps.gov.in. The necessary changes if required would be posted on this web site during advertisement period and may be seen on web site. Tenderers may participate in above E-tender electronically through website https://www.ireps.gov.in only & submission of manual offers against E-tender is not allowed. Manual offers, if submitted shall neither be opened nor considered.

OPENING OF TENDER : 1.1.23

Tender will be opened at the time and date prescribed in preamble to the tender paper, online on the website www.ireps.gov.in and in the office of the **Chief Administrative Officer, Railway Electrification, Allahabad-211001** or his successor/nominee (whose address will be intimated in due course).
After the opening of the tender bids, it shall be scrutinized and analysed. If found necessary by the purchaser, the tenderer shall be asked to furnish the clarifications and the purchaser shall also hold discussions with the tenderer(s) after giving due notice.

MISCELLANEOUS : 1.1.24

Tender documents are not transferable. The cost of the Tender Papers is not refundable.

OMISSIONS & DISCREPANCIES: 1.1.25

Should a tender find discrepancies in or omissions from the drawings or any of the Tender Forms or should he be in doubt as to their meaning, he should at once notify the authority inviting tenders who may send a written instruction to all tenders. It shall be understood that every endeavor has been made to avoid any error which can materially affect the basis of the tender and the successful tenderer shall take upon himself and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof.

CARE IN SUBMISSION OF TENDERS: 1.1.26

(a) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in Clause-37 of the General Conditions of contract for the completion of works to the entire satisfaction of the Engineer.

(b) When work is tendered for by a firm or company of contractors, the tender shall be signed by the individual legally authorized to enter into commitments on their behalf.

Partnership Deeds, Power of Attorney etc.: 1.1.26 A

(i) The tenderer shall clearly specify whether the tender is submitted on his own (Proprietary Firm) or on behalf of a Partnership Firm / company / Joint Venture (JV) / Registered Society / Registered Trust etc.

The tenderer(s) shall enclose the attested copies of the constitution of their concern, and copy of PAN Card along with their tender. Tender Documents in such cases are to be signed by such persons as may be legally competent to sign them on behalf of the firm, company, association, trust or society, as the case may be.

(ii) In case tenderer is other than sole proprietorship firm, following documents shall be submitted by the tenderer:

(a) **Partnership Firm:** The tenderer shall submit (i) a copy of Partnership Deed and (ii) a copy of Power of Attorney (duly registered as per prevailing law) in favour of an individual to sign the tender documents and create liability against the Firm.

(b) **Joint Venture (JV):** The tenderer shall submit documents as mentioned in Clause 17 of the Tender Form (Second Sheet).

(c) **Company registered under Companies Act-2013:** The tenderer shall submit (i) the copies of **MOA (Memorandum of Association)** / **AOA (Articles of Association)** of the company; and (ii) A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.

(d) **LLP (Limited Liability Partnership) Firm:** If the tender is submitted on behalf of a LLP Firm registered under LLP Act-2008, the tenderer shall submit alongwith the tender- (i) a copy of LLP Agreement, (ii) a copy of Certificate of Incorporation; and (iii) a copy of Power of Attorney/Authorisation issued by the LLP Firm in favour of the individual to sign the tender on behalf of the LLP Firm and create liability against the Firm.

(e) **Registered Society & Registered Trust:** The tenderer shall submit (i) a copy of the Certificate of Registration, (ii) Deed of Formation; and (iii) a copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the Society/Trust.

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

(iv) After opening of the tender, any document pertaining to the constitution of Sole Proprietorship Firm / Partnership Firm / Registered Company/ Registered Trust / Registered Society etc. shall be neither asked nor considered, if submitted.

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

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

(vii) The tenderer whether sole proprietor, a company or a partnership firm / joint venture (JV) / registered society / registered trust 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.

1.1.27

(a) Right of Railway to deal with Tenders: The Railway reserves the right of not to invite tenders for any of Railway work or works or to invite open or limited tenders and when tenders are called to accept a tender in whole or in part or reject any tender or all tenders without assigning reasons for any such action.

(b) Rights of the Railway to deal with tender:

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

Reverse Auction (Applicable for works tenders valued more than Rs. 50 Crore): 1.1.28

1.1.28.1 Selection criteria for tender cases of Works, Stores and Services proposed through Reverse Auction (e-RA) route:

(a) In the first phase, following method of purchase through Reverse Auction shall be the preferred method for tenders valued more than Rs. 50 Cr. in each case.

(b) The process of procurement through Reverse Auction shall be followed only in case of tenders where there are at least three proven/likely competitive sources, prima facie competent for execution of work.

(c) Financial Bids in single currency/parameter only shall be allowed.

(d) For cases on Zonal Railways/Pus, personal approved of the PHOD/CHOD duly vetted by associate finance shall be required for any exception in tendering method for cases otherwise eligible to be processed through the method of procurement detailed herein.

1.1.28.2 Procedure for award of contracts through Reverse Auction:

(a) The procedure discussed herein shall be fully implemented through IREPS. Any reference to Reverse Auction in these instructions shall imply e-RA.

(b) Conduct and reporting of Reverse Auction shall be as per Annexure-Ito Part-I, Chapter-I.

(c) Each tender should clearly specify essential technical and commercial parameters in a transparent manner. No deviation to such essential Technical &Commercial conditions shall be permitted to the vendors in the electronic bid form.

1.1.28.2.1 **Technical Bid and Initial Price Offer**:

(a) E-RA shall be adopted only for those cases where evaluation is on the basis of single parameter/currency.

(b) Bidder shall be simultaneously required to electronically submit a Technical &Commercial Bid and Initial Price Offer.

(i) Offers found eligible for award of contract / meeting eligibility criteria shall be categorized as Qualified for Award of Contract for the purpose of e-RA.

(c) Offers not complying with essential technical & commercial requirement of the tender shall be declared as ineligible for award contract.

(d) Technical & Commercial evaluation bids shall be done by a Tender Committee, as per extant guidelines, delegation and the estimated value of tender. Recommendations of Tender Committee shall be considered by Tender Accepting Authority, as per existing guidelines.

(e) Initial Price Offer of only those bidders categorized as Qualified for Award of contract, shall be opened and tabulated by system separately. Extant instructions for electronic tabulation shall apply for tabulation of Initial Price Offers.

1.1.28.2.2 **Financial Bid** :

Financial Bid shall comprise of final Price Offer obtained through Reverse Auction. Following conditions and procedure shall be followed in selection of bidders for conduct of Reverse Auction:

(a) Selection of vendors for Reverse Auction for award of Contract in Works and Services tenders and bulk ordering in Stores tenders :

Number of tenders Qualified for Award of contract / Bulk Order	Number of tenders to be selected for Reverse Auction	Remarks
< 3	NIL*	The bids disallowed from participating in the Reverse Auction shall be the highest bidder(s) in the tabulation of Initial Price Offer. In case the highest bidders quote the same rate, the initial Price Offer received last, as per time log of IREPS, shall be removed first, on the principle of last in first out, by IREPS system itself.
3 to 6	3	
More than 6	50% of Vendors Qualified for award of contract (rounded off to next higher integer)	

Note :

(i) *If the number of tenders qualified for Bulk Order / Award of Contract is less than 3. RA shall not be done and tender may be decided on the basis of Initial Price Offer(s).

(ii) Make in India criteria: All bidders eligible for benefits under Public Procurement (Preference to Make of India) Order - 2017, found Qualified for Bulk Order/Award of Contract and are within the specified range of price preference of lowest Initial Price

bid shall be permitted to participate in the Reverse Auction, irrespective of their inter se ranking on the basis of Initial Price Bid. Such bidders shall be over and above the number of vendors selected for Reverse Auction, as per para1.1.28.2.2 (a).

(b) During Reverse Auction process, bidders shall not be allowed to bid a rate higher than the lowest Initial Price Offer.

1.1.28.2.3 Reverse Auction among bids categorized as Qualified for award of contract shall be conducted on IREPS/Suitable Platform. Bidders shall be able to see the auction screens.

1.1.28.2.4 After obtaining the final bids of the Reverse Auction, tenders shall be finalised as per existing policy (including Make in India Order- 2017, vide para 1.2.64 of Part-I, Chapter-II, if applicable). All the relevant policies of Government of India at the relevant time shall be applicable.

1.1.28.2.5 The level of Tender Committee to consider the Final Prices Offer shall be determined on the basis of lowest Initial Price Offer of bid Qualified for award of contract, as opened prior to Reverse Auction. In case the level Tender Committee which evaluated technical &commercial bids as per para1.1.28.2.1(d) was higher than the level of TC competent to consider lowest Initial Price Offer of bid Qualified for award of contract/Bulk order, the higher level TC shall continue to finalize such tender cases.

1.1.28.2.6 Considering the fact that execution of works, delivery of services and availability of items is of paramount importance, Zonal Railways should resort to tendering through other appropriate methods to meet any exigency.

Annexure-I

Procedure for Conduct and Reporting of Reverse Auction

1. The tendering authority shall solicit bids through an invitation to the electronic Reverse Auction to be published or communicated in accordance with the provisions similar to e-procurement.

2. Convenor of the tender committee shall fix the following, on case to case basis, depending upon the nature of work and complexity of case on hand. These shall be indicated in the tender for e-RA itself.

   a. **Initial e-RA period**: This shall be the initial time interval for e-RA. E-RA shall be open for this duration.
   b. **Auto extension period**: In case any offer is received in the time period equal to auto extension period before close if initial e-RA period, the e-RA shall be extended for time equal to auto extension period from the time of last bid. There shall be no upper limit on number of auto extensions. When no offer is received in the last auto extension period, e-RA shall close.
   C. Minimum decrement in percentage of value of the last successful bid.

3. Date and time for start of e-RA shall be communicated to qualified tenderers by the convener after evaluation of Technical Bids.

4. After submission of Initial Price Bid, tenderers will not be allowed to revise the taxes and other levies.

5. During auction period, identities of the participating tenderers will be kept hidden.

6. Minimum admissible bid value will be last bid value minus minimum decrement as specified by the tendering authority before starting of reverse auction. Starting point for reverse auction shall be lowest initial Price Bid of the tenderer eligible for award of contract.

7. After close of the RA, tabulation of last (minimum) bids received from all the tenderers will be generated and made visible to Railways and participating tenderers.

8. Railway users can also view the bidding history in chronological order.

9. Bidders not be allowed to withdraw their last offer.

10. L-1 will be defined as the lowest bid obtained after the closure of R.A. session.

ANNEXURE – II

TENDERER'S CREDENTIALS (BID CAPACITY)

For works costing more than ₹ 50 cr. or as prescribed by Railways through instruction/NIT issued for the work, the tenderers who meet the minimum eligibility criteria will be qualified only if their available bid capacity is equal to or more than the total bid value of the present tender. The available bid capacity shall be calculated as under:

Available Bid Capacity = [A x N x 2] – B

Where

A = Maximum value of construction works executed and payment received in any one financial year during the current and last three financial years immediately preceding the current financial year, upto date of opening of tender, taking into account the completed as well as works in progress.

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

B = Value of existing commitments and balance amount of ongoing works with the tenderer to be completed in next 'N' years.

Note:

(a) The Tenderer(s) shall furnish the details of existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma(Form-12D) of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of opening of tender. In case of no works in hand, a 'NIL' statement should be furnished. This statement should be submitted duly verified by Chartered Accountant.

(b) In case of JV, the tenderer(s) must furnish the details of existing commitments and balance amount of ongoing works with each member of JV as per the prescribed proforma(Form-12D) of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of opening of tender. In case of no works in hand, a 'NIL' statement should be furnished. This statement should be submitted duly verified by Chartered Accountant.

(c) Value of a completed work/work in progress/work awarded but yet not started for a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned technical eligibility criteria in the tender under consideration.

(d) The arithmetic sum of individual "bid capacity" of all the members shall be taken as JV's "bid capacity".

(e) In case, the tenderer/s failed to submit the above statement along with offer, their/his offer shall be considered as incomplete and will be rejected **summarily**.

(f) The available bid capacity of tenderer shall be assessed based on the details submitted by the tenderer. In case, the available Bid Capacity is lesser than estimated cost of work put to tender, his offer shall not be considered even if he has been found eligible in other eligibility criteria/tender requirement.

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PART-I

CHAPTER -II

PART-I
CHAPTER -II
CONDITIONS OF CONTRACT
FOR OHE, TSS & SCADA WORKS

1.2.29	Default and delay.
1.2.30	Loss sustained due to default and delay.
1.2.31	Correctness of work & Materials.
1.2.32	Contractor's responsibility for discrepancy.
1.2.33	Additions and alterations to erected equipment.
1.2.34	Quantum of work and supplies.
1.2.35	Competent Supervisors.
1.2.36	Training of Purchaser's staff.
1.2.37	Work by other Agencies.
1.2.38	Access to work site.
1.2.39	Infringement of patents.
1.2.40	Insurance.
1.2.41	Accidents.
1.2.42	Contractor's liability for costs damages.
1.2.43	Safety measures.
1.2.44	Recovery for delay in completion.
1.2.45	Extension of time.
1.2.46	Provisional acceptance.
1.2.47	Defective equipments to be changed.
1.2.48	Use of rejected equipment.

Para No.	Subject
1.2.49	Guarantee.
1.2.50	Final acceptance.
1.2.51	Payment.
1.2.52	Site clearance.
1.2.53	Components and materials received for work.
1.2.54	Arbitration.
1.2.55	Payment during Arbitration.
1.2.56	Refund of security deposit.
1.2.57	Contract labour act central rules.
1.2.58	Provision of apprentices act.
1.2.59	Provisions of payment of wages Act.
1.2.60	Provisions of Workmen's Compensation Act.
1.2.61	Provisions of Mines Acts.
1.2.62	Monthly statement of claims.
1.2.63	Letter of Credit as Mode of Payment
1.2.64	Public Procurement (Preference to Make in India), Order-2017
Annexure-I	Proforma for Agreement towards Waiver under Section 12(5) and Conciliation (Amendment) Act and Section 31A (5) of Arbitration
Annexure-II	Proforma for Certification by Arbitrators appointed under clause 63 & 64 of GCC

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PART - I
CHAPTER - II

SCOPE : 1.2.1

This chapter deals with the conditions of Contract under which the various works coming under the purview of this contract are to be executed by the Contractor.

CONDITIONS OF CONTRACT : 1.2.2

If the Tender submitted by a Tenderer is accepted and the contract awarded to The Tenderer, the various works coming under the purview of the contract shall be governed by the terms and conditions included in the Tender papers covering the following :

(i) Preamble to the Tender Papers.

(ii) Instructions to Tenderers and conditions of Tendering, as included in Part-I, Chapter-I.

(iii) Conditions of contract, as included in this chapter.

(iv) Prices and Payments, as included in Part-I Chapter-IIIA, IIIB & IIIC.

(v) Explanatory notes of Schedule 1, Schedule of prices, Part-I, Chapter-IVA, IVB & IVC.

(vi) General specifications, as included or referred to in Part-II and

(vii) Particular specifications, as included or referred to in Part-III, and

(viii) Annexures under Part-IV and Forms under Part-V and as modified or amended by the letter of acceptance of the tender.

PURCHASER'S REPRESENTATIVE : 1.2.3

(i) PURCHASER'S REPRESENTATIVE: Subject as otherwise provided in this contract, all notices to be given on behalf of the Purchaser and all other action to be taken on his behalf may be given or taken, as the case may be, on his behalf by the General Manager or his successor.

(ii) DELEGATION BY ENGINEER: Engineer may from time to time assign duties and delegate authority to assistants, and may also revoke such assignment or delegation. These assistants may include a resident engineer, and/or independent inspectors appointed to inspect and/or test items of Plant and/or materials. The assignment, delegation or revocation shall be in writing and shall not take effect until copies have been received by both parties.

However, unless otherwise agreed by both parties, the engineer shall not delegate the authority to determine any matter in accordance with clause 1.2.14 (Determinations).

Assistants shall be suitably qualified persons, who are competent to carry out these duties and exercise this authority.

Each assistant, to whom duties have been assigned or authority has been delegated, shall only be authorised to issue instructions to the contractor to the extent defined by the delegation. Any approval, check, certificate, consent, examination, inspection, instruction, notice, proposal, request, test or similar act by an assistant, in accordance with the delegation, shall have the same effect as though the act had been an act of the Engineer. However:

(a) Any failure to disapprove any work, Plant or Materials shall not constitute approval, and shall therefore not prejudice the right of the engineer to reject the work, Plant or materials.
(b) If the contractor questions any determination or instruction of an assistant, the contractor may refer the matter to the engineer, who shall promptly confirm reverse or vary the determination or instruction.

CONTRACTOR'S REPRESENTATIVE : 1.2.4

The Contractor's representative shall be a person as defined in Para 1.1.2.

CONTRACTOR'S OFFICE & ADDRESS : 1.2.5

The Contractor shall within a month of issue of letter of acceptance of Tender, establish an office at a convenient place indicated in Part-III, for progressing designs and drawings and field works, expeditiously, in consultation and with approval of the Purchaser. He shall intimate the

Purchaser the address thereof in which all correspondence shall be sent. Any communication sent to the Contractor by post at his said address shall be deemed to have reached the Contractor duly and in time. Important documents shall be sent by Registered post/Speed Post.

PURCHASER'S ADDRESS : 1.2.6

The list of addresses to which correspondence and documents relating to the contract should be sent, is included in Part-III.

1.2.7 - Deleted -

TAXES : 1.2.8

(a) The Contractor and all personnel employed by him shall pay such taxes like income tax as are payable under statutory laws of India and the Purchaser will not accept any liability for the same.

(b) Deduction of income tax at source as per provision of finance act and income tax act in force may be made from the Contractor/sub-Contractor and the amount so deducted may be credited to the Central Government.

(c) Implementation of "The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996" and "The Building and Other Construction Workers' Welfare Cess Act, 1996":

The tenderers for carrying out any construction work must get themselves registered from the Registering Officer under Section-7 of the Building and Other Construction Workers Act, 1996 and rules made thereto by the concerned State Govt. and submit certificate of Registration issued from the Registering Officer of the concerned State Govt. (Labour Dept.). As per this Act, the tenderer shall be levied a cess @ 1% of cost of construction work, which would be deducted from each bill. Cost of material, when supplied under a separate schedule item, shall be outside the purview of cess.

ILLEGAL GRATIFICATION : 1.2.9

Any bribe, commission, gift or advance given, promised or offered by the Contractor, or his partner, Agent or servant or any one on his or their behalf to any officer, servant, representative or the agent of the Purchaser or any person on his or their behalf in relation to the obtaining or the execution of this or any other Contract with the Purchaser, shall, in addition to the criminal liability he may incur under the prevention of corruption act (1908), subject the Contractor to the cancellation of this and all other Contracts, and also to payment of any loss resulting from any such cancellation to the like extent as is provided in case of cancellation due to other causes, and the Purchaser shall be entitled to deduct the amounts so payable from any moneys otherwise due to the Contractors under this or any other Contract as envisaged under para 1.2.42. Any question or dispute as to the commission of any offence under the present clause shall be decided by the Purchaser, in such manner and on such evidence or information as may be thought fit and sufficient and his decision shall be final and conclusive in the matter.

RAILWAY PASS : 1.2.10

No Railway pass for the conveyance of the Contractor or his agents or his labour and/or stores will be granted. The Contractor may, however, carry free of charge but at his own risk such labour, supervisory staff and stores as far as necessary for the execution of work by work trains between the Contractor's depot/s (See para 1.2.22 and 1.2.27) and site of work.

LAWS OF INDIA : 1.2.11

(a) This contract shall be governed by the laws for the time being in force in the Republic of India.

(b) Deleted.

FORCE MAJEURE : 1.2.12

If, at any time, during the continuance of this contract the performance, in whole or in part, by either party, of any obligation under this Contract shall be prevented or delayed by reason of any war, hostility, acts of the public enemy, civil commotion, sabotage, fires, floods, earthquakes, explosions, epidemics, quarantine restrictions, strikes, lock-outs, any Statute, Statutory Rules,

regulations, orders or requisitions issued by any Government Department or competent authority or acts of God (thereinafter referred to as "event") then, provided notice of the happening of any such event is given by either party to the other within twenty one days from the date of occurrence thereof neither party shall by reason of such event be entitled to terminate this contract nor shall either party have any claim for damages against the other in respect of such non-performance or delay in performance and the obligations under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist PROVIDED FURTHER that if the performance in whole or part of any obligation under this contract is prevented or delayed by reason of any such event beyond a period as mutually agreed to by the Purchaser and the Contractor after any event or 60 days in the absence of such an agreement whichever is more, either party may at its option terminate the contract, provided also that if the contract is so terminated under this clause, the Purchaser will at the time of such termination take over from the Contractor, at prices as provided for in the contract, all erected equipment or equipments under erection as also all or any portion of unused, undamaged and acceptable equipments, whether in storage or in the course of manufacture, at Schedule rates or at prices mutually agreed to, where Schedule rates are not available.

NOTICE UNDER LOCAL LAWS : 1.2.13

The Purchaser shall, throughout the continuance of the Contract, and in respect of all matters arising out of the Contract, serve all notices and obtain all consents and way leaves, approvals and permissions required to be taken by the Purchaser under any regulations and by-laws of the local or other authority, which shall be applicable to the works.

DETERMINATION OF CONTRACT : 1.2.14

Notwithstanding the provisions under para 1.2.12 the Purchaser may, at any time, by a notice in writing, summarily determine the contract without liability to pay any compensation to the contractor in respect thereof in any of the following events and action would be taken as per para-19 of the Preamble.

Determination of contract owing to default of contractor –**if the contractor should:**

(i) Becomes bankrupt or insolvent, or
(ii) Make an arrangement for assignment in favour of his creditors, or agree to carry out the contract under a Committee of Inspection of his Creditors, or
(iii) Being a Company or Corporation, go into Liquidation (other than a voluntary Liquidation for the purpose of amalgamation or reconstruction), or
(iv) Have an execution levied on his goods or property on the work, or
(v) Assign the contract or any part thereof otherwise than as provided in clause 1.1.16 of these conditions, or
(vi) Abandon the contract, or
(vii) Persistently disregard the instructions of the Engineer, or contravene any provision of Contract, or
(ix) Fail to adhere to the agreed programme of work by a margin of 10% of the stipulated period,

or

Fail to execute the contract documents in terms of Clause 8 of the Regulations for Tenders and Contracts,

or

(ix) Fails to submit the documents pertaining to identity of JV and PAN in terms of Clause18.11 of Tender Form available in the Regulations for Tenders and Contracts,

or

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

or

(x) Fail to take steps to employ competent or additional staff and labour as required under clause 26 of the conditions (Para 1.2.35 of tender document), or

(xi) Fail to afford the Engineer or Engineer's representative proper facilities for inspecting the works or any part thereof as required under clause 28 of the conditions (GCC), or

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

(xiii)(A) At any time after the tender relating to the contract, has been signed and submitted by the contractor, being a partnership firm admit as one of its partners or employee under it or being an incorporated company elect or nominate or allow to act as one of its directors or employee under it in any capacity whatsoever any retired engineer of the gazetted rank or any other retired gazetted officer working before his retirement, whether in the executive or administrative capacity, or whether holding any pensionable post or not, in the Railways for the time being owned and administered by the President of India before the expiry of one year from the date of retirement from the said service of such Engineer or Officer unless such Engineer or Officer has obtained permission from President of India or any officer duly authorized by him in this behalf to become a partner or a director or to take employment under the contract as the case may be,

or

(xiii)(B) Fail to give at the time of submitting the said tender:

(a) The correct information as to the date of retirement of such retired engineer or retired officer from the said service or as to whether any such retired engineer or retired officer was under the employment of the Contractor at the time of submitting the said tender,

Or

(b) The correct information as to such engineers or officers obtaining permission to take employment under the Contractor,

Or

(c) Being a partnership firm, the correct information as to, whether any of its partners was such a retired engineer or a retired officer,

Or

(d) Being an incorporated company, correct information as to whether, any of the Directors was such a retired engineer or retired officer,

Or

(e) Being such a retired engineer or retired officer suppress and not disclose at the time of submitting the said Tender the fact of his being such a retired engineer or a retired officer or make at the time of submitting the said Tender a wrong statement in relation to his obtaining permission to take the contract or if the Contractor be a partnership firm or an incorporated company to be a partner or Director of such firm or Company as the case maybe or to seek employment under the Contractor.

(f) Submits copy of fake documents/certificates in support of credentials submitted by tenderer.

Then and in any of the said clause, the Engineer on behalf of the Railway may serve the Contractor with a notice (FORM-25) in writing to that effect and if the contractor does not within seven days after the delivery to him of such notice proceed to make good his default in so far as the same is capable of being made good and carry on the work or comply with such directions as aforesaid of the entire satisfaction of Engineer, the Railway shall be entitled after giving 48 hours notice (FORM-26 or 26 A, as the case may be) in writing under the hand of the Engineer to rescind the contract as a whole or in part or parts (as may be specified in such notice)'and after expiry of 48 hours notice, a final termination notice (FORM-27 or 27A, as the case may be) should be issued.

Note: Engineer at his discretion may resort to the part termination of contract only in cases where progress of work is more than or equal to 80% of the original scope of work.

(2) Right of Rly. after rescission of contract owing to default of contractor – In the event of any or several of the courses, referred to in sub clause (1) of this clause, being adopted -

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

(b) In the contract which has been rescinded as a whole, the Security Deposit already with railways under the contract shall be encashed/ forfeited and the Performance Guarantee already submitted for the contract shall be encashed. The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.
Further the authorized representative of failed Contractor cannot be accepted as authorized r epresentative in new contract.

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

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

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

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

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

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

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

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

LOSS IN TRANSIT : 1.2.15

If loss or damage occurs to the stores or any part thereof during transit by rail, the Contractor shall have only such remedy as is available to the public against the carrier under the Indian Railways (Amendment) Act 1961, No. 39 of 1961.

AGREEMENT : 1.2.16

(a) Execution of Contract Document: The Tenderer whose tender is accepted, shall be required to appear in person at the office of Chief Administrative Officer/Chief project Director/RE or concerned Engineer, as the case may be, or if tenderer is a firm or corporation, a duly authorized representative shall appear and execute the contract agreement within seven days of notice from Railways that the Contract Agreement is ready. The Contract Agreement shall be entered into by Railway only after submission of valid Performance Guarantee by the Contractor. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender. In such cases the Railway may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and the Railway shall be entitled to forfeit the full amount of the Earnest Money and other dues payable to the Contractor under this contract. The failed Contractor shall be debarred from participating in the re-tender for that work. The form for agreement is included in part V (Form 14).

(b) Form of Contract Document: Every contract shall be complete in respect of the document it shall so constitute. Not less than 2 copies of the contract document shall be signed by the competent authority and the Contractor and one copy given to the Contractor.

(c) If a work is transferred from the jurisdiction of one Railway to another Railway or to a project authority or vice versa while the contract is in subsistence the contract shall be binding on the Contractor and successor Railway/Project in the same manner and take effect in all respects as if the Contractor and the successor Railway/Project were parties thereto from the inspection and the corresponding officers or the competent authority in the successor Railway/Project will exercise the same powers and enjoy the same authority as conferred to the Predecessor Railway/Project under the original contract/ agreement entered into.

(d) If for administrative or other reasons the Contract is transferred to the successor Railway/Project the contract shall, notwithstanding anything contained herein contrary thereto, be binding on the Contractor and the successor Railway/Project in the same manner and take effect in all respects as if the Contractor and the successor Railway/Project had been parties thereto from the date of this contract.

(d) Final Supplementary Agreement: After the work is completed and taken over by the Railway as per terms and conditions of the contract agreement or otherwise concluded by the parties with mutual consent and full and final payment is made by the Railway to the Contractor for work done, and there is unequivocal no claim on either side under the contract, the parties shall execute the final supplementary agreement annexed as per FORM-29.

SECURITY DEPOSIT: 1.2.17

(A) The Earnest Money deposited by the Contractor with his tender will be retained by the Railways as part of security for the due and faithful fulfillment of the contract by the Contractor. The Security Deposit shall be 5% of the contract value. Security Deposit may be deposited by the Contractor before release of first on account bill in cash or Term Deposit Receipt issued from Scheduled Bank, or may be recovered at the rate of 10% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the Railway may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained (including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.

Further, in case of contracts having value equal to or more than ₹ 50 crore (Rs Fifty crore) the Security Deposit may be deposited as irrevocable Bank Guarantee Bond also, issued by a scheduled bank after execution of contract documents, but before payment of 1st on account bill. Provided further that the validity of Bank Guarantee Bond shall be extended from time to time, depending upon extension of contract granted in terms of Clause 17 of the Standard General Conditions of Contract.

Further, in case Security Deposit has been submitted as Term Deposit Receipt/Bank Guarantee Bond in full amount, the Earnest Money deposited by the Contractor with his tender will be returned by the Railways.

Note: After the work is physically completed as certified by competent authority, Security Deposit recovered from the running bills of a Contractor can be returned to him, if he so desires, in lieu of Term Deposit Receipt/irrevocable Bank Guarantee for equivalent amount from Scheduled Bank, to be submitted by him.

(B) **(i) Refund of Security Deposit:** Security Deposit mentioned in sub clause (1) above shall be returned to the Contractor after the following:

(a) Final Payment of the Contract as per clause 51.(1) and
(b) Signature of Final Supplementary Agreement or Certification by Engineer that Railway has No Claim on Contractor and
(c) Issue of Maintenance Certificate on expiry of the maintenance period as per clause 50.(1).

(B) **(ii)** Forfeiture of Security Deposit: Whenever the contract is rescinded as a whole under clause 62 (1) of GCC, the Security Deposit already with railways under the contract shall be forfeited. However, in case the contract is rescinded in part or parts under clause 62 (1) of GCC, the Security Deposit shall not be forfeited.

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

SCHEME OF WORK : 1.2.18

(a) Within a period of 90 days beginning from the date of issue of Letter of Acceptance of Tender, the Contractor shall submit to the authority as mentioned in para 3.20(i)(b) and (v), the following documents (see para 1.1.11).

(i) Detailed time schedule for design and submission of various documents enumerated in Part-II Chapter-V. Designs and Drawings to be supplied by the Purchaser shall also included in the time schedule to make it comprehensive. The comprehensive schedule shall be planned in a manner such that the entire basic designs and drawings for the group/s is/are accepted by the Purchaser within a period not exceeding one third of the total period allowed for and working drawings, within a period not exceeding two third of the total period allowed for completing the work. This period shall be reckoned from the date of issue of the letter of Acceptance of Tender. The schedule shall take into account the time required for study by the Purchaser who reserves for this purpose 30 days for verifying the designs and drawings.

***NOTE** : The above provision is applicable provided the Purchaser has been able to supply all pegging plans and other drawings and designs in a uniformly spread out manner to the maximum extent possible over a period ending at least four months before the target dates allotted to the Contractor.*

(ii) The Contractor shall submit a detailed time schedule for the execution of the various items of the work specifying the duration of each part of these works together with comprehensive scheme of execution of the each TSS. The planning for each stage of work shall be done in order of priority as given by the Purchaser and should be such as to complete the entire work within the stipulated period. This planning should also include the programme of delivery of materials and equipment which should synchronize with the progress of field work.

(iii) A detailed time schedule shall be in form of a PERT network consisting of adequate numbers of activities covering key phases of work for each section. The network shall indicate the interface facilities and materials to be supplied by the Purchaser and dates by which those are required .The

planning for each stage of work shall be done in the order of priority as given by the Purchaser and should be such as to complete the entire work within the stipulated period.

(b) WORKS TO BE DONE AS APPROVED

The planning shall be finalised in consultation with the Purchaser and approved by the latter in writing before commencement of the work and the Contractor shall be held responsible for the execution of the work in full compliance with approved design and drawings. Designs and drawings modified at site by the Purchaser's Engineers shall be treated as approved. However, such modifications shall be incorporated in the designs and drawings and resubmitted for formal approval.

(c) MONTHLY PROGRESS REPORT

The Contractor shall furnish to the authority as mentioned in para 3.20(i)(b) and (v), or his successor / nominee (whose address will be advised in due course) during the first week of every calendar month, a progress report showing progress of finalisation of designs and drawings, materials and equipment received at site and the works carried out during the preceding month and up-to-date progress of these items alongwith the total quantum of designs and drawings, materials and equipments and the works required for the contract.

(**d)** For finalising the scheme for work out-line in above sub-paras, the Contractor shall make use of the latest network analysis techniques like CPM technique, PERT chart etc.

(e) Contractor shall widely use IT (Information Technology) for the purpose of progress reporting and Material Management. The contractor shall make the following information available to the purchaser in the form of reports which shall be uploaded on a Web based system. Following Reports shall be deliverable by the IT management system.

SN	Name of the report	Data update frequency
1	Daily progress report of all OHE works specifying the total quantum, balance quantum, location of work and the work done on the previous day.	Once a day before 09:00 hrs on the following day
2	Weekly progress report of all OHE works specifying the total quantum, balance quantum, location of work and the work done on the previous week.	Once a week on the following Monday before 09:00 hrs
3	Monthly progress report of all OHE works specifying the total quantum, balance quantum, location of work and the work done on the previous Month.	Once a month on the third day of the next MONTH before 09:00 hrs
4	Material requirement sub section wise	After completion of design once. There after on every change in designs.
5	Material consumed, Ground balance and the balance material required	Once a week on the following Monday at 09:00 hrs
6	Daily, Weekly, Monthly Traffic and Power Block demanded and granted	Once a day/week/month as the case may be for each report at 09:00 hrs.
7	Traffic Block and Power Block plan for next day/week	19:00 hrs each day for the next day requirement

The Reports provided shall be generally be normally in a format which requires smaller network bandwidth to open quickly (within < 5 sec for a 64 kbps band width system).

PROCUREMENT OF MATERIALS/QUALITY OF MATERIALS: 1.2.19

All materials used in the work shall be procured from RDSO/ CORE approved sources only and of the best quality and of the class most suited for the purpose specified. It is essential that the manufacturer/s from whom supply is arranged should have long experience of design and manufacture of equipments components, materials and fittings. The requisite facilities for testing prototypes supplied against this contract should be available with the manufacturer. In the case of these equipments components or fittings for which the requisite facilities for testing prototypes are not available with the Manufacturer the manufacturer shall arrange to carry out the prototype tests at his own cost in a testing laboratory approved by the Purchaser. Only tested quality steel shall be used.

All erection work carried out shall also be of the best quality, acceptable to the Purchaser.

NOTE:-

1. The supply of all materials shall be from the approved sources only (as mentioned in the RDSO's/CORE's approved list of vendors). However, items / materials for which RDSO/CORE approved sources do not exist, the same may be procured as per relevant BIS/Specifications or from other sources after one time approval of the source (for particular work only) from the project in-charge (SAG).

2(a) It may be ensured, procurement of any material from a Part-II sources is limited to 15% of the total requirement of the project.

2(b) Procurement from Part-II can be considered beyond 15% in case that source has successfully executed a larger quantity order in the same Railway unit or other Railway units / PUs in the preceding 3 years. Successful executions will be signified by both quantitative and qualitative performance. Upper limit of quantity to be procured from such a source will not exceed 25% of the net procurable quantity in a given procurement case with another 5% on new source in deserving cases and with strict compliance of extant procedure on such educational ordering. That is to say, the procurement from a Part-II source can be upto 15% or the highest quantity of a past order, successfully executed in the preceding three years in the same Railway unit or other Railway units /PUs, whichever is higher, subject to maximum of 25% of the net procurable quantity.

2(c) Aggregate quantity to be procured from all Part-II approved vendors taken together, however, will not exceed 25% of the net procurable quantity.

3. Apart from deviations, if any, proposed by the contractor and accepted by the purchaser, in case of ambiguity in tender paper in respect of procurement of materials required for the subject work, the decision of the purchaser shall be final.

SPECIFIED RAILWAY STORES : 1.2.20

FOR OHE WORKS : 1.2.20.1

(a) The Purchaser shall supply to the contractor free on rail or free on lorry upto the RE siding/ contractor's depot all the steel work that are indicated in Annexure-4. The materials will be unloaded & stacked by the contractor at the appropriate place in the presence of Purchaser's representative. The steel work which are to be supplied by the Purchaser to the contractor will be made available as described above sufficiently in advance of the planned dates of erection. The contractor may return to the Purchaser any steel work found defective or damaged on account of manufacturing defects. After completion of the works, any undamaged surplus steel work left over with the contractor shall be returned to the Purchaser. For the purpose of final reconciliation, the procedure laid down in para 1.4.6, Part-I, Chapter-IVA, will be followed.

(b) **EQUIPMENTS, COMPONENTS, FITTINGS AND OTHER MATERIALS**

The various materials which will be supplied to the contractor by the Purchaser free on rail or free on lorry upto the RE siding/contractor's depot, are listed in Annexure-4. The prices in Schedule-1, Section-1 to 5, shall be exclusive of the cost of supply of these items. For the purpose of final reconciliation, the procedure laid down in para 1.4.6, Part-I, Chapter-IVA, will be followed. The shortage, if any, shall be recovered from the contractor by the Purchaser at the prices specified in note at the end of para 1.4.6 (f) Part-I, Chapter-IVA. In addition the material/items specified in Annexure-4, some of the items which are normally in the contractor's scope of supply may also be supplied by the Railways either in part or in full, to meet the requirement of tendered work. The recovery of such items will be made in terms of Clause 1.3.2 and 1.3.10 (Part-I, Chapter-IIIA).

Further, the Purchaser reserves the right to supply any equipments, components or materials, indigenous or imported, from his own resources in quantities which may fulfill the contract either in whole or in part upto a maximum of 10% of the total value of the contract free on rail or free on lorry upto the RE siding/contractor's depot. The same shall be accepted by the Contractor provided that the Purchaser shall at the time of issue of letter of Acceptance of the tender to the Contractor, indicate to the contractor the list of materials and quantities thereof which will be supplied by the Purchaser free on rail or free on lorry upto the RE siding/ contractor's depot sufficiently in advance of the planned dates of erection. Such materials shall be tested by the contractor at his own cost before use to the extent that the specifications require tests at site

prior to installation but the contractor shall not be responsible for any defects in the material or component and the contractor may return to the Purchaser any materials which are found defective or damaged on account of manufacturing defects. Any damaged surplus materials left out with the contractor on completion of works should also be returned to the Purchaser for which necessary adjustments would be made. The cost of materials supplied by the Purchaser to the contractor in terms of the above sub-para would be recovered from the contractor as indicated in para 1.3.10(Part-I, Chapter-IIIA). Purchaser may also supply material to the extent of 10% of contract value as Rly supply material for which no recovery shall be affected. Instead, contract value shall get reduced to that extent which will be accepted by the contractor provided the Purchaser shall at the time of issue of letter of Acceptance of the tender to the Contractor, indicate to the contractor the list of materials and quantities thereof which will be supplied by the Purchaser as free Rly supply materials.

(c) Should it be impossible for the Contractor to obtain any of the items included in schedule – 3, Part-V, Form-7(Sh.1 to 26) indigenously for any reason accepted as adequate by the Purchaser, the Purchaser, will arrange to import such items at his own cost and supply them to the Contractor in accordance with para 1.2.20.1(b). The cost of such supplies shall be recovered in accordance with para 1.3.10 of (Part-I, Chapter-IIIA).

(d) The various equipments, components and materials supplied by the Purchaser to the Contractor will be handed over to the Contractor, as far as possible in a stage ready for installation. The Purchaser shall supply to the Contractor within reasonable time (as far as possible within ***3 months*** of issue of the letter of Acceptance of Tender) six copies each of the drawings of all items to be supplied by the Purchaser. Wherever possible, 3 copies each of the instructions booklets for various equipments will also be supplied by the Purchaser. The Contractor shall carefully follow the instructions mentioned in the various instruction booklets and those indicated by the Purchaser during the erection of equipments supplied by the Purchaser and shall endeavor to bring such equipment into successful operation. In the event of the failure of any item supplied by the Purchaser due to inherent defects/deficiencies in the item, the Contractor shall not be responsible. Should the defects be repairable at site without requiring the dismantlement of the equipment, the repair shall be done by the Contractor, free of cost, for which the necessary replacement parts will be supplied by the Purchaser, free of cost, to the Contractor. If the defect cannot be rectified at site and the replacement of the equipment is required, then the Purchaser shall replace the defective equipment, alternatively the Contractor may be required to dismantle the defective equipment and re-erect the required equipment for which he shall be paid separately at original schedule-1 rates as applicable, if available or at rates to be mutually agreed to between the Purchaser and the Contractor prior to undertaking the work.

(e) In case damage to the stores handed over to the Contractor, is caused by faulty test or careless handling by the Contractor as distinct from damage due to inherent manufacturing defect, the cost of repairs to replacement of the damaged equipment shall be borne by the Contractor.

NOTE: (1) Booster *Transformers complete with all accessories will be supplied along with necessary oil for the first filling to the Contractor. The Contractor shall make his own arrangements for oil filtration, testing and commissioning as well as arrangements for oil filtration plant and power supply for the same.*

(2) *Empty drums, wooden crates, and other packing materials including gunny bags used for supply of Purchaser's materials to the contractor shall be the property of the Contractor. The Tenderer should take note of this while quoting rates.*

(f) **SUPPLY OF CEMENT** D E L E T E D

(g) Railway may supply any item to the contractor for erection which are not provided for in the contract. Erection rate shall be mutually finalised as Non Schedule item, if Schedule of Rate for the same are not available in the contract. Railway may also supply for erection, with the consent of the contractor, any item as per the latest specifications as a substitute of the same item of old specifications provided for in the contract.

FOR TSS & SCADA WORKS : 1.2.20.2

(a) The various materials which will be supplied to the Contractor by the Purchaser, free at Contractor's depot are listed in Annexure-4. The price in Schedule-1, Section-8 to 11, shall be exclusive of the cost of supply of these items. For the purpose of final reconciliation the procedure

laid down in Para 1.4.5, Part-1, Chapter-IV B will be followed. Shortages shall be recovered from the Contractor by the purchaser at the prices specified in the Note at the end of Para 1.4.5, Part-1, Chapter-IV B. Cost of repairs to damage of materials handed over to the Contractor, shall be borne by the Contractor.

(b) Further the Purchaser reserves the right to supply any equipments, components or materials which are in contractor's scope of supply, indigenous or imported, from his own resources in quantities which may fulfill the contract either in whole or in part up to a maximum of 10% of the total value of the contract. No handling charges will be paid to the Contractor for such supplies, and the same shall be accepted by the Contractor provided that the Purchaser shall, at the time of issue of Letter of Acceptance of Tender to the Contractor, indicate to the Contractor the list of materials and quantities thereof which will be supplied. Such materials will be supplied by the Purchaser free at the Contractor's depot/sufficiently in advance of the planned date/s of erection. Such materials shall be tested by the Contractor at his cost before use to the extent that the specifications require tests at site prior to installation but Contractor will not be responsible for any defects in the material or component and he may return to the Purchaser any materials which are found defective or damaged on account of manufacturing defects. Any undamaged surplus materials left with the Contractor on completion of the work should also be returned to the Purchaser for which necessary adjustments would be made. The cost of the materials supplied by the Purchaser to the Contractor in terms of the above sub-para would be recovered from the Contractor as indicated in Para 1.3.9 of (Part-I, Chapter-IIIB & IIIC).

(c) The various equipments, components and materials supplied by the Purchaser to the Contractor will be handed over to the Contractor, as far as possible in a stage ready for installation. The Purchaser shall supply to the Contractor within reasonable time (as far as possible within ***3 months*** of issue of the letter of Acceptance of Tender) six copies each of the drawings of all items to be supplied by the Purchaser. Wherever possible 3 copies each of the instructions booklets for various equipments will also be supplied by the Purchaser. The Contractor shall carefully follow the instructions mentioned in the various instruction booklets and those indicated by the Purchaser during the erection of equipments supplied by the Purchaser and shall endeavor to bring such equipment into successful operation. In the event of the failure of any item supplied by the Purchaser due to inherent defects/deficiencies in the item, the Contractor shall not be responsible. Should the defects be repairable at site without requiring the dismantlement of the equipment, the repair shall be done by the Contractor, free of cost, for which the necessary replacement parts will be supplied by the Purchaser, free of cost, to the Contractor. If the defect cannot be rectified at site and the replacement of the equipment is required, then the Purchaser shall replace the defective equipment, alternatively the Contractor may be required to dismantle the defective equipment and re-erect the required equipment for which he shall be paid separately at original schedule-1, (Part-I, Chapter-IVB & IVC), rates as applicable, if available or at rates to be mutually agreed to between the Purchaser and the Contractor prior to undertaking the work.

(d) In case damage to the stores handed over to the Contractor, is caused by faulty test or careless handling by the Contractor as distinct from damage due to inherent manufacturing defect, the cost of repairs to replacement of the damaged equipment shall be borne by the Contractor.

NOTE : (1) *Empty drums, wooden crates, and other packing materials including gunny bags used for supply of Purchaser's materials to the contractor shall be the property of the Contractor. The Tenderer should take note of this while quoting rates.*

(e) **SUPPLY OF CEMENT** D E L E T E D

(f) Railway may supply any item to the contractor for erection which are not provided for in the contract. Erection rate shall be mutually finalised as Non Schedule item, if Schedule of Rate for the same are not available in the contract. Railway may also supply for erection, with the consent of the contractor, any item as per the latest specifications as a substitute of the same item of old specifications provided for in the contract.

OTHER RAILWAY STORES : 1.2.21

If any material other than those specified in para 1.2.20 is supplied by the Purchaser either at the Contractor's request or suo moto in order to prevent any possible delay in the execution of the works likely to occur due to the Contractor's inability to make adequate arrangements for supply thereof or otherwise, recovery will be made from Contractor's bill at the issue rate or market rate prevailing at the time of supply, whichever is higher, plus 5% on account of initial freight and 2%

on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material, freight and incidental charges or Schedule-3 rate for OHE works. In case of TSS & SCADA works it shall be the supply rate of schedule-1, Section-8 to 12, whichever is higher, freight between the Purchaser's source of supply and the Contractor's depot or RE siding shall be to the Contractor's account. If, however, the material required by the Contractor is not available in Purchaser's stock or the Purchaser decides not to supply the same, be that for whatever reason, the Purchaser shall not be bound to arrange for the supply at cost quoted above or at any other cost nor will this fact be accepted as an excuse for delay in execution of works.

NOTE for OHE works: ***Deleted***

NOTE for TSS & SCADA works:

No material other than those specified in clause 1.2.20 above shall be supplied. The unspecified stores can be supplied to the Contractor on the discretion of the Railway administration subject to the availability of materials. The transaction shall be strictly on sale basis for which recovery will be made as per para 1.2.21 above from the first bill received from the contractor subsequent to the handing over of the materials.

CONTRACTOR'S ORGANISATION : 1.2.22

FOR OHE WORKS : 1.2.22.1

(a) In addition to the establishment of an office as per para 1.2.5, the Contractor shall set up at least one main depot for receiving and storing steel work and other materials and establish a workshop for small fabrication and assembly work, if considered necessary by the Contractor. If he and the Purchaser deem it necessary, sub-depots may be set up to ease operation of work trains and distribution of materials. The location of Contractor's depot and sub-depots will be mutually agreed upon by the Purchaser and the Contractor. For the main and sub-depots, the Purchaser shall offer open space reasonably leveled and workable and suitable for storage of materials free of charge inside Railway premises which will be convenient from the point of view of operation. The depot/s shall, as far as possible, be located such as to be accessible by road. The depot will be provided with a siding of suitable length to accommodate the work trains and allow shunting of trains within the depot area, free of charge, to serve the area for the use of the Contractor.

NOTE *: For unloading of Purchaser's steel work and other Railway materials, for attention to wagons, for stabling of Purchaser's wagons of work trains the Purchaser at his own cost, will arrange for provision of additional sidings, as required by him. All other expenses for providing covered and enclosed storage and workshop accommodation, other facilities and running the establishment shall be borne by the Contractor. Labour charges for laying of additional sidings or alterations to the sidings, if considered essential by the Contractor, shall be borne by the Contractor. The recoverable costs shall be finalised and mutually agreed upon, before the tracks are laid. Track materials such as Rails, fastenings and ballast, and/or ashes cinder only for additions or alterations to sidings shall be provided free of charge to the Contractor by the Purchaser. Maintenance of all sidings will be done by the Purchaser at his own cost, On completion of the work the cost of dismantling such additional sidings shall be borne by the Contractor. In case of difference of opinion in these matters the decision of the General Manager or his successor shall be final.*

(b) The Purchaser will also provide free of charge stabling lines for work trains at suitable stations, should it be considered necessary to suit convenience of operation or to avoid haulage of work trains back to main or sub-depot/s except for the purpose of recoupment of stock on work trains. Space for storage of ballast and sand may also be provided free of charge along such stabling lines as convenient to the Purchaser. The receipt of storage of materials at the main and sub-depots shall be so planned as to avoid transport of materials between the main and sub-depot/s and vice versa to the maximum extent possible.

NOTE *For para 1.2.22.1 (a) & (b): The delay in providing open space/stabling lines shall only entitle the contractor suitable DOC extension and no other compensation shall be admissible.*

(c) The main depots will be located at stations as indicated in part-III. The proposed location/s of sub-depots and stabling lines is/are to be given by the Tenderer for scrutiny and approval by the Purchaser.

(d) For the main depot the services of a commercial Clerk shall be provided, when required, for complying with commercial formalities of receiving and dispatching goods. The cost of such clerk/s will be borne by the Purchaser.

(e) The contractor shall hand over the depot, sub-depot area complete with sidings, within a period of one year from completion of the work, cleaned of all Contractor's stores or refuse unless otherwise agreed to by the Purchaser.

(f) The Contractor will be responsible for transfer of materials from source of supply to the main or sub depots, between depot/s and workshops except where otherwise stated. If wagons are required, the Purchaser will use his good offices for expeditious allotment. The Contractor will be responsible for all loss and/ or damage in the transfer of materials and for demurrage or wharfage he may incur, and no loss damage or expenses incurred on this account will be reimbursed by the Purchaser. Work trains for transport between depots or between depot/s and work site will be provided to the extent indicated in para 1.2.27.

(g) Electricity may be supplied at places where spare capacity is available for running of machinery and for lighting. The Contractor shall provide his own distribution system in consultation and with the approval of the Purchaser. The cost of providing connections and of energy consumed shall be paid by the Contractor to the Purchaser in accordance with relevant rules and prevailing rates of the Railway.

(h) At places where piped water supply is available the Purchaser may supply water to the Contractor at convenient points for his office, workshops and stores if necessary in connection with the work. The Contractor shall arrange to lay his own pipe lines for distribution in consultation and with the approval of the Purchaser. The Contractor shall be charged for consumption by the Railways at the rate of Rs. 2/- only per 1000 liters. The Contractor shall arrange water at the work site at his own cost. However, in exceptional cases where the Purchaser is satisfied that it is not feasible for the Contractor to arrange water due to its non-availability nearby, water may be made available free of cost in water tanks at watering station/s which may be carried to work site through work trains. The decision of the Purchaser in regard to supply of water through work trains shall be final and binding on the Contractor.

(j) The Contractor shall arrange at his own cost all tools, plants and facilities as necessary for erection and testing of the equipments, in compliance with the Specification.

(k) No conservancy cess charges will be recovered from the Contractor. The Tenderer should take note of this while quoting rates.

(l) Contractor shall arrange and make available at their depot the following measuring equipments duly calibrated for inspection at site by the representative of the purchaser as and when required:

(i) Weighing Machine of capacity 2 MT

(ii) Alco meter

(iii) Vernier Caliper

(iv) Micrometer

(v) Radius Gauge

(vi) Thread Gauge

(vii) Steel Measuring Tapes 3m & 30 m length each

(viii) Angle Protractor

FOR TSS & SCADA WORKS: 1.2.22.2

a) In addition to the establishment of an office as per Para 1.2.5 the Contractor shall set up at least one main depot for receiving and storing steel work and other materials and establish a

workshop for small fabrication and assembly work. The location of Contractor's depot will be mutually agreed upon by the Purchaser and the Contractor. The Purchaser shall offer free of charge open space reasonably level and workable for the depots. The depot will be provided with a siding of suitable length free of charge. All other expenses for providing covered and enclosed storage and workshop accommodation and facilities and running the establishment shall be incurred by the Contractor.

b) The Contractor shall hand over the depot area complete with siding on completion of the work, cleared of all structures, stores or refuse unless otherwise agreed to by the Purchaser.

c) The Contractor will be responsible for transport of materials from source of supply to the depot or between depot and work site. If wagons are required, the Purchaser will use his good offices for expeditious allotment. The Contractor will be responsible for all loss and/or damage in the transfer of materials and for demurrage or wharf age he may incur, and no loss, damage or expenses incurred on this account, will be reimbursed by the Purchaser.

d) Electricity may be supplied at places where spare capacity is available for running of machinery and for lighting. The Contractor shall provide his own distribution system in consultation and with the approval of the Purchaser. The cost of providing connection sand of energy consumed shall be paid by the Contractor to the Purchaser in accordance with relevant rules and prevailing rates of the Railway.

e) At places where piped water supply is available, the Purchaser may supply water to the Contractor at convenient point/s for execution of work and for his depot, if necessary. The Contractor shall arrange to lay his own pipelines for distribution, in consultation and with the approval of the Purchaser. The Contractor will be charged for consumption at the fixed rate of Rs. two per thousand liters subject to periodical revision by the General Manager or his successor.

f) The Contractor shall arrange at his own cost all tools, plants and facilities for erection and testing of the equipment, in compliance with the specification.

The list of machinery, tools and plants and the other infrastructure available with the Tenderer will be furnished along with the bid (Form-12B & 12C).

g) No conservancy cess charges will be recovered from the Contractor. The Tenderer should take note of this while quoting rates.

CONTRACTOR'S DRAWINGS ETC. : 1.2.23

Any calculations, designs, drawings, schedules, information, data, progress charts etc. required by the Purchaser's Engineer in connection with the contract shall be furnished by the Contractor at his own expenses. The Contractor will not be required to furnish drawings, designs and calculations etc. for basic designs and employment schedules provided by the Purchaser in case no modification/deviation is required for a particular basic design/ employment schedule. In case of new developments in designs, comments on Research Designs and Standards Organisation (hereinafter called RDSO's) and decision of Purchaser to implement the same basic drawings /designs/employment schedules will be submitted by the contractor to the Purchaser. If the RDSO's drawings/ designs/employment schedule is not revised, Contractor need not submit drawings/ designs/ employment schedules to the Railway Electrification. In the event of Contractor suggesting any alteration/deviation in standard drawings, he shall submit the retraced drawings with full calculations and justification of the change to the Purchaser. The Purchaser if convinced of the need of the alteration shall approach RDSO for necessary approval. In case of any ambiguity in the interpretation of design and drawing, the decision of the purchaser shall be final and conclusive.

SUB- CONTRACTORS: 1.2.24

(a) The Contractor may sub-let a part of the works under this contract and enter into contract with suppliers for supply of materials.

(b) The names of all sub-Contractors proposed to be employed for execution of work or any part thereof including manufacture of components and fittings shall be submitted by the Contractor to the Purchaser and got approved by him before the Contractor enters into an agreement with the Sub-Contractor for the purpose.

(c) The Contractor shall arrange for effective supervision of Sub-Contractor's work and remain solely responsible for materials supplied and for works carried out on his behalf by the sub-contractor/s.

QUALITY ASSURANCE MATERIALS: 1.2.25

(a) All the equipments, materials, fittings and components will be subject to quality control programme of the manufacturer, being part of the quality Assurance programme of the Contractor. The materials may also be inspected by the Purchaser or his representative either at the manufacturer works or at the Contractor's depot. The Purchaser or his representative shall have the right to be present during all the stages of manufacture and shall be accorded free of charge all reasonable facilities for inspection and testing as well as to examine the stage inspection report of the manufacturer in addition to the quality audit which the Contractor may institute as a part of his programme so as to satisfy himself that the materials are in accordance with specifications, approved drawings and designs and Purchaser's prescribed quality Assurance Standards.

(b) **ERECTION**

All erection work will also be subjected to the Quality Assurance Programme including inspection by the Purchaser or his representative to ensure that the work is done in accordance with the specifications and approved drawings and designs and Purchaser's prescribed Quality Assurance Standards.

(c) **EXPENSES OF PURCHASER'S REPRESENTATIVE**

All the expenses of Purchaser's representative shall be borne by the Purchaser whether the inspected material is finally utilised in work or not.

(d) The decision of the General Manager or his successor shall be final in respect of acceptability or otherwise of any material, fittings, components or equipments required for the work.

(e) **QUALITY ASSURANCE PROGRAMME**

For proper control of quality and to ensure that the materials, equipments and fittings are manufactured according to specification and the erection is according to approved instructions, drawings, specifications, the Contractor shall adopt a suitable quality assurance programme to ensure quality at all necessary points, whether at manufacturer's works, or in his depot or at work site as well as during erection. Such quality assurance programme shall also meet the requirement of the Purchaser's Prescribed Quality Assurance Standards. This programme of the Contractor shall generally cover the following:-

1. The organisation to manage and implement the Quality Assurance programme.

2. The documentation control system:-
   - i) Basic control system.
   - ii) Adopted at manufacturer’s works.
   - iii) Adopted at the Contractor's Depot and work site.

3. Procedure adopted for:-
   - i) Source Inspection.
   - ii) Incoming raw material inspection.
   - iii) Verification of materials purchased.
   - iv) Fabrication controls.
   - v) Site erection controls.

4. Inspection and Test Procedure for:-
   - i) Manufacture and quality control procedure.
   - ii) Field activities.

5. System of handling and storage.

6. System of quality audit.

7. System of maintenance of records.

8. For the purpose of obtaining ` On Account Payment ' (See para 1.3.9 of Part-I, Chapter-IIIA for OHE, para 1.3.8 of Part-I, Chapter-IIIB for TSS, & Part-I, Chapter-IIIC for SCADA), the Contractor shall submit along with the invoice, the documents indicated in the Prescribed Quality Assurance Standard which should inter-alia cover the following as may be applicable in each case.

i) Material test reports on raw materials used.
ii) Material type and routine test report on components specification.
iii) Inspection plan with reports of the Inspection plan check points.
iv) Routine test report.
v) Factory test results as required under the specification.
vi) Quality audit report including test check report of Purchaser's representative if any.

CRANES : 1.2.26

(a) FOR OHE WORKS

One crane of adequate capacity with a jib of requisite length will be provided by the Purchaser, for use in a work-train for mast erection by the Contractor, free of all charges including pay and allowances of the crew and all running expenditure will be borne by the Purchaser. Extra cranes required for additional work trains may be provided to suit the needs of the progress of work if considered necessary by the Purchaser. Road crane for handling heavy materials at the contractor's depot will be arranged by the contractor who will also arrange his own crew for its operation and maintenance. All charges including pay and allowances of the crew and all running expenditure will be borne by the contractor. However, in exceptional cases where the Purchaser is satisfied that it is not feasible for the contractor to arrange a road crane himself, the same may be made available to the contractor on hire basis depending on its availability with the Purchaser on mutually agreed terms and conditions.

It may, however, be noted that if the road crane required by the contractor is not available with the Purchaser or if the purchaser decides not to supply the same be that for whatever reason, the purchaser shall not be bound to arrange for the supply of the road crane nor will this fact be accepted as an excuse for delay in execution of works.

(b) FOR TSS & SCADA WORKS :

The contractor can make his own arrangement for loading and unloading of all material at his depot or at work sites. The contractor may, however, obtain such facilities from the Railways as a normal user on payment of normal schedule charges.

WORK TRAINS : 1.2.27

(a) The Purchaser will provide work trains to the Contractor for erection of mast and portal structures and stringing of conductors only. For distribution of foundation materials enroute, no work train will be provided and, therefore, the Contractor shall have to make his own arrangement for carrying such materials by road transport. However, in case of locations inaccessible by road, if work trains are required by the Contractor, the same will be made available on payment at the rate of Rs. 6,000/- (Rupees Six thousand) per work train per day. The work train on hire basis can also be made available for erection of Booster Transformers, unloading of Auxiliary Transformers and Interrupters subject to availability on request of Contractor. This rate will be applicable for an effective traffic block period of one and a half hours or more on each day. The charges will be reduced pro-rata if the effective traffic block hours actually provided in a day are less than one and a half hours. The running time to and fro from the depot to the work site or time required for loading at the depot shall not be reckoned for the purpose of this charge. The minimum number of wagons to be provided for work train for distribution of foundation materials will be 8 (4 wheelers) except in unavoidable circumstances.

However, no reduction in charges will be allowed if the number of wagons falls below 8 in such cases. Work trains may be used for transport of materials other than foundation materials from the depot to another only to the extent necessary. The work trains shall not be used for erection of small parts steel works, installation of droppers, adjustment of OHE or solely for transport of labour to the site of work (See para 1.2.10) . The number of work trains will ordinarily be provided for the work as indicated in part - III.

(b) **COMPOSITION OF WORK TRAINS AND EQUIPMENTS TO BE INSTALLED**

The work trains provided by the Purchaser would consist of wagons open or covered, wagon under frames, coaching stock withdrawn from service, brake van/s and locomotive, to the extent available for the work. The Contractor shall indicate the equipment and super structure he intends to provide on each work train he is planning to use. This equipment and super structure shall be supplied and erected by the Contractor at his own cost on the Purchaser's Wagons or Wagons under frames in accordance with drawings to be supplied by the Contractor and approved by the Purchaser. The Contractor shall submit detailed drawings of the work trains within two months from the date of issue of the Letter of Acceptance of Tender to enable the Purchaser to obtain approval from the competent authorities for the use of such work train, if required. The Contractor may utilise his own super structure and other tools and equipment already used by him in the previous groups.

(c) **CHARGES FOR THE WORK TRAINS**

The work trains provided by the Purchaser, shall be free of all operating costs/charges to the contractor inclusive of pay and allowances of loco and trains crew, running expenses for fuel, water, oil etc. and maintenance of loco and wagon under frames and running gear, upto the limit indicated in sub-para (d) below. The Purchaser will not entertain complaints regarding non-availability of work trains, but such non-availability will be reasonable ground for extension of time.

(d) **EXTENT TO WHICH PERMITTED AND LIABILITY FOR EXTRA EQUIPEMENTS**

Work trains will be made available to the Contractor on the basis of the block hours indicated in Part – III, (Para 3.18) per kilometer of track to be equipped in accordance with the final quantity of Item 1 of Schedule 1, (Section 1 to 5) for completing the work. The block hours for work trains shall be reckoned from the time the track is placed at the Contractor's disposal, at the site of work for use of the train, for any purpose permitted in sub-para (a) above, to the time it is cleared by the Contractor. The running time to and from the work spot would be excluded from such reckoning. An amount of Rs.6,000/- per work train per day or part thereof shall be paid by the Contractor to the Purchaser for any extra period for which work trains are requisitioned by him and provided by the Purchaser, over and above that required to complete works on the above basis, unless the Contractor proves to the satisfaction of the Purchaser that the additional work trains days required by him are not due to any fault or negligence on his part. The extra work train days for the purpose of this para shall be computed by dividing the overall block hours for work trains used by the Contractor in excess of what is permitted, by six ladder trolleys may be used simultaneously with work trains employed for stringing of overhead equipment or by themselves for droppering or adjustment of equipment. The use of these ladder trolleys shall not be taken into account for computation of overall block hours.

(e) INTENSIVE USE OF WORK TRAINS

The work trains provided by the Purchaser shall be intensively used, shall not be misused, under loaded or run unnecessarily. The Contractor shall fully co-operate with the Purchaser to see that the volume of work done by the work trains is commensurate with the expenses incurred on the work trains. Work trains shall be used to progress the work without gaps to the maximum extent possible. Work trains shall be moved out of block sections immediately after the materials to be distributed are unloaded or the work completed even though the block period granted for the purpose is not over. Violation of these principles will entail withdrawal of the facility of work trains and Contractor shall not be entitled to any claim on this account.

(f) CONTINUOUS USE OF WORK TRAINS

Work trains once supplied shall be used continuously. Whenever a work train is not required for a period of 3 days or more the Contractor shall be responsible to cancel the same by giving the Purchaser at least 3 days' notice in advance. If any train is subject to an idle period of a week at a time it is liable to be withdrawn. Trains or wagons if and when required for removal of spoil earth from the excavations in certain areas (specially stations) will be placed by the Purchaser free of charge, at the Contractor's disposal. Blocks granted for this purpose shall not be reckoned for the purpose of sub-para (d) above.

(g) PROGRAMME OF THE WORK TRAINS

The Contractor shall submit a chart showing the tentative programme of work for the working of various work trains for entire group within three months from the date of order to enable movement of diversion of traffic over the section to be planned well in advance.

(h) The Contractor shall submit his requirement of various types of rolling stock at least 3 months in advance of the date from which the work trains would be required for his use.

(i) MONTHLY PROGRAMME OF WORK

(ii) The Contractor shall also submit detailed monthly programme of work indicating the different sections in which the work trains would be required to work at least 10 days in advance of the month for which the programme has been submitted. In order to avoid unnecessary blocking of tracks, the Contractor shall make out the monthly programme of work considering the actual work expected to be done and his block requirements on any particular day/s which may be less than the average foreseen in para 3.18(a)

(j) LADDER TROLLEYS

In addition to work trains, the Contractor may use light ladder trolleys on tracks for carrying out installation of droppers and adjustments of traction overhead equipment. The ladder trolleys shall not weigh more than 200 kg. and should be capable of being removed from the track easily and quickly. The detailed drawings of these should be submitted within 3 months from the date of issue of Letter of Intent/Acceptance of Tender to enable the Purchaser to obtain approval from the competent authorities for the use of such trolleys on tracks, if required.

(k) In order to minimise blocking the track for work material trains the tenderer shall consider the working conditions on the sections and assess use of alternative methods of construction on a part or whole of the work. He should submit clear proposals along with financial implications if any to the Purchaser for such special methods of saving of blocks that could be obtained along with reduction/redundancy of the facilities being provided by the Railway in terms of Clauses 1.2.26, 1.2.27 and 1.2.28.

(l) Work trains not to be granted for Traction sub-station and SCADA works.

TRAFFIC BLOCKS: 1.2.28

(a) The Purchaser will make arrangements to obtain traffic blocks (hereinafter referred to as blocks) necessary for the running and operation of work trains and light ladder trolleys and track lorries for works to be carried out along or adjacent to the track (See 1.2.27 a). The Contractor shall, however, carry out maximum amount of work possible without block. Works such as grouting of traction masts, muffing, and erection of brackets shall invariably be done without blocks. Installation of droppers and adjustment of traction over-head equipment may also be permitted to be carried out with light ladder trolleys protected by banner flags in accordance with General and Subsidiary Rules of Indian Railway.

(b) Blocks will normally be granted any time during day or night to suit convenience of traffic operations. The Contractor shall equip himself to carry out all construction during night block also efficiently by suitable lighting equipment. The blocks granted will ordinarily be on one track at a time over a distance covered by one or two consecutive block sections. In case of blocks to be granted after sunset, the Contractor will be informed at least 24 hours in advance. The duration of blocks, normal and maximum, which would ordinarily be granted on different tracks and in different sections, during day and/or night time, is indicated in Part - III. Blocks shall not be availed of by the Contractor when it is not possible for him to complete the specific field work within the block period granted by the Purchaser.

(c) Block periods shall be counted from the time the track is placed at the Contractor's disposal at the work spot till it is cleared by the Contractor. All blocks asked for and granted shall be reckoned in accordance with Part 1.2.27. If by the contract completion date the total reckoned period of block works out to less than the specified number of block hours per kilometer of single track to be equipped as indicated in Part-III, the Contractor shall be eligible for corresponding extension of time for completion of the work.

(d) Blocks will normally be granted for work trains or for carrying out other work in one block section except , when the work overlaps two adjacent block sections, when blocks will be granted over both the blocks sections. The contractor shall organise the various works so as to use fully the blocks granted to him. He shall ensure that none of the equipment obstructs at any time at any track for which he has not been granted a block.

(e) The contractor shall in consultation with the Purchaser submit a weekly block programme for works or for work trains 7 days in advance of the week for which the programme has been submitted. At the end of each week a comparison shall be made between the block periods asked for by the Contractor and that availed of by the Contractor, fractions of an hour in the total being ignored.

(f) Blocks will be subject to normal operating conditions and rules of the Railway. All formalities of exchanging private numbers etc. with the traffic control will be carried out by the Purchaser's staff and for this purpose the Purchaser will depute a representative for each erection gang, who will be responsible for imposing traffic blocks and also removing the same after men, material and equipment have been cleared by the Contractor from running tracks and the same declared safe for traffic by the Purchaser's representative in case of works involving safety of running tracks.

The protection required for block working i.e. flagmen, flags etc. shall be provided by the contractor. Competency for the above shall, however, be given by the Railway authority. Protection of track by banner flags shall be done in accordance with General Rules of Indian Railways and Subsidiary Rules of the concerned zonal Railway where work is being carried out. Flagmen so deployed by the contractor shall be medically fit for A/3 category (as per Indian Rly Medical Manual); examination and certification of which shall be given by Railway Doctor. Such medical examination from Rly Doctors shall be arranged by Rly authority; prescribed fee for which shall be borne by the contractor.

(g) Blocks required for carrying out works necessitated by the thefts, pilferage, accidents or such other incidents, shall be granted by the Purchaser over and above the normal requirements of block and shall not be counted for the purpose of para 1.2.27 (d) or 1.2.28 (c).

(**h)** Traffic blocks given after energisation (see 1.2.46.1)(a) shall not be reckoned for the purposes of Para 1.2.27 (d) or 1.2.28 (c).

(i) Traffic Blocks not to be granted for Traction sub-station and SCADA works.

DEFAULT AND DELAY : 1.2.29

The contractor shall execute the work with due diligence and expedition keeping to the approved time schedule. Should he refuse or neglect to comply with any responsible orders given to him in writing by the Purchaser's Engineer in connection with the work or contravene the provision of the contract or the progress of works lags persistently behind the time schedule due to his neglect, the Purchaser shall be at liberty to give seven day's notice in writing to contractor requiring him to make good the neglect or contravention complained of and should the contractor fail to comply with the requisitions made in the notice within seven days from the receipt thereof, the purchaser shall be entitled after giving 48 hours notice in writing under the hand of the Contractor's Engineer (to rescind the contract as a whole or in part or parts as may be specified in such notice) and action would be taken as per 1.2.17 and para-19 of Preamble.

LOSS SUSTAINED DUE TO DEFAULT AND DELAY : 1.2.30

(a) In the event of any loss to the Purchaser on account of execution and/or completion of the work or any part thereof by agencies other than the contractor, in terms of para 1.2.29, the contractor shall be liable to reimburse the loss to the Purchaser without prejudice to the other rights and remedies of the Purchaser, and the reimbursement in full or in part as the case may be, shall be met, at the option of the Purchaser from out of all or any of the following sources, viz:

(i) Any amount due and payable to the contractor by the Purchaser on any account whatsoever,
(ii) The Contractor’s Security Deposit in the hands of the Purchaser as far as available; and
(iii) Any other assets whatsoever of the Contractor.

(c) (i) and/or (ii) above-mentioned the Purchaser shall have the right of appropriation suomoto.

NOTE : The above para should be read in conjunction with para 1.2.42.

CORRECTNESS OF WORK AND MATERIALS: 1.2.31

(a) The contractor shall be solely responsible for the correctness of the position, levels and dimensions of the works according to approved drawings, notwithstanding that he may have been assisted by the Purchaser or his men in setting out the same.

(b) If any dimension figured upon a drawing differs from that obtained by scaling the drawing, the figured dimension should be normally taken as correct, unless it is prima facie mistake. But all such cases shall be brought to the notice of the Purchaser's Engineers and the discrepancy set right before execution.

CONTRACTOR'S RESPONSIBILITY FOR DISCREPANCY: 1.2.32

(a) All designs and drawings submitted by the contractor shall be based on a thorough study and shall be such that the contractor is satisfied about their suitability. The Purchaser's approval will be based on these considerations, notwithstanding the approval communicated by the Purchaser, during the progress of the contract for designs and drawings, prototype samples of components, materials and equipment after inspection of materials, after erection and adjustments to installations, the ultimate responsibility for correct design and execution of work shall rest with the contractor unless the Purchaser insists on adoption of his own designs in spite of the contractor not being agreeable to it.

(**b)** The contractor shall be responsible for and shall bear and pay the costs for any alteration of works arising from any discrepancies, errors or omissions in the designs and drawings supplied by him, whether such designs and drawings have been approved by the Purchaser or not.

ADDITIONS AND ALTERATIONS TO ERECTED EQUIPMENT: 1.2.33

The Purchaser may require **ADDITIONAL INSTALLATIONS OR MODIFICATIONS OR REPLACEMENTS** as per new designs as evolved or decided during the currency of the contract to be carried out on the works he deems necessary, either during the execution or after a part or whole of the installations coming within the purview of the contract has been put into commercial service. Further it may be necessary and expedient to energies overhead equipment which has been completed and finally adjusted in portions in yards. This will necessitate erection of new equipment in the vicinity or joining energised equipment. In case the prices for such additional works or modifications or replacements are not covered by the schedule of prices and are such that either party considers additional prices for such works justified, such additional works or modifications shall be carried out by the Contractor. Any additional prices for such work items would be mutually settled between the purchaser and the contractor, based on proper rate analysis and with reference to the current prevalent market rates or the rates available with the Railway Construction Administration in that or nearby area/s. In case additional installations or modifications or replacements are required to be carried out under this para, the Purchaser shall grant a reasonable extension of time, should it be necessary.

QUANTUM OF WORK AND MATERIALS: 1.2.34

The procedure detailed below shall be adopted for dealing with variations in quantities during execution of works contracts:

Unless otherwise specified in the special conditions of the contract, the accepted variation in quantity of each individual item of the contract would be upto 25% of the quantity originally contracted, except in case of foundation work.
(ii) The Contractor shall be bound to carry out the work at the agreed rates and shall not be entitled to any claim or any compensation whatsoever upto the limit of 25% variation in quantity of individual item of works.
(iii) In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, then same shall be executed at following rates
Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;

Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;
Variation in quantities of individual items beyond 150% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.
Variation to quantities of Minor Value Item:
The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1 % of the total original agreement value.
d.(i) Quantities operated upto and including 100% of the agreement quantity of the concerned minor value item, shall be paid at the
rate awarded for that item in that particular tender;
d.(ii) Quantities operated in excess of 100% but upto 200% of the agreement quantity of the concerned minor value item, shall be paid at 98% of the rate awarded for that item in that particular tender;
d.(iii) Variation in quantities of individual minor value item beyond 200% will be avoided and would be permitted only in exceptional unavoidable circumstances and shall be paid at 96% of the rate awarded for that item in that particular tender.

(iv) In case of earthwork, the variation limit of 25% shall apply to the gross quantity of earthwork and variation in the quantities of individual classifications of soil shall not be subject to this limit.
(v) In case of foundation work, no variation limit shall apply and the work shall be carried out by the Contractor on agreed rates irrespective of any variation.
(vi) As far as SOR items are concerned, the limit of 25% would apply to the value of SOR schedule as a whole and not on individual SOR items. However, in case of NS items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).

NOTE-

(a) It is also pointed out that this variation in quantities from 1.2.34 (1) to (10) above would apply not only to works items of contracted section but also to its extensions in any direction as well as existing sidings and sidings/yard modifications etc coming up in the section during the execution of the contract.

(b) The Contractor shall, if called upon by the Purchaser, supply equipment, components, fittings and materials listed in Schedule-3,Part-V, Form-7 (Sheet -1 to 26) for OHE portion and material's column as listed in schedule-1, Section-8 to 12 for TSS and SCADA works for other requirements upto a maximum of 5% of the total value of supplies of the contract at prices included in Schedule-3 during the currency of the contract. Bulk requirements of the Purchaser under this sub-para would be intimated within 6 months from the date of issue of Letter of Acceptance of the Tender. Delivery of such materials shall be effected by the Contractor from ready stock, if available, or otherwise after procurement from the manufacturers.

(c) (i) FOR TSS WORKS : The contractor shall supply standby spares and spares components and materials for maintenance as specified in Schedule-4 & 5 and quantity included in Annexure-3, Part-IV. The supply of spares should be completed before the planned date of energisation of sub-station.

(c) (ii) FOR SCADA WORKS : -DELETED-

COMPETENT SUPERVISORS : 1.2.35

(Clause 26 to GCC): Provision of Efficient And Competent Staff At Work Sites by The Contractor

(i) The contractor shall place and keep on the works at all times efficient and competent staff to give the necessary directions to his workmen and to see that they execute their work in sound & proper manner and shall employ only such supervisors, workmen & labourers in or about the execution of any of these works are as careful and skilled in the various trades.

(ii) The contractor shall at once remove from the works any agents, permitted sub-contractor, supervisor, workman or labourer who shall be objected to by the Engineer and if and whenever required by the Engineer, he shall submit a correct return showing the names of all staff and workmen employed by him.

(iii) In the event of the Engineer being of the opinion that the contractor is not employing on the works a sufficient number of staff and workmen as is necessary for proper completion of the

works within the time prescribed, the contractor shall forthwith on receiving intimation to this effect deploy the additional number of staff and labour as specified by the Engineer within seven days of being so required and failure on the part of the contractor to comply with such instructions will entitle the Railway to rescind the contract under Para-1.2.14 of these conditions.

1.2.35A (Clause 26A to GCC) : Deployment of Qualified Engineers at work sites by the contractor :

(i) The contractor shall also employ Qualified Graduate Engineer or Qualified Diploma Engineer, based on value of contract, as may be prescribed by the Ministry of Railways through separate instructions from time to time.

(ii) In case the contractor fails to employ the Engineer, as aforesaid in Para 26 A.1, he shall be liable to pay penalty at the rates, as may be prescribed by the Ministry of Railways through separate instructions from time to time for the default period for the provisions, as contained in Para 26A.1.

(iii) No. of qualified engineers required to be deployed by the contractor for various activities contained in the works contract shall be specified in the tender documents as 'special condition of contract' by the tender inviting authority.'

Note: (i) In terms of provisions of new clause 26A.1 to the General Conditions of Contract (GCC), Contractor shall also employ following qualified Engineers during execution of the allotted work :

(a) One qualified Graduate Engineer when cost of work to be executed is Rs. 200 lakh and above, and

(b) One qualified Diploma Holder Engineer when cost of work to be executed is more than Rs. 25 lakh, but less than Rs. 200 lakh.

(ii) Further, in case the contractor fails to employ the qualified engineer, as aforesaid in para (i) above, he, in terms of provisions of Clause 26A.2 to the General Conditions of contract, shall be liable to pay an amount of Rs. 40,000/- and Rs. 25,000/- for each month or part thereof for the default period for the provisions, as contained in Para (i)(a) and (i)(b) above respectively.

(iii) Provision for deployment of Qualified Engineers (Graduate Engineer or Diploma Holder Engineer) shall be for the values as prescribed above. However, for the works contract tenders, if it is considered appropriate by the tender inviting authority, not to have the services of qualified engineer, the same shall be so mentioned in the tender documents by the concerned Executive with the approval of Officer not below the level of SAG Officer, for reasons to be recorded in writing.

TRAINING OF PURCHASER'S STAFF: 1.2.36

The Contractor shall train, free of charge, in a manner mutually agreed between the Purchaser and Contractor, such staff of the Purchaser as may be deputed by him and the wages and allowances and all other associated expenses of such staff shall be paid by the Purchaser.

WORK BY OTHER AGENCIES: 1.2.37

(a) Any other works undertaken at the same time by the Purchaser or the Railway direct or through some other agencies at the same time or section where the Contractor is carrying out his work will not entitle the Contractor to prefer any claim regarding any delays or hindrances he may have to face on this account but the Purchaser shall grant a reasonable extension of time to the Contractor. The Contractor shall comply with any instruction which may be given to him by the Purchaser in order to permit simultaneous execution of his own works and those undertaken by other Contractors or the Railway without being entitled on this account to any extra charge.

(**b)** The Contractor shall not be entitled to any extra payment due to hindrance resulting from normal Railway operations, such as delay on account of adequate number of and duration of

blocks not being granted, operational delay in movement of work trains etc. but the Purchaser shall grant a reasonable extension of time to the Contractor.

(c) The Contractor shall take note that owing to works being carried out by the Purchaser and others, there may be breaks in the Continuity of the locations for work owing to works such as track remodeling being undertaken. But the Contractor shall not be entitled to claim any extra payment on account of such breaks. However, such breaks in the continuity of work would be reasonable ground for extension of completion date/s for the work.

(d) If the Purchaser is unable to supply materials to the Contractor as specified in the contract, in time, the Contractor shall not be entitled to any extra payment on account of such delay in supply. However, such delays in supply will be reasonable ground for extension of completion date/s for the work.

(e) In cases where the lines to be electrified are not in their final position, the Purchaser will furnish the remodelling plans for such lines to the Contractor and/or peg out the altered or remodelled position of the tracks to be electrified to enable preparation of designs and assessment of quantities of components required for the work. However, the Contractor may not undertake field work on such track till they are in final position. The Contractor shall not be entitled to any compensation in case of delay in such remodeling work, but the Purchaser will grant a reasonable extension of the time for completion.

(f) In course of checking the overhead equipment layout plans, the Contractor shall prepare a list of infringements, if any exist, and advise the Purchaser in time. The Purchaser will arrange for removal of these infringements. The works which will be carried out by the Purchaser are detailed below.

i) Alterations of slewing of tracks to accommodate traction structures of overhead equipment or to suit the Railways requirement.

ii) Alterations to over-bridge, tunnels, foot-over bridges and irrigation troughs, raising of bridges or troughs, or lowering of track to give sufficient clearance for overhead equipment.

iii) Protection at over bridges to prevent accidental or malicious interference with overhead equipment.

iv) In cuttings, any work necessary to provide clearance for traction structures.

v) At viaducts and bridges, any alterations required to enable traction structure to be accommodated.

vi) Alterations to station buildings, signal gantries, signal cabins and other similar constructions, which may be required for erection of overhead equipment, with requisite electrical clearances.

vii) Deleted.

viii) Removal of signal, telegraph, power lines and guys to enable overhead equipment to be erected, with requisite electrical clearances.

ix) Any blasting work required for excavation in rock other than for foundations.

x) Any rail strapping or other similar work/s necessary for the installation of track structures and overhead equipment on bridges and over-bridges.

xi) Any special steel work and fittings for attachment for masts/portals on steel girder or other bridges, or for attachment to other non-traction structures of the Railway for carrying or anchoring overhead equipment conductors.

xii) Dismantling and drilling of piers of bridges and walls, supply and grouting of dowel pins or holding down bolts, in the piers of bridges or walls.

xiii) Clearing the way and removing all infringements for erection of 25KV feeder lines from grid sub-stations.

xiv) Chopping/trimming of tree branches required for erection of Overhead equipment shall be done by the contractor. At least four metes clearance shall be made available before 25KV charging between the nearest OHE Structures and the tree branches. Also to ensure that there are no loose tree branches nearby or overhead which are likely to fall on the live OHE. However cutting of the trees is NOT covered under this sub clause.

(g) In the course of checking layout plans and general arrangement drawings for switching and/or booster stations, the Contractor shall prepare a list of infringements if any exist, and advise the Purchaser in time. The Purchaser will arrange for removal of these infringements at his own cost.

ACCESS TO WORK SITE : 1.2.38

(a) Access to the site for the purpose of this contract shall be accorded to the Contractor by the Purchaser at all times. In the execution of the work no person other than the Contractor or his duly appointed representative or approved sub-contractor and bonafide workmen shall have access to the site. Access to the site of work at all times shall be allowed by the Contractor to officials or approved representatives of the Purchaser or to Railway staff for purpose of maintenance.

(b) The Purchaser or his authorised representative shall have the right to refuse admission to the work site of any person employed by the Contractor whom the Purchaser or his Engineer may consider undesirable.

(c) The Purchaser or his Engineer shall be at liberty to object to the employment of any person as Contractor's Agent/ Representative, approved Sub-contractor's supervisors, workmen or labourer for execution of this contract on the ground of misconduct, incompetence or negligence. The Contractor on receipt of notice of such objection in writing from the Purchaser or his Engineer shall forthwith remove the person so objected to and provide in his place any other competent person and shall not allow the persons so objected to, to enter the site of work subsequently or remain in the execution of the contract. The Purchaser will not be liable to pay any cost or damage on this account.

(d) While finalizing the general arrangement and layout of subsections, the Contractor shall prepare a list of infringements, if any, which have to be removed, and incorporate the list in the said drawings. The Contractor will arrange for the removal of such infringements at his own cost.

INFRINGEMENT OF PATENTS : 1.2.39

(a) The Contractor is forbidden to use any patents or registered drawings, processes or patterns in fulfilling his contract without the previous consent in writing of the owner of such patents, drawings, patterns or trade marks, except where these are specified by the Purchaser himself. Royalties where payable for the use of such patented processes, registered drawings or patterns shall be borne exclusively by the Contractor. The Contractor shall advise the Purchaser of any proprietary rights that may exist on such processes, drawings or patterns which he may use of his own accord.

(b) In the case of patents taken out by the Contractor of the drawings or patterns registered by him, or of those patents, drawings or patterns for which he holds a licence, the signing of the contract automatically gives the Purchaser the right to repair by himself the purchased articles covered by the patent or by any person or body chosen by him and to obtain from any sources he desires the component parts required by him in carrying out the repair work. In the event of infringement of any patent rights due to above action of the Purchaser, he shall be entitled to claim damages from the Contractor on the grounds of any loss of any nature which he may suffer e.g., in the case of attachment because of counterfeiting.

(c) **INDEMNIFICATION BY CONTRACTOR**

In the event of any claim or demand being made or action being brought against the Purchaser for infringement of letters patent in respect of any equipment, machine, plant, work or thing used or supplied by the Contractor under this contract or in respect of any method of using or working by the Purchaser of such equipment, machine, plant, work or thing, the Contractor shall indemnify the Purchaser and keep him indemnified and harmless against all claims, costs, charges and expenses arising from or incurred by reason of such claim provided that the Purchaser shall notify the Contractor immediately after any claim is made and that the Contractor

shall be at liberty, if he so desires with the assistance of the Purchaser if required but at the Contractor's expense, to conduct all negotiations for the settlement of the same or any litigations that may arise therefrom and PROVIDED THAT no such equipment, machine, plant, work or thing, shall be used by the Purchaser for any purpose or in any manner other than that for which they have been supplied by the Contractor and specified under this contract.

INSURANCE : 1.2.40

(a) The Contractor shall take out and keep in force a policy or policies of insurance against all liabilities of the Contractor or the Purchaser at common law or under any statute in respect of accidents to persons who shall be employed by the Contractor in or about the site of the Contractor's Offices for the purpose of carrying out the works on the site. The Contractor shall also take out and keep in force a policy or policies of Insurance against all recognised risks to their offices and depots. Such insurance shall in all respects be to the approval of the Purchaser and if he so requires in his name.

(b) INSURANCE OF MATERIALS AND INSTALLATIONS

The Contractor shall take out and keep in force a policy or policies of insurance for all materials in storage and traction installations excluding foundations under erection and/or erected until such materials and installations are provisionally handed over to the Purchaser. For this purpose, the traction installations in a section (See para 1.2.46) shall be deemed to have been provisionally handed over, when a Provisional Acceptance Certificate is issued for the section or the traction installations in the section are commissioned or on the expiry of three months after installations are given ready in all respect for handing over as per Para 1.2.46.1(a) & 1.2.46.2(a), whichever is earlier, for commercial use. The Contractor shall not be liable for losses, damages to equipments erected in the course of erection or in store at the Contractor's depot, in consequence of mutiny or other similar cause over which the Contractor has no control and which cannot be insured. Such losses or damages shall be the liability of the Purchaser and if required by the Purchaser, be made good by the Contractor, at the cost of Purchaser.

Note: *It may be noted that the beneficiary of the insurance policy should be Rlys or the policies should be pledged in favour of Railways. The contractor shall keep the policy/policies current till the installations are provisionally handed over to the purchaser. It may also be noted that in the event of contractor's failure to keep the policy current and alive, renewal of the policy will be done by the purchaser, for which the cost of the premium will be recovered from the contractor as per the procedure laid down in clause 1.3.10 Pt. I Chapter-IIIA for OHE, 1.3.9 Pt.I Chapter-IIIB for TSS & 1.3.9 Pt. I Chapter-IIIC for SCADA.*

(c) The Contractor should, however, insure the stores brought to site, against risks in consequence of war and invasion, as required under the Emergency Risk (goods) Insurance Act in force from time to time.

NOTE: Deleted.

(d) The Contractor shall take out all insurance covers in connection with this contract with Government recognised Insurance Companies.

(e) Deleted.

(f) For purpose of enabling the Contractor to take the insurance cover in connection with this contract, the Purchaser will advise the approximate price of all the Railway supply materials two months before the same are handed over to the Contractor at his depot. However, the recovery in case of shortages of such materials will be made in accordance with provisions specified in Note at the end of Para 1.4.6.(f), Pt. I, Chapter IVA, 1.4.5.(c), Pt. I, Chapter IVB & 1.4.5.(a), Pt. I, Chapter IVC.

ACCIDENTS : 1.2.41

(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 thereunder 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.

(c) The Contractor's liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by bad design, workmanship, material or negligence on the part of the Contractor and further the liability of the Contractor will be limited to Rs. 25 lacks for any one accident.

(d) The Contractor shall be responsible for all repairs and rectification of damages to traction installations erected or under erection due to railway accidents, thefts, pilferage or any other cause, without delay to minimise or to avoid traffic detentions, in a section until the installations are provisionally handed over to the Purchaser (See para 1.2.46).

(e) CLEARING DAMAGED INSTALLATIONS

The Contractor shall at his cost arrange for expeditious clearing of the railway track/s of traction installations obstructing or fouling the track/s when they are damaged as a result of railway accident or any other cause, upon the oral/telephonic/written instructions from the Purchaser's representative, until installations are provisionally handed over to the Purchaser. If the Contractor fails to clear the tracks expeditiously and within reasonable time, the Purchaser will arrange to clear the track/s or the damaged installations and recover the expenses incurred from the Contractor, If during such clearance operations further damage is caused to the installations, the Purchaser is not liable to reimburse the Contractor the cost of such further damage in the installations.

(f) The Contractor shall arrange for temporary slewing of overhead equipment for crane operation for derailment of rolling stock due to accidents for which the Contractor is not responsible, if required by the Railway or the Purchaser, at the cost of the Purchaser (Item 31 of Schedule 1, Section-1) until the installations are provisionally handed over to the Purchaser. If the Contractor fails to slew the overhead equipment within reasonable time the Purchaser will arrange to slew the equipment and recover the extra expenses, if any incurred from the Contractor. After the crane operations are completed, the Contractor shall restore the overhead equipment to its normal positions.

NOTE for sub-para (d) & (e) :

For the works mentioned in (d) and (e) above the Contractor will be granted blocks and work train/s will be made available to him over and above the normal requirements of block and work train(s) which shall not be counted for the purpose of Para 1.2.27(d) or 1.2.28(c) [See para 1.2.28 (g)].

CONTRACTOR'S LIABILITY FOR COSTS AND DAMAGES : 1.2.42

(a) WITHHOLDING AND LIEN IN RESPECT OF SUMS CLAIMED.

Whenever any claim or claims for payment of a sum of money arises out of or under the Contract against the Contractor, the Purchaser shall be entitled to with hold and also have lien to retain such sum or sums in whole or in part from the Security, if any, deposited by the Contractor and for the purpose aforesaid, the Purchaser shall be entitled to withhold the said cash security deposit or the security if any, furnished as the case may be and also have lien over the same pending finalisation or adjudication of any such claim. In the event of the Security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, the Purchaser shall be entitled to withhold and have lien to retain to the extent of such claim amount or amounts referred to supra, from any sum or sums found payable or which at anytime thereafter may become payable to the Contractor under the same contract or any other Department of the Central Government pending finalisation or adjudication of any such claim. It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to by the Purchaser till the claim arising out of or under the contract is determined by the Arbitrator (if the contract is governed by the Arbitration clause) or by the competent court as the case may be and that the Contractor will have no claim for

interest or damages whatsoever or any account in respect of such withholding or retention under the lien referred to supra and duly notified as such to the Contractor. If the Contractor is a partnership firm or a limited company, the Purchaser shall be entitled to withhold and also have lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company, as the case may be, whether in his individual capacity or otherwise.

(b) LIEN IN RESPECT OF OTHER CONTRACTS

Any sum or sums of money due and payable to the Contractor (including the security deposit returnable to him) under the Contract may be withheld or retained by way of lien by the Purchaser against any claim of this or any other Railway or any other Department of the Central Government in respect of payment of a sum of money arising out of or under any other contract made by the contractor with this or any other Railway or any other department of the Central Government.

(c) It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Purchaser will be kept withheld or retained as such by the Purchaser till the claim arising out of or under any other contract is either mutually settled or determined by the Arbitrator, if the other contract is governed by the Arbitration clause or by the competent court as the case may be, and that the Contractor shall have no claim for interest or damages whatsoever on this account or any other grounds in respect of any sum of money withheld or retained under this clause and duly notified to the Contractor .

SAFETY MEASURES : 1.2.43

(a) The Contractor shall take all precautionary measures in order to ensure the protection of his own personnel moving or working on the Railway premises, but shall then conform to the rules and regulations of the Railway. If and when, in the course of the work there is likely to be any danger to persons in the employment of the Contractor due to running traffic while working in the Railway siding and premises, the Contractor shall provide necessary protection i.e. Flagmen, Flag etc. required in block working. Competency for the above shall, however, be given by the Railway authorities. The Purchaser shall remain indemnified by the Contractor in the event of any accident occurring in the normal course of work, arising out of the failure of Contractor or his men to exercise reasonable precaution at all places of work . The Contractor shall be responsible to take all precautions to ensure the safety of the public whether on public or railway property and shall post such look out men as may, in the opinion of the Engineer, be required to comply with regulations appertaining to the work. Contractor shall ensure placement of barricading / partitions at the place of work to ensure safety of habitants of adjacent area, failing which Engineer may advise stoppage of work as per his discretion

(c) (i)Blasting of rock for foundation work shall be done only after due notice is given to the Purchaser and time/s and date/s for blasting operations agreed to by the Purchaser. Blasting, if required to be done in the vicinity of the track, shall not be undertaken until the Purchaser's flagmen on duty take necessary steps to protect trains and the track is adequately protected by the Contractor against damage by blasted rock. The Contractor shall follow detailed instructions which will be issued to him regarding blasting operations in the vicinity of tracks. He flagmen for protection of trains and the Track in such cases will be appointed by the purchaser and no expenses on this account will be charged from the contractor.

(ii) Explosives shall not be used on the works or on the site by the Contractor without the permission of the Engineer and then also only in the manner and to the extent to which such permission is given. Where explosives are required for the works, they shall be stored in a special magazine to be provided by and at the cost of the Contractor in accordance with the Explosive Rules. The Contractor shall obtain the necessary license for the storage and the use of explosives. All operations in which or for which explosives are employed shall be at the sole risk and responsibility of the Contractor and the Contractor shall indemnify the Railway in respect thereof

(c) During stringing operations every care shall be taken to prevent conductors hanging low over tracks on which traffic block has not been given. All conductors shall be pulled out before traffic block is cleared so that such conductors do not infringe with moving traffic.

(d) Ladder trolleys shall be used with caution. They shall not be put on tracks until the flagmen are on duty to protect the trolleys and the Purchaser's representative authorises in writing for the

trolleys to be put on the tracks. Ladder trolleys shall be promptly removed on instructions from the Purchaser's representative and well in advance of trains. No claims shall rest on the Purchaser in the event of a ladder trolley being run over by train. The flagmen for the above job will be provided by the contractor.

Competency for the above shall, however, be given by the Railway authority. Protection of track by banner flags shall be done in accordance with General Rules of Indian Railways and Subsidiary Rules of the concerned zonal Railway where work is being carried out. Flagmen so deployed by the contractor shall be medically fit for A/3 category (as per Indian Rly Medical Manual); examination and certification of which shall be given by Railway Doctor. Such medical examination from Rly Doctors shall be arranged by Rly authority; prescribed fee for which shall be borne by the contractor.

(e) The Contractor shall abide by all Railway regulations in force for the time being and ensure that the same are followed by his representatives, Agents or Sub-contractors or workmen. He shall give due notice to his employees and workers about provision of the para.

(f) While working within station limits, especially on passenger platforms, the Contractor shall ensure that at all times sufficient space is left for free movement of passenger traffic. He must cover and/or barricade the excavations carried out in such areas and continue to maintain these till the work is completed, with a view to avoid any accident to public or to Railway staff.

(g) The works must be carried out most carefully without any infringement of the Indian Railway Act or the General and Subsidiary Rules in force on the Railway in such a way that they do not hinder Railway Operation or affect the proper functioning or damage any Railway equipment, structure or rolling stock except as agreed to by the Purchaser, provided that all damage and disfiguration caused by the Contractor to any Railway property must be made good by the Contractor at his own cost failing which cost of such repairs shall be recovered from the Contractor.

(h) If safety of track or track drainage etc. is affected as a consequence of works undertaken by the Contractor, the Contractor shall take immediate steps to restore normal conditions. In case of delay, the Purchaser shall, after giving due notice to the Contractor in writing, take necessary steps and recover the costs from the Contractor.

(j) Moreover, if any time the works to be carried out directly concern the safety of trains, the Contractor's staff must comply fully with the Railway regulations given to him by the authorised Railway staff. The Contractor's employees and workers may for no reason operate an installation concerning train safety or train movement. They shall notify the authorised representative of the Purchaser who will take all necessary steps in this regard.

(k) The Contractor shall be responsible for safe custody of all equipments till provisional acceptance.

(l) The Contractor's liability to meet third party claims of the type outlined above will be applicable only in cases where accidents have been caused by bad design, workmanship, material or negligence on the part of the Contractor and further the liability of the Contractor will be limited to Rs. 25 lacks for any one accident.

(m) The Contractor shall ensure that unauthorised, careless or inadvertent operation of switchgear, which may result in accident to staff and/or damage to equipment, does not occur.

(n) The Contractor shall abide by all instructions issued by the Purchaser from time to time in connection with protection/safety of track/Railway installations/personnel as well as quality control. The Contractor should not leave the excavated pits unfilled overnight. Due to any reason if it become necessary to leave the pit unfilled overnight, it should be filled back effectively with sand bags to the satisfaction of the Purchaser's representative.

(o) The Contractor shall obtain a valid electrical contractor license for LT/HT/EHT of voltage equal to OR more than 110/132/200KV as applicable from the concerned statutory authority before taking up the physical execution of work and submit a copy of the same to concerned Rly Electrification project in-charge.

RECOVERY FOR DELAY IN COMPLETION: 1.2.44

Extension of Time for delay due to Contractor:
(i) With liquidated Damage (LD): The time for the execution of the work or part of the works specified in the contract documents shall be deemed to be the essence of the contract and the works must be completed not later than the date(s) as specified in the contract. If the Contractor fails to complete the works within the time as specified in the contract for the reasons other than the reasons specified in Clause 17 and 17-A of GCC, the Railway may, if satisfied that the works can be completed by the Contractor within reasonable short time thereafter, allow the Contractor for further extension of time (Proforma at FORM-17) as the Engineer may decide. On such extension the Railway will be entitled without prejudice to any other right and remedy available on that behalf, to recover from the Contractor as agreed damages and not by way of penalty for each week or part of the week, a sum calculated at the following rates of the contract value of the works.

For the purpose of this Clause, the contract value of the works shall be taken as value of work as per contract agreement including any supplementary work order/contract agreement issued. Provided also, that the total amount of liquidated damages under this condition shall not exceed 5% of the contract value or of the total value of the item or groups of items of work for which a separate distinct completion period is specified in the contract.

S.No.	Duration of extension of time under Clause 17-B of GCC	Rate of Penalty
(i)	Up to Twenty percent of original period of completion including period of extension of DOC granted under Section 17A(i) of GCC	As decided by Engineer, between 0.01% to 0.10% of contract value for each week or part of the week
(ii)	Above Twenty percent but upto Thirty percent of original period of completion including period of extension of DOC granted under Section 17A(i) of GCC	0.20% of contract value for each week or part of the week
(iii)	Above Thirty percent but upto Forty percent of original period of completion including period of extension of DOC granted under Section 17A(i) of GCC	0.30% of contract value for each week or part of the week
(iv)	Above Forty percent of original period of completion including period of extension of DOC granted under Section 17A(i) of GCC	0.50% of contract value for each week or part of the week

Provided further, that if the Railway is not satisfied that the works can be completed by the Contractor and in the event of failure on the part of the contractor to complete the work within further extension of time allowed as aforesaid, the Railway shall be entitled without prejudice to any other right or remedy available in that behalf, to appropriate the contractor's Security Deposit and rescind the contract under Clause 1.2.14 of these Conditions, whether or not actual damage is caused by such default.

EXTENSION OF TIME: 1.2.45

If such a failure as aforesaid shall have arisen from any cause which the Purchaser may admit as being a reasonable ground for extension of time, the General manager/Chief Administrative officer or his successor(s)/ nominee shall allow such additional time as he may in his absolute discretion consider to be reasonably justified by the circumstances of the case. Such extension shall be granted by the Purchaser in the Form No.18 (Part-V).The Contractor will apply for extension at least two months before the expiry of the period of completion.

PROVISIONAL ACCEPTANCE: 1.2.46

For OHE and TSS works : 1.2.46.1

(a) Immediately after completion of works at each switching/booster station/TSS or after completion of work in a section of overhead equipment between two consecutive switching stations including the works of he said switching stations hereinafter referred to as a sub-group, the Contractor shall certify and advise the Purchaser in writing that the section/stations are (i) Complete (ii) ready for satisfactory commercial service and (iii) ready to be handed over. He will also place at the disposal of the Purchaser the required staff for checking it and putting it into operation.

(b) The test or tests as stipulated in part - II, Chapter VII of the specification excluding power collection tests which would be carried out subsequently in connection with the taking over by the Purchaser of the equipment and installations shall be carried out jointly by the Purchaser and the Contractor within a month after the receipt of the Contractor's notifications, as stated in sub-para above.

(c) After inspection and satisfactory conclusion of tests and when the Purchaser is satisfied with the satisfactory working of the installations he will issue a `Provisional Acceptance Certificate' which would be signed by both the parties. The Provisional Acceptance Certificate will not be withheld for any minor defects.

(d) Should the result/s of inspection and the test/s be not satisfactory, an extension of one month will be granted to the Contractor to make good the defects and deficiencies pointed out by the Purchaser. Fresh inspection and tests will then be carried out after the Contractor has attended to the defects and deficiencies. If these tests are also not satisfactory, the Purchaser may proceed at the Contractor's expenses by all means deemed expedient, to have the installation made satisfactory until they comply with the specifications and approved drawings and designs.

(e) In such a case, or in case of delay in completing the work under this Contract within the time limit, the Purchaser reserves the right if he deems it possible to use in a reasonable manner any section or any part of the section even if some installations of the sections are not completely erected. The Purchaser will give to the Contractor for this purpose seven days previous notice. The Contractor shall then take at his own expense all necessary steps to complete the works in accordance with the provisions of the contract. In case it becomes impossible to proceed with the above mentioned taking over tests, for reasons other than for which the Contractor is responsible, the "Provisional Acceptance Certificate" shall be issued at or within a mutually agreed reasonable period not exceeding three months after completion of the relevant sections as indicated in sub-para/s above.

NOTE *1) : Provisional Acceptance Certificate for each section/ Sub-group will be issued immediately after all tests (excluding power collection tests) are completed to the satisfaction of the Purchaser. Should the Purchaser be unable to complete the tests and energisation of the line within a reasonable time which shall not exceed one month from the date of Contractor's notification, the issue of Provisional Acceptance Certificate shall not be delayed and shall be issued within a maximum time of three months after notification under para 1.2.46.1(a) has been given. The power collection tests shall normally be carried out for the entire group/s within three months of the date of energisation of the last section in the group/s.*

(2) The issue of Provisional Acceptance Certificate shall not be withheld for rectification of minor defects which may reasonably be considered not essential for introduction of commercial service and operation of installation. In such cases, only the value of materials and cost of rectification of minor defects shall be withheld from the payments of Provisional Acceptance until rectification is completed.

***(3**) Break down maintenance shall continue to be done by OHE contractor even after issue of PAC till CRS inspection. Payments for materials (contractor supply) used during Break down maintenance done after issue of PAC shall be made at Sch-3, Form-7(Sh. 1 to 26) for OHE rates of the contract. Rly supply materials shall be given by Rly.*

For this purpose, payments shall continue to be made even after PAC payments. Damaged materials during break down shall be handed over by the contractor to Rly.

For SCADA works : 1.2.46.2 -DELETED-

DEFECTIVE EQUIPMENTS TO BE CHANGED: 1.2.47

(a) Notwithstanding the issue of Provisional Acceptance Certificate and partial or full use of any equipment, if the completed equipment or any portion thereof before it is finally taken over at the end of the guarantee period be found to be or to have become defective in course of usage by the Railway due to faulty material, design or workmanship, or otherwise fails to fulfill the requirement of the Contract and/or its purpose, the Purchaser shall normally give the Contractor prompt notice setting forth the particulars of each defects or failure and the Contractor shall forthwith make the defects good or modify or replace the equipment, as may be directed by the Purchaser's Engineer, at his own cost in all respects to make it comply satisfactorily with the said requirements. Should the Contractor fail to do within a reasonable time the service of the said notice upon him or should time not permit of service of such notice, the Purchaser may repair or reject and replace the whole or part of such defective equipment as the case may be, at the cost of the Contractor. The Contractor's full liability under this clause shall be satisfied by the payment to the Purchaser of the extra total cost, if any, of such replacement delivered and erected as provided for in the original Contract, such extra cost being the ascertained difference between the price paid by the Purchaser under the provisions above mentioned for such replacement and the Contractor's price for the plant so replaced, plus the sum, if any, paid by the Purchaser to the Contractor in respect of such defective equipment. Should the Purchaser not so replace the rejected equipment within a reasonable time, the Contractor's liability under this clause shall be satisfied by the repayment by the Contractor of all moneys paid by the Purchaser to him in respect of such rejected equipment. Rejected/defective materials shall be returned to the Contractor to the extent possible.

(b) Provisions of this para will apply only in respect of the equipments and components supplied by the Contractor or his sub-Contractor.

USE OF REJECTED EQUIPMENT : 1.2.48

In the event of such rejection as aforesaid, the Purchaser shall, without prejudice to his other rights and remedies and, in particular, without prejudice to his rights under the clause just preceding, be entitled to the use of the rejected equipment for a time reasonably sufficient to enable him to obtain other replacement equipment. During such period, if the rejected equipment is used commercially, the Contractor shall not be entitled to the payment on energisation (1.2.14) until such rejected equipment is rectified and/or replaced, but the Purchaser shall not be entitled to claim any damages arising out of rejected equipment in respect of such period..

GUARANTEE : 1.2.49

(a)(i) **FOR OHE Works:-** The Contractor shall guarantee satisfactory working of the installations erected by him for a period of **eighteen months** from the date of commercial operation or from the date of provisional Acceptance of each section (1.2.46.1) by the Purchaser whichever is **later**. The guarantee for spares should be coincident with the guarantee for erected equipment.

(ii) **FOR TSS Works:-** The Contractor shall guarantee satisfactory working of the installations erected by him for a period of **thirty six months** from the date of commercial operation or from the date of provisional Acceptance of each section (1.2.46.1) by the Purchaser whichever is **later**. The guarantee for spares should be coincident with the guarantee for erected equipment.

(iii) **FOR SCADA Works:-** -DELETED-

(b) During the period of guarantee the Contractor shall keep available an experienced engineer and necessary equipment to attend to any defective installations resulting from defective erection and/or defects in the equipment supplied by the Contractor. This engineer shall not attend to rectification of defects which arise out of normal wear and tear and come within the purview of routine maintenance work. The Contractor shall bear the cost of modifications, additions or substitutions that may be considered necessary due to faulty materials, design or workmanship for the satisfactory working of the equipment. The final decision shall rest with the General Manager/Chief Administrative officer or his successor(s)/ Nominee.

(c) During the period of Guarantee the Contractor shall be liable for the replacement at site of any parts which may be found defective in the equipment whether such equipment be of his own manufacture or those of his sub-contractor, whether arising from faulty design, materials, workmanship or negligence in any manner on the part of the Contractor provided always that such

defective parts as are not repairable at site are promptly returned to the Contractor if so required by him at his (Contractor's) own expenses. In case of type defects in Contractor's equipment and components detected during guarantee period, Contractor should replace all such items irrespective of the fact whether all such items have failed or not. The Contractor shall bear the cost of repairs carried out on his behalf by the Purchaser at site. In such a case, the Contractor shall be informed in advance of the works propose to be carried out by the Purchaser.

(d) If it becomes necessary for the Contractor to replace or renew any defective portion of the equipment under the para aforesaid then the provisions of the said para shall also apply to the portions of the equipment so replaced or renewed until the expiration of six months from the date of such replacement or renewal or until the end of the above mentioned period (see sub-para 1.2.49(a)) whichever is later. Such extension shall not apply in case of defects of a minor nature, the decision of the General Manager or his successor/nominee being final in the matter. If any defect be not remedied within a reasonable time during the aforesaid period the Purchaser may proceed to do work at the Contractor's risk and expense, but without prejudice to any other rights and remedies which the Purchaser may have against the Contractor in respect of such defects or faults.

(e) The repaired or renewed parts shall be delivered and erected on site free of charge to the Purchaser.

(f) Any materials, fittings, components or equipments supplied under 1.2.34 shall also be covered by the provisions of this paragraph. The liability of the Contractor under the guarantee will be limited to re-supply of equipments, components and fittings made under 1.2.34. Such re-supply shall be effected at the Contractor’s depot or, in the event of closure of the depot, at the stores depot of the Engineer-in-charge of maintenance of overhead equipment of the section covered by the contract.

(g) In the case of materials, components, fittings and equipments supplied by the Purchaser under 1.2.20.1 (b) for OHE & 1.2.20.2(a) for TSS & SCADA, no liability will rest on the Contractor for failures on account of defective materials or workmanship and for any consequential damages. Such defective materials, if not yet erected on line, will be returned by the Contractor to the Purchaser and such quantities will be considered for the purpose of final reconciliation over and above allowance as per part-I, Chapter IV.

FINAL ACCEPTANCE : 1.2.50

(a) The final acceptance of the entire equipment installed on the Group shall take effect from the date of expiry of the period of guarantee as defined in paragraph 1.2.49 of the expiry of the last of the respective periods of guarantee of various sections for which provisional Acceptance Certificates are issued or brought into commercial operation, provided in any case that the Contractor has complied fully with his obligations under clause 1.2.49 in respect of each section of the Group, provided also that the attention has been paid by way of maintenance by the Purchaser.

(b) If on the other hand the contractor has not so complied with his obligation under para 1.2.49 in respect of any section, the Purchaser may either extend the period of guarantee in respect of that section until the necessary works are carried out by the Contractor or carry out those works or being them carried out suo moto on behalf of the Contractor at the Contractor's expenses. After expiry of the period of guarantee for each section, a certificate of final acceptance for the section shall be issued by the Purchaser and the last of such certificate will be called the last and final acceptance certificate. The contract shall not be considered as completed until the issue of final acceptance certificate by the Purchaser.

(c) The Purchaser shall not be liable to the Contractor for any matter arising out of or in connection with the contract or execution of the work unless the Contractor shall have made a claim in writing in respect thereof before the issue of final acceptance certificate under this clause.

(d) Notwithstanding the issue of final acceptance certificate, the Contractor and the Purchaser (subject to sub-clause as above) shall remain liable for fulfillment of any obligation incurred under the provision of the contract prior to the issue of final acceptance certificate which remains unperformed at the time such certificate is issued and for determining the nature and extent of such obligation the contract shall be deemed to remain in force between the parties hereto.

PAYMENT : 1.2.51

Payments will be governed by the terms specified in Part-I, Chapter IIIA for OHE, Chapter IIIB for TSS & Chapter IIIC for SCADA and in accordance with accepted Schedule of Prices, read with relevant paras of the other parts and Chapters of the Tender Papers. The Purchaser retains the right to withhold money due to the Contractor arising out of this contract for any default of the Contractor from other contracts which the Contractor may have with the Government of India.

(i) The Contractor shall, whenever required, produce or cause to be produced for examination by the Purchaser any quotation/ invoice, cost of other account, book of account, voucher, receipt letter, memorandum paper or writing or any copy of or extract from any such document and also furnish information and returns verified in such manner as may be required in any-wise relating to the execution of this contract or relevant for verifying or ascertaining the cost of the execution of this Contract (the decision of the Purchaser on the question of relevancy of any documents, information or return being final and binding on the parties). The Contractor shall similarly produce vouchers etc., if required, to prove to the Purchaser, that materials supplied by him are in accordance with the specifications laid down in the contract.

(ii) If any portion of the work be carried out by a sub-contractor or any subsidiary or allied firm or company the Purchaser shall have power to secure the books of such Sub-contractor or any subsidiary or allied firm or company, through the Contractor, and such books shall be open to his inspection. The Contractor should seek prior permission from the Purchaser for subletting whole and/or part of the work to any sub-contractor.

(iii) The obligations imposed by sub-clauses (i) and (ii) above are without prejudice to the obligation of the Contractor under any statute, rules or order binding to the Contractor or other conditions of the Contract.

(iv) It is an agreed term of the contract that the Purchaser reserves to itself the right to carry out post-payment Audit and/or technical examination of the works and the final bill, including all supporting vouchers, abstracts etc. and to make a claim on the Contractor for the refund of any excess amount paid to him if as a result of such examination any overpayment to him is discovered to have been made in respect of any work done or alleged to have been done by him under the contract.

(v)(a) QUARTERLY STATEMENT OF CLAIMS

The Contractor shall prepare and furnish to the Engineer once in every quarter commencing from the month following the month of issue of Letter of Acceptance an account giving full and detailed particulars of all claims for any additional expense to which the Contractor may consider himself entitled and of all extra or additional works ordered by the Engineer which he has executed during the preceding quarter and no claim for payment for any such work will be considered which has not been included in such particulars.

(b) SIGNING OF NO CLAIM CERTIFICATE

The Contractor shall not be entitled to make any claim whatsoever against the Railway under or by virtue of arising out of this contract, nor shall the Railway entertain or consider any such claim, if made by the Contractor, after he shall have signed a " No claim certificate "in favour of the Railway in such forms as shall be required by the Railway, after the works are finally measured up. The Contractor shall be debarred from disputing the correctness of the items covered by the "No claim certificate "or demanding a reference to arbitration in respect thereof.

SITE CLEARANCE : 1.2.52

(a) At the end of each spell or work and on completion of the work, the Contractor shall, as a part of his contractual obligation, leave the tracks, switching/ booster station sites and their approaches, store yards etc. Cleared of rubbish and obstruction of all kinds according to the instructions of the Purchaser's Representatives. Besides, he shall take all necessary steps in the course of the execution of the works to avoid the presence of loose earth and ballast on platforms, in drainage on the track formation and pathways in the vicinity. If within a fortnight of completion of the

particular item of site work the refuse is not cleared, the Purchaser will arrange to get them removed at the cost of the Contractor. However, before the Purchaser actually gets the site cleared he shall send intimation in writing to the Contractor expressing his intention.

(b) The storage of equipment, tools and machinery used by the Contractor shall be done in an orderly manner and anything used by the Contractor for execution of the works shall in no way constitute a danger or hindrance to the working of the Railway or to the movement of its staff or passengers.

EQUIPMENTS, COMPONENTS AND MATERIALS RECEIVED FOR WORK: 1.2.53

The Contractor shall utilise all equipments, components or materials, procured specifically for the purpose of execution of the work, in the work or other requirements. Any surplus materials left over at the end of the work shall not be disposed off without prior approval of the Purchaser in writing. The Purchaser may within a period of six months from the date of provisional Acceptance of the last section, switching/Booster station notify the Contractor of the Purchaser's interest in any or all of the surplus materials and shall have the right to take over the materials at Schedule 3, Part-V, Form-7(Sh. 1 to 26) prices in case of OHE and in case of TSS and SCADA at prices indicated in Supply column of Schedule-1, Section-8 to 12. The materials so notified by the Purchaser shall be taken over by the Purchaser and paid for in full. The Contractor may use in any manner deemed fit, only such surplus materials which are not covered by the Purchaser's notification after getting the approval of the Purchaser in writing.

ARBITRATION AND CONCILIATION: 1.2.54 (As per clause 63 of GCC)

Reconciliation of disputes: All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the "Chief Engineer" or "Divisional Railway Manager" through “Notice of Dispute” provided that no such notice shall be served later than 30 days after the date of issue of Completion Certificate by the Engineer. Chief Engineer or Divisional Railway Manager shall, within 30 days after receipt of the Contractor’s “Notice of Dispute”, notify the name of conciliator(s) to the Contractor.

The Conciliator(s) shall assist the parties to reach an amicable settlement in an independent and impartial manner within the terms of contract.

If the parties reach agreement on a settlement of the dispute, they shall draw up and sign a written settlement agreement duly signed by Engineer In-charge, Contractor and conciliator(s). When the parties sign the settlement agreement, it shall be final and binding on the parties.

The parties shall not initiate, during the conciliation proceedings, any arbitral or judicial proceedings in respect of a dispute that is the subject matter of the conciliation proceedings.

The conciliation proceedings shall be terminated:

By the signing of the settlement agreement by the parties on the date of agreement; or

- By written declaration of the conciliator, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of declaration; or
- By a written declaration of any party to the conciliator to the effect that the conciliation proceedings are terminated, on the date of declaration; or

(a) **MATTERS FINALLY DETERMINED BY THE RAILWAY:**

All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the determination of the contract, shall be referred by the Contractor to the GM and the GM shall, within 120 days after receipt of the Contractor’s representation, make and notify decisions on all matters referred to by the Contractor in writing provided that matters for which provision has been made in Clauses 8, 18, 22(5), 39, 43(2), 45(a), 55, 55-A(5), 57, 57A,61(1), 61(2) and 62(1) of Standard General Conditions of Contract or in any Clause of the Special Conditions of the Contract shall be deemed as ‘excepted matters’ (matters not arbitrable) and decisions of the Railway authority,

thereon shall be final and binding on the Contractor; provided further that 'excepted matters' shall stand specifically excluded from the purview of the Arbitration Clause.

(b)(i) Demand for Arbitration:

In the event of any dispute or difference between the parties hereto as to the construction or operation of this contract, or the respective rights and liabilities of the parties on any matter in question, dispute or difference on any account or as to the withholding by the Railway Electrification of any certificate to which the contractor may claim to be entitled to, or if the Railway Electrification fails to make a decision within 120 days, then and in any such case, but except in any of the 'excepted matters' referred to in clause 63 of these conditions, the contractor, after 120 days but within 180 days of his presenting his final claim on disputed matters, shall demand in writing that the dispute or difference be referred to arbitration.

(b)(ii) The demand for arbitration shall specify the matters which are in question, or subject of the dispute or difference as also the amount of claim item wise. Only such dispute or difference, in respect of which the demand has been made, together with counter claims or set off, given by the Railway Electrification, shall be referred to arbitration and other matters shall not be included in the reference.

(A) The parties may waive off the applicability of sub-section 12(5) of Arbitration and Conciliation (Amendment) Act 2015, if they agree for such waiver, in writing, after dispute having arisen between them, in the format given under Annexure-I of these conditions.

(B) The arbitration proceedings shall be assumed to have commenced from the day, a written and valid demand for arbitration is received by the Railway Electrification.

(C) The claimant shall submit his claim stating the facts supporting the claims along with all the relevant documents and the relief or remedy sought against each claim within a period of 30 days from the date of appointment of the Arbitral Tribunal.

(D) The Railway Electrification shall submit its defence statement and counter claim(s), if any, within a period of 60 days of receipt of copy of claims from Tribunal thereafter, unless otherwise extension has been granted by Tribunal.

(b)(iii) No new claim shall be added during proceedings by either party. However, a party may amend or supplement the original claim or defense thereof during the course of arbitration proceedings subject to acceptance by Tribunal having due regard to the delay in making it.

(b)(iv) If the contractor(s) does/do not prefer his/their specific, and final claims in writing, within a period of 90 days of receiving the intimation from the Railway Electrification that the final bill is ready for payment, he/they will be deemed to have waived his/their claim(s) and the Railway Electrification shall be discharged and released of all liabilities under the contract in respect of these claims.

(c) Obligation during pendency of Arbitration:

Work under the contract shall, unless otherwise directed by the Engineer, continue during the arbitration proceedings, and no payment due or payable by the Railway Electrification shall be withheld on account of such proceedings, provided, however, it shall be open for Arbitral Tribunal to consider and decide whether or not such work should continue during arbitration proceedings.

(d) Appointment of Arbitrator:

(d) (i) Appointment of Arbitrator where applicability of section 12(5) of Arbitration and Conciliation Act has been waived off:

(A) In cases where the total value of all claims in question added together does not exceed Rs. 1,00,00,000/- (Rupees one Crore only), the Arbitral Tribunal shall consist of a sole arbitrator who shall be a Gazetted officer of Railway Electrification not below JA grade, nominated by the General Manager. The sole arbitrator shall be appointed within 60 days from the day when a written and valid demand for arbitration is received by GM.

(B) In cases not covered by clause 1.2.54(d)(i)(A), the Arbitral Tribunal shall consist of a panel of three Gazetted Railway Electrification Officers not below JA grade or two Railway Electrification Gazetted Officers not below JA Grade and a retired Railway Officer, retired not below the rank of SAG Officer, as the arbitrators. For this purpose, the Railway Electrification will send a panel of at least four (4) names of Gazetted Railway Officers of one or more departments of the Railway Electrification which may also include the name(s) of retired Railway Officer(s) empanelled to work as Railway Arbitrator to the contractor within 60 days from the day when a written and valid demand for arbitration is received by the General Manager. Contractor will be asked to suggest to General Manager, at least 2 names out of the panel for appointment as contractor's nominee within 30 days from the date of dispatch of the request by Railway. The General Manager shall appoint at least one out of them as the contractor's nominee and will, also simultaneously appoint the balance number of arbitrators either from the panel or from outside the panel, duly indicating the 'presiding arbitrator' from amongst the 3 arbitrators so appointed. General Manager shall complete this exercise of appointing the Arbitral Tribunal within 30 days from the receipt of the names of Contractor's nominee. While nominating the arbitrators it will be necessary to ensure that one of them is from the Accounts Department. An Officer of Selection grade of the Accounts Department shall be considered of equal status to the officers in SA grade of other departments of the Railways for the purpose of appointment of Arbitrators.

64.3.(a).iii: The serving railway officer working in arbitral tribunal in the ongoing arbitration cases as per clause 1.2.54(d)(i) A & 1.2.54(d)(i) B above, can continue as arbitrator in the tribunal even after his retirement

(d)(ii) <u>Appointment of Arbitrator where applicability of section 12(5) of A & C Act has not been waived off</u>:

(A) In cases where the total value of all claims in question added together does not exceed ₹ 50,00,000/- (Rupees Fifty Lakh), the Arbitral Tribunal shall consist of a Retired Railway Officer, retired not below the rank of Senior Administrative Grade Officer, as the arbitrator. For this purpose, the Railway will send a panel of at least four (4) names of retired Railway Officer(s) empanelled to work as Railway Arbitrator duly indicating their retirement dates to the Contractor within 60 days from the day when a written and valid demand for arbitration is received by the General Manager.

Contractor will be asked to suggest to General Manager at least 2 names out of the panel for appointment as arbitrator within 30 days from the date of dispatch of the request by Railway. The General Manager shall appoint at least one out of them as the arbitrator.

(B) In cases where the total value of all claims in question added together exceed ₹ 50,00,000/- (Rupees Fifty Lakh), the Arbitral Tribunal shall consist of a Panel of three (3) retired Railway Officer, retired not below the rank of Senior Administrative Grade Officer**,** as the arbitrators. For this purpose, the Railway will send a panel of at least four (4) names of retired Railway Officer(s) empanelled to work as Railway Arbitrator duly indicating their retirement date to the Contractor within 60 days from the day when a written and valid demand for arbitration is received by the General Manager.

Contractor will be asked to suggest to General Manager at least 2 names out of the panel for appointment as Contractor's nominee within 30 days from the date of dispatch of the request by Railway. The General Manager shall appoint at least one out of them as the Contractor's nominee and will, also simultaneously appoint the balance number of arbitrators either from

the panel or from outside the panel, duly indicating the 'Presiding Arbitrator' from amongst the 3 arbitrators so appointed. General Manager shall complete this exercise of appointing the Arbitral Tribunal within 30 days from the receipt of the names of Contractor's nominees. While nominating the arbitrators, it will be necessary to ensure that one of them has served in the Accounts Department .

(d)(iii) If one or more of the arbitrators appointed as above refuses to act as arbitrator, withdraws from his office as arbitrator, or vacate his/their office/offices or is/are unable or unwilling to perform his functions as arbitrator for any reason whatsoever or dies or in the opinion of the General Manager fails to act without undue delay, the General Manager shall appoint new arbitrator/arbitrators to act in his/their place in the same manner in which the earlier arbitrator/arbitrators had been appointed. Such constituted Tribunal may, at its discretion, proceed with the reference from the stage at which it was left by the previous arbitrator(s).

(d)(iv) The arbitral Tribunal shall have power to call for such evidence by way of affidavits or otherwise as the Arbitral Tribunal shall think proper, and it shall be the duty of the parties here to do or cause to be done all such things as may be necessary to enable the Arbitral Tribunal to make the award without any delay. The proceedings shall normally be conducted on the basis of documents and written statements.

(d)(v) Before proceeding into the merit of any dispute, the Arbitral tribunal shall first decide and pass its orders over any plea submitted/objections raised by any party, if any, regarding appointment of arbitral Tribunal, validity of arbitration agreement jurisdiction and scope of the Tribunal to deal with the dispute (s) submitted to the arbitration, applicability of time 'limitation' to any dispute, any violation of agreed procedure regarding conduct of the arbitral proceeding or plea for interim measures of protection and record its order in day to day proceedings. A copy of the proceedings duly signed by all the members of tribunal should be provided to both the parties.

(e) (i) <u>Qualification of Arbitrator (s):</u>

(a) Serving Gazetted Railway officers of not below JA Grade level.

(b) Retired Railway officers not below SA Grade level, one years after his date of retirement.

(c) Age of arbitrator at the time of appointment shall be below 70 years.

(e)(ii) An arbitrator may be appointed notwithstanding the total number of arbitration cases in which he has been appointed in the past.

(e)(iii) While appointing arbitrator(s) under sub-clause (d)(i)(A), (d)(i)(B),(d)(ii)(A) & (d)(ii)(B) above, due care shall be taken that he/they is/are not the one/those who had an opportunity to deal with the matters to which the contract relates or who in the course of his/their duties as Railway servant(s) expressed views on all or any of the matters under dispute or differences. . A certification to this effect as per Annexure-II shall be taken from Arbitrators also. The proceedings of the Arbitral Tribunal or the award made by such Tribunal will, however, not be invalid merely for the reason that one or more Arbitrator had, in the course of his service, opportunity to deal with the matters to which the contract relates or who in the course of his/their duties expressed views on all or any of the matters under dispute.

(e)(iv) The arbitral award shall state item wise, the sum and reasons upon which it is based. The analysis and reasons shall be detailed enough so that the award could be inferred therefrom.

(e)(v) A party may apply for corrections of any computational errors, any typographical or clerical errors or any other error of similar nature occurring in the award of tribunal and interpretation of a specific point of award to tribunal within 60 days of receipt of the award.

(e)(vi) A party may apply to tribunal within 60 days of the receipt of award to make an additional award as to claims presented in the arbitral proceedings but omitted from the arbitral award.

(f) In case of the Tribunal, comprising of three Members, any ruling or award shall be made by a majority of Members of Tribunal. In the absence of such a majority, the views of the Presiding Arbitrator shall prevail.

(g) Where the arbitral award is for the payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.

(h) The cost of arbitration shall be borne by the respective parties. The cost shall interalia include fee of the arbitrator(s) as per the rates fixed by the Railway Board from time to time and the fee shall be borne equally by both the parties, provided parties sign an agreement in the format given at Annexure-II to these condition after/while referring these disputes to Arbitration. Further, the fee payable to the arbitrator(s) would be governed by the instructions issued on the subject by Railway Board from time to time irrespective of the fact whether the arbitrator(s) is/are appointed by the Railway Administration or by the court of law unless specifically directed by Hon'ble court otherwise on the matter.

(i) (i) Arbitrator tribunal shall be entitled to 50% extra fee, if award is declared within 6 month.

(j) Subject to the provisions of the aforesaid Arbitration and Conciliation Act – 1996 and the rules thereunder and relevant para of General Conditions of Contract (GCC) and any statutory modification thereof shall apply to the appointment of arbitrators and arbitration proceedings under this clause.

(k) **Place of Arbitration**: The venue for an arbitration shall be the place from which the Letter of Acceptance of Tender is issued or such other place as the Purchaser at his discretion may determine.

PAYMENT DURING ARBITRATION : 1.2.55

Work under the contract shall, unless otherwise directed by the Purchaser, continue during the Arbitration proceedings and no payment due to or payable by the Purchaser shall be withheld on account of such proceedings. Notwithstanding anything contained herein, the Arbitrators/ Umpire, as the case may be, shall have full authority to direct withholding of any payment if such action is considered fit and proper at any time.

REFUND OF SECURITY DEPOSIT : 1.2.56

(See tender clause 1.2.17)

PROVISIONS OF CONTRACT LABOUR REGULATION AND ABOLITION ACT: 1970: 1.2.57

(i) The Contractor shall comply with the provisions of the Contract Labour Regulation and Abolition act 1970 and the Contract Labour Regulation and Abolition Central Rules, 1971, as modified from time to time, wherever applicable, and shall also indemnify the Purchaser from and against any claims under the aforesaid Act and the rules.

(ii) The Contractor shall obtain a valid license under the aforesaid Act as modified from time to time before the commencement of the work and continue to have a valid license until the completion of the work. Any failure to fulfill this requirement shall attract the penal provisions of the contract arising out of resultant non-execution of the work.

(iii) The Contractor shall pay to labour employed by him, directly or through Sub-contractors, the wages as per provisions of the aforesaid Act and the rules, wherever applicable. The Contractor shall, notwithstanding the provisions of the contract, cause to be paid the wages to labour indirectly engaged on the work including any engaged by his sub-contractors in connection with the said work, as if the labour has been immediately employed by him.

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

(v) In every case in which, by virtue of the provisions of the aforesaid Act or the rules, the Purchaser is obliged to pay any amount of wages to a workman employed by the Contractor or his Sub-contractor in execution of the work or to incur any expenditure in providing welfare and health amenities required to be provided under the aforesaid Act and the rules or to incur any

expenditure on account of the contingent liability of the Purchaser due to the Contractor's failure to fulfill his statutory obligations under the aforesaid Act or the Rules, the Purchaser will recover from the Contractor the amount of wages so paid or the amount of expenditure so incurred, and without prejudice to the rights of the Purchaser under Section 20 Sub-section (2) and Section 21 Sub-section (4) of the aforesaid Act, the Purchaser shall be at liberty to recover such amount or part thereof by deducting it from the Security Deposit and/ or from any sum due by the Purchaser to the Contractor whether under the contract or otherwise. The Purchaser shall not be bound to contest any claim made against it under sub-section (1) of section 20 and sub-section (4) of section 21 of the aforesaid Act except on the written request of the Contractor and upon his giving the full security for all costs for which the Purchaser might become liable in contesting such claim. The decision of the Purchaser regarding the amount actually recoverable from the Contractor as stated above, shall be final and binding on the Contractor.

PROVISIONS OF APPRENTICES ACT, 1961 : 1.2.58

(a) The Contractor shall be responsible to ensure compliance with the provisions of the Apprentices Act, 1961 and the rules and order issued thereunder from time to time in respect of Apprentices directly or through petty Contractors or Sub-Contractor's employed by him for the purpose of carrying out the Contract. If the Contractor directly or through petty Contractor's or sub-Contractors fails to do so, his failures will be a breach of the contract and the Railway may, in its discretion, rescind the contract. The Contractor shall also be liable for any pecuniary liability arising on account of any violation of the provisions of the Act.

NOTE: *The Contractors are required to engage Apprentices when the works undertaken by them last for a period of one year or more and/or the cost of work is Rs. one lakh or more.*

(b) **EMPLOYMENT UNDER ENGINEERING WORKS CONTRACTS**

Under this scheme it is proposed to get employment to un-employed Engg. Graduates/diploma holders with the Railway Contractors. Fresh Engg. Graduates without any experience of any kind will be taken under training by the Contractor on stipend specified by the competent authority. Engg. Graduates/diploma holders who have gained experience and have completed a period of 6 months will be paid at rate specified from time to time by the competent authority.

Under the above provision, the Contractor is required to employ such Engineers/Diploma holders at the rates specified above and in the ratio for such Employment as indicated below:

Contract Value	No. of Engineer/Diploma holders to be employed	Duration
Rs. 10 lakh and above.	2 Engg. Degree holders and 2 Engg. Diploma holders	Duration of the contract

Under the above scheme it would be obligatory for the Contractor to give a declaration alongwith his tender to the effect that the Graduate Engineers/Diploma holders having been employed by him under the particular work for which tender is submitted, are in accordance with the rates and ratios specified above and none of them is related to him (Contractor), failing which the tender may be disqualified. In case of wrong information having been given by the Contractor which comes to light subsequently, the contract may be rescinded and action taken in accordance with para 1.2.14 of Tender Papers.

PROVISIONS OF PAYMENTS OF WAGES ACT: 1.2.59

The contractor shall comply with the provisions of the payment of wages Act 1936 and the rules made thereunder in respect of all employees directly or through petty contractors or sub-contractors employed by him in the works. If in compliance with the terms of the contract, the contractor directly or through petty contractors or sub- contractors shall supply any labour to be used wholly or partly under the direct order and control of the Engineer whether in connection with the works to be executed hereunder or otherwise for the purpose of the Engineer such labour shall nevertheless, be deemed to comprise persons employed by the contractor and any moneys which may be ordered to be paid by the Engineer shall be deemed to be moneys payable by the Engineer on behalf of the Contractor and the Engineer may on failure of the contractor to repay such moneys to the Railway deduct the same from any moneys due to the contractor in terms of the contract. The Railway shall be entitled to deduct from any moneys due to the contractor (Whether under this contract or any other Contract) all moneys paid or payable by the Railway by way of compensation of aforesaid or for costs of expenses in connection with any claim thereto and the decision of

the Engineer upon any question arising out of the effect or force of this clause shall be final and binding upon the contractor.

PROVISION OF WORKMEN'S COMPENSATION ACT: 1.2.60

In every case in which by virtue of the provision of Section 12, Sub-section (1) of the Workmen's Compensation Act, 1923, Railway is obliged to pay compensation to a workman directly or through petty Contractors or sub-Contractors employed by the Contractor in executing the work. Railway will recover from the Contractor the amount of the compensation so paid, and without prejudice to rights of Railway under Section 12, sub-section (2) of the said Act Railway shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Railway to the Contractor whether under these conditions or otherwise. Railway shall not be bound to contest any claim made against it under section 12, sub-section (i) of the said Act except on the written request of the Contractor and upon his giving to Railway, full security for all costs for which Railway might become liable in consequence of contesting such claim.

PROVISION OF MINES ACT: 1.2.61

The Contractor shall observe and perform all the provisions of the Mines Act, 1952 or any statutory modifications of reenactment thereof for the time being enforce and any rules regulations made there under in respect of all the persons directly or through petty contractors or sub-contractors employed by him under this contract and shall indemnify the Railway from and against any claim under the Mines Act. or the rules and regulations framed there under, by or on behalf of any persons employed by him or otherwise.

1.2.62: DELETED

Letter of Credit as Mode of Payment: **1.2.63**

(a) For all the tenders having advertised cost of Rs 10 lakh or above, the contractor shall have the option to take payment from Railways through a letter of credit (LC) arrangement.

(b) This option of taking payment through LC arrangement has to be exercised in IREPS (Indian Railway Electronic Procurement System- the e-application on which tenders are called by Railway) by the tenderer at the time of bidding itself, and the tenderer shall affirm having read over and agreed to the term and condition of the LC option.

(c) The option of taking payment through LC arrangement, once exercised by tenderer at the time of bidding, shall be final and no change shall be permitted, thereafter, during execution of contract.

(d) In case tenderer opts for payment through LC, following shall be the procedure to deal with release of payment through LC:

(i) The LC shall be a sight LC.
(ii) The contractor shall select his Advising /Negotiating bank for LC. The incidental cost towards issue of LC and its operation thereof shall be borne by the contractor.
(iii) SBI, New Delhi, Main Branch will be the nodal branch for issue of LCs based on line requests received from Railway Accounts Units for tenders opened in financial year 2018-19. SBI branches where the respective Railway Accounts office has its Account (Local SBI branch) will be the issuance/reimbursing branch for LC issued under this arrangement. The Bank shall remain same for this tender till completion of contract. The incidental cost @ 0.15 per annum of LC value, towards issue of LC and operation thereof shall be borne by the contractor and shall be recovered from his bills.
(iv) The LC shall be opened initially for duration of 180 to 365 days in consultation with contractor. The LC shall be extended time to time as per progress of the contract, on the request of the contractor. The value of LC to be opened initially as well as extended thereafter shall be finalized by the engineer in consultation with the contractor on the basis of expected progress of work.

(v) The LC terms and conditions shall inter-alia indemnify and save harmless the Railway from and against all losses, claims and demands of every nature and description brought or recovered against the Railway by reason of any act or ,omission of the contractor, his agents or employees, in relation to the Letter of Credit (LC). All sums payable/borne by Railways on this account shall be considered as reasonable compensation and paid by contractor.

(vi) The LC terms and conditions shall inter- alia provide that Railways will issue a Document of Authorisation (format enclosed as Annexre-1) after passing the bill for completed work, to enable contractor to claim the authorised amount from their bank.

(vii) The acceptable, agreed upon document for payments to be released under the LC shall be the Document of Authorisation.

(viii) The Document of Authorisation shall be issued by SrAFA/ AFA at Project and SrAFA/I at HQ level, against each bill passed by Railways.

(ix) On issuance of Document of Authorization, a copy of Document of Authorisation shall be posted on IREPS for download by the contractor. A digitally signed copy of Document of Authorisation shall also be sent by SrAFA(As mentioned under clause viii above) to Railway's bank (Local SBI Branch).

(x) The contractor shall take print out of the Document of Authorisation available on IREPS and present his claim to his bank (advising Bank) for necessary payments as per LC terms and conditions. The claim shall comprise of copy of Document of Authorisation, bill of exchange and Bill.

(xi) The payment against LC shall be subject to verification from Railway's Bank (Local SBI Branch).

(xii) The Contractor's bank (advising bank) shall submit the documents to the Railway's Bank (Local SBI Branch).

(xiii) The Railway's bank (issuing bank) shall, after verifying the claim so received w.r.t. the digitally signed Document of Authorisation received from Railway Accounts Office, release the payment to contractor's bank (advising bank) for crediting the same to contractor's account.

(xiv) Any number of bills can be dealt within one LC, provided the sum total of payments to contractor is within the amount for which LC has been opened.

(xv) The LC shall be closed after the release of final payment including PVC amount, if any, to the contractor.

(xvi) The release of performance guarantee or security deposit shall be dealt directly by railway with the contractor i. e., not through LC.

Public Procurement (Preference to Make in India), Order-2017: 1.2.64

Whereas it is the policy of the Government of India to encourage 'Make in India' and promote manufacturing and production of goods and services in India with a view to enhancing income and employment, and

Whereas procurement by the Government is substantial in amount and can contribute towards this policy objective, and

Whereas local content can be increased through partnerships, cooperation with local companies, establishing production units in India or Joint Ventures (JV) with Indian suppliers, increasing the participation of local employees in services and training them.

Now therefore the following Order is issued:

(i) **This Order is issued pursuant to Rule 153(iii) of the General Financial Rules 2017**.

(ii) **Definitions**: For the purposes of this Order:

'*Local Content*' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured(excluding net domestic indirect taxes) minus the value of imported content in the item(including all customs duties) as a proportion of the total value, in percent.

'*Local Supplier*' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed under this Order or by the competent Ministries/Departments in pursuance of this Order.

'*L 1*' means the lowest tender or lowest bid of the lowest quotation received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.

'*margin of purchase preference*' means the maximum extent to which the price quoted by a local supplier may be above the L 1 for the purpose of purchase preference.

'Nodal Ministry' means the Ministry or Department identified pursuant to this order in respect of a particular item of goods or services.

'*Procuring entity*' means a Ministry or department or attached or subordinate office of or autonomous body controlled by, the Government of India and includes Government companies as defined in the Companies Act.

(iii) **Requirement of Purchase Preference**: Subject to the provisions of this Order and to any specific instructions issued by the Nodal Ministry or in pursuance of this Order, purchase preference shall be given to local suppliers in all procurements undertaken by procuring entities in the manner specified hereunder:

a. In procurement of goods in respect of which the Nodal Ministry has communicated that there is sufficient local capacity and local competition, and where the estimated value of procurement is Rs. 50 Lakhs or less, only local suppliers shall be eligible. If the estimated value of procurement of such goods is more than Rs. 50 Lakhs, the provisions of sub-paragraph b or c, as the case may be, shall apply.

b. In the procurement of goods which are not covered by paragraph (iii)(a) and which are divisible in nature, the following procedure shall be followed.

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.

ii. If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L1 price. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L1 bidder.

c. In procurements of goods not covered by sub-paragraph (iii)(a) and which are not divisible, and in procurement of services where the bid is evaluated on price alone, the following procedure shall be followed.

i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.

ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.

iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.

(iv) Exemption of small purchases: Notwithstanding anything contained in paragraph (iii), procurements where the estimated value to be procured is less than Rs. 5 lakhs shall be exempt from this Order. However, it shall be ensured by procuring entities that procurement is not split for the purpose of avoiding the provisions of this Order.

(v) Minimum local content: The minimum local content shall ordinarily be 50%. The Nodal Ministry may prescribe a higher or lower percentage in respect of any particular item and may also prescribe the manner of calculation of local content.

(vi) **Margin of Purchase Preference**: The margin of purchase preference shall be 20%.

(vii) **Requirement for specification in advance**: The minimum local content, the margin of purchase preference and the procedure for preference to Make in India shall be specified in the notice inviting tenders or other form of procurement solicitation and shall not be varied during a particular procurement transaction.

(viii) **Government E-market place**: In respect of procurement through the Government E-market place (GeM) shall, as far as possible, specifically mark the items which meet the minimum local content while registering the item for display, and shall, wherever feasible, make provision for automated comparison with purchase preference and without purchase preference and for obtaining consent of the local supplier in those cases where purchase preference is to be exercised.

(ix) **Verification of local content**:

a. The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.

b. **In cases of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.**

c. Decisions on complaints relating to implementation of this Order shall be taken by the competent authority which is empowered to look into procurement-related complaints relating to the procuring entity.

d. Nodal Ministries may constitute committees with internal and external experts for independent verification of self-declarations and auditor's/accountant's certificates on random basis and in the case of complaints.

e. Nodal Ministries and procuring entities may prescribe fees for such complaints.

f.False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of the General Financial Rules, along with such other actions as may be permissible under law.

g. A supplier who has been debarred by any procuring entity for violation of this Order shall not be eligible for preference under this Order for procurement by any other procuring entity for the duration of the debarment. The debarment for such other procuring entities shall take effect prospectively from the date on which it comes to the notice of other procurement entities, in the manner prescribed under paragraph (ix)(h) below.

h. The Department of Expenditure shall issue suitable instructions for the effective and smooth operation of this process, so that:

i. The fact and duration of debarment for violation of this Order by any procuring entity are promptly brought to the notice of the Member-Convenor of the Standing Committee and the Department of Expenditure through the concerned Ministry/Department or in some other manner.

ii. On a periodical basis such cases are consolidated and a centralized list or decentralized lists of such suppliers with the period of debarment is maintained and displayed on website(s);

iii. in respect of procuring entities other than the one which has carried out the debarment, the debarment takes effect prospectively from the date of uploading on the website(s) in the such a manner that ongoing procurements are not disrupted.

(x) **Specifications in Tenders and other procurement solicitations**:

a. Every procuring entity shall ensure that the eligibility conditions in respect of previous experience fixed in any tender or solicitation do not require proof of supply in other countries or proof of exports.

b. Procuring entities shall endeavour to see that eligibility conditions, including on matters like turnover, production capability and financial strength do not result in unreasonable exclusion of local suppliers who would otherwise be eligible, beyond what is essential for ensuring quality of creditworthiness of the supplier.

c. Procuring entities shall, within 2 months of the issue of this Order review all existing eligibility norms and conditions with reference to sub-paragraphs 'a' and 'b' above.

d. If a Nodal Ministry is satisfied that Indian suppliers of an item are not allowed to participate and/ or compete in procurement by any foreign government, it may, if it deems appropriate, restrict or exclude bidders from that country from eligibility for procurement of that item and/or other items relating to that Nodal Ministry. A copy of every instruction or decision taken in this regard shall be sent to the Chairman of the Standing Committee.

e. For the purpose of sub-paragraph (x)(d) above, a supplier or bidder shall be considered to be from a country if (i) the entity is incorporated in that country, or (ii) a majority of its shareholding or effective control of the entity is exercised from that country; or (iii) more that 50% of the value of the item being supplied has been added in that country. Indian suppliers shall mean those entities which meet any of these tests with respect to India".

ANNEXURE-I

Agreement towards Waiver under Section 12(5) and Section 31A (5) of Arbitration and Conciliation (Amendment) Act

I/we..... (Name of agency/Contractor) with reference to agreement no..... raise disputes as to the construction and operation of this contract, or the respective rights and liabilities, withholding of certificate and demand arbitration in respect of following claims :

Brief of claim:

(i) Claim 1- Detailed at Annexure-
(ii) Claim 2 –
(iii) Claim 3 –

I/we..... (post of Engineer) with reference to agreement no..... hereby raise disputes as to the construction and operation of this contract, or the respective rights and liabilities, withholding of certificate and demand arbitration in respect of following claims:

I/we.....do/do not agree to waive off applicability of section 12(5) of Arbitration and Conciliation (Amendment) Act.

Signature of Claimant_____ Signature of Respondent _____

Agreement under Section 31(5)

I/we..... (Name of claimant) with reference to agreement no..... hereby waive off the applicability of sub section 31-A (2) to 31-A (4) of the Arbitration and Conciliation (Amendment Act. We further agree that the cost of arbitration will be shared by the parties as per Clause 64(6) of GCC.

Signature of Claimant_____ Signature of Respondent_____

*Strike out whichever not applicable.

□□□□□□

ANNEXURE-II

Certification by Arbitrators appointed under Clause 63 & 64 of Indian Railways General Conditions of Contract

1. Name:

2. Contact Details:

3. Prior experience (Including Experience with Arbitrations):

4. **I do not have more than ten on-going Arbitration cases with me**.

5. I hereby certify that I have retired from Railways w.e.f. _____ and empanelled as Railway Arbitrator as per 'The Arbitration and Conciliation Act- 1996'.

6. I have no any past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind.

   Or

   I have past or present relationship in relation to the subject matter in dispute, whether financial, business, professional or other kind. The list of such interests is as under:

7. I have no any past or present relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality in terms of The Arbitration and Conciliation Act-1996.

   Or

   I have past or present relationship with or interest in any of the parties whether financial, business, professional or other kind, which is likely to give rise to justifiable doubts as to my independence or impartiality in terms of The Arbitration and Conciliation Act-1996. The details of such relationship or interests are as under:

8. There are no concurrent Circumstances which are likely to affect my ability to devote sufficient time to the arbitration and in particular to finish the entire arbitration within twelve months.

   Or

There are Circumstances which are likely to affect my ability to devote sufficient time to the arbitration and in particular to finish the entire arbitration within twelve months. The list of such circumstances is as under:

PART - I

CHAPTER- III A

PART - I
CHAPTER – III "A''

PRICES AND PAYMENT FOR OHE, SWS, BT STATIONS & LT SUPPLY TRANSFORMER STATIONS

1. **PART - I**

1.3 **CHAPTER - III "A"**

PRICES AND PAYMENT FOR OHE, SWS, BT STATIONS AND LT SUPPLY TRANSFORMER STATIONS

SCOPE : 1.3.1

This Chapter deals with prices to be paid for supply and/or erection of various items of work or for supplies and other amounts payable in accordance with accepted schedules of prices and rates and terms and conditions of payment mentioned herein. This is a composite works contract. The total prices for the completed items of work are the actual prices payable to the Contractor as per the terms and condition of the Contract.

SCHEDULE OF PRICES : 1.3.2

(a) (i) **PRICES FOR ITEM WITH S.O.R.**

The rates given against various items of work in five sections of Schedule-1, Section-1 to 5 of the tender paper are the standard schedule of rates (S.O.R.). The tenderers are required to quote a single percentage below/at par/above against the S.O.R. cost of each section separately while quoting the summary of prices **on IREPS site.** The actual payment to be made against any item of any sections of Schedule-1, Section-1 to 5, shall be derived after loading the SOR prices of that sections with the tenderer's quoted percentage for the same section. The prices so obtained shall be the unit prices for the various items of work given in Schedule-1, Section-1 to 5.

(a) (ii) **Rates of NON SOR Items (Non schedule items)(Schedule-1, Section-6 & 7)**

The rates of NON SOR items (**Schedule-1, Section-6 & 7)** have to be quoted separately **on IREPS site.** The tenderers are required to quote uniform percentage below/at par/above against the estimated cost for these items while quoting Offered prices. The actual payment to be made against any item of Sch.1, Section-6 & 7, shall be derived after loading the estimated cost with the tenderer's quoted percentage. The prices so obtained shall be the unit prices for the various items of works given in Schedule-1, Section-6 & 7.

All Unit prices shall be FIRM irrespective of minor variations in basic quantities and use of alternative types of various components and fittings approved by the purchaser. Minor changes in basic designs shall not affect the unit prices, so long as such changes are mutually agreed to by the Purchaser and the Contractor. All Unit Prices shall be in RUPEES. The prices shall be for materials and erection except for the materials indicated in Annexure-4 for which only erection charges will be payable, and for execution of work in accordance with specifications and approved drawings and designs. The Contractor shall carefully note the items of materials, equipments, fittings and components which will be supplied by the Purchaser.

(b) **UNIT PRICES FOR MATERIALS**

The unit prices indicated in column 4 of Schedule-1, Section – 1 to 5 are inclusive of the prices of materials including all incidental charges for transport, loading/ unloading and handling of materials, commission for arranging dispatch by rail direct from manufacturer's factory and completing all necessary formalities in this respect, such as submission of forwarding notes, arranging placement of wagon, collection of railway receipts, all insurance premia, bankers charges for bank guarantee, indemnity bonds inclusive of cost of stamps etc. as also siding or shunting charges, if any, levied by the Railway.

The prices shall include all taxes, duties and levies (including Octroi etc.) applicable on this works contract. Therefore, they should quote their prices taking into account the rate of taxes as leviable in the event of sale through works contract to the Central Government Organisation in that state. It is clarified that required forms applicable for this purpose will be supplied to the contractor as applicable in the state where the contract is being executed.

The price shall also include provision for losses and wastages in transit and erection.

FOR ERECTION

The unit prices indicated in column 5 of Schedule-1, Section – 1 to 5 are inclusive of cost of erection and testing to be done by the Contractor to the extent indicated in part-II, Chapter-VII and also cover all cost of administration of the contractor, insurance premium, banker's charges for guarantees, cost of stamps, cost of storage, loading and unloading and handling of materials, and for any road transport which the Contractor may use for carriage of materials between his depot and depot/s and site of work. The unit prices shall include cost of works and adjustments necessary to be done by the Contractor during or after the tests carried out by the Purchaser as per Part II, Chapter VII.

However, if the rates for existing GST or cess on GST for Works Contract is increased or any new tax/cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/ date of completion extended under clause 17 & 17(A) of GCC and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.

Further, if the rates of existing GST or cess on GST for Works Contract is decreased or any new tax/cess on Works Contract is decreased/removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

(c) COPPER FOR COMPONENTS & FITTINGS - DELETED -

(d) OTHER PRICE ADJUSTMENTS:-

(i) Price variation on account of variation in the prices of various materials required for supply of various equipments/fittings/components used in the tendered work will be reimbursable/ recoverable on basic price on each bill submitted by the contractor as per the following formulae:-

1.0 For Schedule-1, Section-1 (General) :-

Percentage variation payable on the net amount of material bill of this Section

$$= [(W - W_o)/W_o] \times 85$$

Where,

W = Index Number of Wholesale Prices - By Groups and Sub-Groups - All commodities – as published in the R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration.

W_o = Index Number of Wholesale Prices - By Groups and Sub-Groups - All commodities – as published in the R.B.I. Bulletin for the base period.

2.0 For Schedule-1, Section-2 (Concreting) of OHE, Pt.-I, Ch.-IV A & {Concreting of TSS, Pt.-I, Ch.-IV B} :-

Percentage variation on the net amount of material bill of this Section

$$= [(C_s - C_o)/ C_o \times 0.4136] \times 85$$

Where,

C_s = R.B.I. wholesale price index for cement & Lime for the month which is six months prior to date of casting of foundation.

C_o = R.B.I. wholesale price index for cement & Lime for the month which is one month prior to date of opening of tender.

3.0 For Schedule - 1, Section - 3 (Ferrous):-

For all items of Schedule-1 Section-3 (Ferrous) of OHE and Item No. 3 of Schedule-1 Section-8 of TSS

Percentage variation on the net amount of material bill of this section

$$= [(Sf - Sfo)/Sfo + (Z - Zo)/Zo \times 0.06] \times 85$$

Where,

Sf = IEEMA price for Steel Blooms (size 150 mm x 150 mm) for the month which is Two months prior to date of inspection of material.
Sfo = IEEMA price for Steel Blooms (size 150 mm x 150mm) for the month which is one month prior to date of opening of tender.
Z = IEEMA price for Zinc for the month which is two months prior to date of inspection of material.
Zo = IEEMA price for Zinc for the month which is one month prior to date of opening of tender.

4.0 For Schedule-1, Section- 4(a) & 4(b) (Non-Ferrous) :-

Percentage variation on the net amount of material bill of this section

$= [(Cu - Cu_o)/Cu_o] \times 85$

Where,

Cu = IEEMA price for Copper wire bar for the month which is two months prior to date of inspection of material.
Cu_o = IEEMA price for Copper wire bar for the month which is one month prior to date of opening of tender.

5.0 For Schedule-1, Section-5 (Insulators) :-

Percentage variation on the net amount of material bill of this section

$= [(In - In_o)/In_o] \times 85$

Where,

In = R.B.I. wholesale price index for Structural Clay Products for the month which is two months prior to date of inspection of material.
In_o = R.B.I. wholesale price index for Structural Clay Products for the month which is one month prior to date of opening of tender.

(ii) Price variation on erection:-

Price variation on erection will be reimbursable/recoverable on each monthly bill submitted by the contractor as per the following formula:-

The percentage variation on the net amount of erection bill

$= [(I - I_o)/I_o] \times 85$

Where,

I_o = Consumer Price Index Number for Industrial Workers - All India - Published in R.B.I. Bulletin for the base period.

I = Consumer Price Index Number for Industrial Workers - All India - Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration.

In case, due to unavoidable reasons, measurements of work executed during the quarterly period are delayed beyond the next quarterly period, the benefit of the price variation in erection due to such delay shall not be allowed to the contractor.

NOTE:

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

(a) payment/recovery for increase/decrease in GST on works contract or imposition/removal of any tax/cess on Works Contract as per clause 1.3.2 (b).

(b) payment/recovery for overall market situation shall be made as per Price Variation Clause given hereunder.

(ii) No cognizance will be given for any sort of fluctuations in taxes and other market conditions etc. for any individual items for the purpose of making adjustments in payment except as provided for in the under noted clauses.

(iii) Price Variation clause (PVC) shall be applicable only for contracts of value (contract agreement value) Rs. 5 crore and more, irrespective of the contract completion period.

Materials supplied free of cost by Railway to the contractors shall fall outside the perview of Price Variation Clause. If, in any case, accepted offer includes some specific payment to be made to consultants or some materials supplied by Railway free or at fixed rate, such payments shall be excluded from the gross value of the work for the purpose of payment/recovery of price variation.

(iv) **Price Variation during Extended Period of Contract**:

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

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

(b) In case the indices fall below the Indices applicable to the last month of original/extended period of completion under Clause 17-A of the General Conditions of Contract, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17-B of the General Conditions of Contract.

(v) The Base Month for 'Price Variation Clause' shall be taken as month 28 days prior to opening of tender including extensions, if any, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month following the month of opening of tender. The Price Variation shall be based on the average Price Index of the quarter under consideration.

Base month for applicability of PVC shall be only from the date of opening of the tender and not from the date of negotiation, if any.

(vi) The price variation as calculated for materials other than concreting materials will be calculated to the extent of 85% only of the total under supply column of Schedule-1 for respective sections (for which on account payment is admissible). The value of price variation shall be increased on pro-rata basis for the remaining 15% of such materials for which on account payment is not admissible. Similarly, the value of price variation shall be reduced pro-rata in case of unused materials, but for which ONA payment has already been made.

(vii) Adjustment for variation in prices of material, labour, fuel, explosives, detonators, steel, concreting, ferrous, non-ferrous, insulators, zinc, and cement shall be determined in the manner prescribed.

(viii) Components of various items in a contract on which variation in prices be admissible, shall be Material, Labour, Fuel, Steel, Cement, Concreting, Ferrous, Non-ferrous, Insulator, Zinc, Erection etc. However, for fixed components, no price variation shall be admissible.

(ix) The demands for escalation of cost shall be allowed on the basis of provisional indices made available by Reverse Bank of India. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

(x) The Price Variation Clause (PVC) of General Conditions of Contract (GCC) shall not apply to such a works contract which is either on Annual Maintenance Contract (AMC) or a Zonal contract.

(e) - Deleted -

(f) - Deleted -

(g) **QUANTITIES**

The approximate estimated quantities of various items of work are included in Schedule-1, Section-1 to 5, under column quantities.

(h) - Deleted -

(i) **EXPLANATORY NOTES**

Explanatory notes for various items of work included in Schedule 1, Section 1 to 5, are given in Part-I, Chapter IV A.

(j) **NEW ITEMS OF WORK**

i) During the execution of the work, if the Contractor is called upon to carry out any new item of work not included in Schedule 1, Section-1 to 5, the Contractor shall execute such works at such prices as may be mutually agreed upon with the Purchaser before commencement and these will be based on the rate analysis as per the current market / prevalent rates of such or similar items available with the Rly Administration in that or nearby areas.

ii) Provided that if the Contractor commence work or incurs any expenditure in regard thereto before the rates are determined and agreed upon as lastly hereon-to-fore mentioned, then and in such a case the Contractor shall only entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of the rates as aforesaid according to the rates as shall be by the Purchaser. However, if the contractor is not satisfied with the decision of the Purchaser in this respect he may appeal to Chief Administrative Officer within 30 days of getting the decision of the Purchaser, supported by analysis of the rates claimed. The Chief Administrative Officer's decision after hearing both the parties in the matter would be final and binding on the contractor and the Railway Electrification.

PRICE OF EQUIPMENTS, COMPONENTS & MATERIALS : 1.3.3

The rates given in any sections of Schedule-3, Form-7(Sh. 1 to 26) of the tender paper loaded by same percentage increase/decrease quoted by the tenderer against S.O.R. rates for the corresponding section of Schedule-1, Section-1 to 5, items shall be the effective "On account" rates for items given in the above mentioned subsection of the Schedule-3, Form-7(Sh. 1 to 26).

PRICE OF ADDITIONAL SUPPLIES : 1.3.4

The additional supplies will be taken over from the Contractor at the prices indicated in Schedule 3 (para 1.2.34 (c) and 1.3.12).

PAYMENTS AND RECOVERIES : 1.3.5

Subject to any deduction or recoveries which the Purchaser may be entitled to make under the contract, the Contractor shall, unless otherwise agreed to, be entitled to get the following payments subject to the conditions stipulated in subsequent paragraphs:

i) Payment of mobilisation advance.
ii) Payment for designs.
iii) Payments for foundations.
iv) `On Account' payments.
v) Progress payments for supply and erection.
vi) Payments for additional supplies.
vii) Reimbursement on account of price variation (para 1.3.2 (d)).
viii) Payment for provisional acceptance for each sub-group.
ix) Payment for surplus materials taken over.
x) Final settlement.

INVOICING PROCEDURE : 1.3.6

(a) The contractor shall submit his invoicing procedure for approval by the purchaser within 2 months from the date of receipt of Letter of Acceptance of tender. Separate bills will be submitted by the contractor for different activities as being done presently. However, all these bills will normally be submitted once in a month only. More than one bill for one type of payment in a month can be allowed on case to case basis by obtaining **Chief Project Director's** approval. Separate invoices shall be submitted for different type of payments. Each invoice of the bill shall be submitted with original supporting documents wherever these are acceptable to the Purchaser's Engineer, where copies of original documents are required in support of several invoices included in the bill, true certified copies of the original documents may be forwarded to the Purchaser's Engineer with his consent.

(b) Invoices shall be submitted only on the basis of agreed principles and prices, quantities and measurement of works completed and shall be approved by the Purchaser's Engineer prior to the submission of invoices. For this purpose, the Schedule of quantities and measurements submitted by the Contractor for approval of the Purchaser's Engineer may be only upto the extent of work completed except in the case of payments on provisional acceptance under para 1.3.14.

PAYMENTS FOR DESIGNS : 1.3.7

Payments for designs shall be made on the basis of prices included in item 1, Schedule- 1, Section-1. The amount payable shall be based on assessed quantities against items 1(a) and 1(b) of Schedule 1, Section-1 (Assessment 1) (See para 2.5.9) and payments shall be made in 10 installments.

The amount payable as the first installment shall be 1/10th of the estimated total payments due against item 1(a) and 1(b) of Schedule 1, Section-1 (Assessment 1). The first installment is payable soon after Schedule-1, Section-1, (Assessment 1) is approved and subsequent 8 installments shall be paid thereafter based on progress made as indicated below :-

Payment of five installments due against item 1(a) will be related to the approval of layout plans and cross section drawings, including foundation layout and cross section drawings for Booster Transformer stations and L.T Supply Transformer Stations. Each of these installments will, however, be paid after every 20% of the aforesaid drawings for the entire section have been approved and distribution copies issued.

Payment for three installments due against item 1(a) will be related to the approval of structure erection drawings along with the profiles and the general arrangements drawings, including

balance drawings for Booster Transformer Stations and L.T. Supply Transformer stations. Each of these installments will be paid after every 33-1/3% of the aforesaid drawings for the entire section have been approved and distribution copies issued.

Eight installments against item 1(b) will be paid depending upon the progress of Switching Station designs and drawings as mutually agreed.

The 10th and the last installment shall be the balance amount payable to the Contractor against the actual total payment due against item 1(a) and 1(b) based on the final quantities for the completed work. The amount is payable only after design work is completed and completion drawings referred to in Part-II Chapter-V are submitted.

ADVANCE PAYMENTS FOR FOUNDATIONS : 1.3.8

(a) - Deleted -
(b) - Deleted -

`ON ACCOUNT' PAYMENTS : 1.3.9

(a) `On Account' payment will be made for equipments, components, fittings and materials required for the execution of work and additional supplies as described below subject to a maximum of 2 'On Account' bills for items costing up to Rs. 1 lakh. For items costing beyond 1 lakh, the `On Account' bills shall not be less than 1 lakh. No `On Account' payment will be made on supplies of concreting materials. `On account' payment made will subsequently be adjusted against progress payment (para 1.3.11) and against payment due on provisional acceptance of each sub-group/section (See para 1.3.14) and/or against payment due on supply of spares and other supplies (see 1.3.12). All `On Account' payment shall be covered by a standing indemnity bond in the approved Form (Form No. 16 Pt. V).

NOTE:- All the invoices should be accompanied by the following:-

1. *Supplier's challans*
2. *Inspection Certificate granted by the Purchaser's representative.*
3. *Certificate of receipt of materials at Contractor's Depot/s duly accepted by the Purchaser's Engineers.*
4. *Certificate that the stores have been insured.*
5. *Quality assurance documents (see para 1.2.25).*

(b) DELETED

(c) The contractor should furnish a Bank Guarantee for 10% of the amount claimed for 'On Account' payments along with invoices. The Bank Guarantee shall be in the prescribed form from State Bank of India or from any Scheduled Bank/Nationalised Bank duly conforming to the requirements specified in Para-1.1.5 (d). Initial validity of ONA BG shall be one year or up to stipulated contract completion period; whichever is less. In the event of extension to the time of completion, the Contractor shall extend the validity of the Bank Guarantee if the ONA payments are not fully adjusted from progress payments by that time. In case the Contractor is unable to furnish the Bank Guarantee, equivalent cash would be held by the Purchaser from the payments due to the Contractor.

The above mentioned Bank Guarantee may be released progressively after adjustment of the above amount from the progress payments in terms of para 1.3.11 & after obtaining specific approval of Chief Project Manager/In-Charge of the project. Contractor may furnish BGs in different denominations (maximum five number BGs) for this purpose. Each BG will be released after adjusting the ONA payment to the extent of that particular BG.

(d) **LIMIT FOR "ON ACCOUNT" PAYMENTS**

"ON Account payment shall be paid in full at Sch-3 rates subject to the condition that ONA payment shall stop when cumulative ONA payment reaches 85% of the total value of materials required to

complete the work. For this purpose the total value of the materials required to complete the work should be total of item 3 to 37 of column 7 of Sch-1, Section-1 to 5, as per the latest approved assessment of quantities(para 2.5.9)

(e) `On Account' payments will commence only when Schedule 1, Section-1 to 5 (Assessment-1) is approved by the Purchaser.

RECOVERIES FROM THE CONTRACTOR: 1.3.10

(a) All the recoveries for materials supplied and services rendered by the Purchaser to the Contractor and other refunds due from the Contractor shall, unless otherwise specified, ordinarily be made by deductions from payments due to the Contractor covering the value of supply and erection in the progress payment for erection (see para 1.3.11) and from payment on provisional Acceptance (see para 1.3.14).

(b) The cost of materials supplied by the Purchaser under the second sub-para of 1.2.20.1(b) will be recovered in full by the Purchaser at relevant price in schedule-3 or book rate or last purchase rate whichever is higher, to the extent of requirement of such materials for each sub-group, from the payments to be made under paras 1.3.11 and 1.3.14.

(c) The cost of materials if supplied under para 1.2.21. Will be recovered in the manner indicated in sub-para (a) above.

(d) The materials supplied under paras 1.2.20.1 & 1.2.21 shall be covered by the standing indemnity bond (see Form No 16, part-V).

(e) The security deposit shall be as per item 4 of the Preamble/Para 1.2.17 of Part-I, Chapter-II. The amount over and above the initial deposit of Earnest Money will be recovered from ONA/Progress payment bills of the contractor @ 10% till it reaches 5% of the contract value.

PROGRESS PAYMENTS FOR SUPPLY AND ERECTION GENERAL: 1.3.11

(a) (i) The entire group will be divided into sections of approximately 100 TKMs or part thereof each of which will further be subdivided into agreed sub-sections. The priority of sections will be advised by the purchaser. Progress Payment for foundations, mast erection, bracket erection and wiring shall be as per para 1.3.11(a)(ii).

(a)(ii) Progress payment for supply and erection are payable against items 2 to 37 of schedule 1, Section-1 to 5. Only one progress payment per item will be made for each agreed sub-section. In case the Contractor is unable to complete any item of work in particular sub-section for reason accepted as adequate by the Purchaser, progress payments will be made to the extent of work completed in the sub-section. Supplementary progress payments will be made in respect of the left over works when the work is completed.

On completion of each item of work in schedule-1, Section-1 to 5 (Ref. para 1.3.11) on each agreed sub-section, the Contractor shall be due payments to the suitable extent (as detailed in Clause 1.3.11) of the prices for supply and/or erection included in schedule-1, Section-1 to 5 .The portion of the progress payments towards the supply shall be progressively set off against 'On Account' payment for supply made under para 1.3.9 until the entire 'On Account' payments are adjusted. Thereafter the progress payment towards supply shall commence. The progress payments towards erection will be made as follows:-

(b) **FOUNDATIONS**

(i) Payment will be made on casting of foundation blocks, with or without Core holes, to the extent of 70% of the Prices for item 2 of Sch.-1, Sec.-2 and on the total volume of foundation blocks inclusive of muffs, as included in the approved cross-section drawings or as installed at site with permission of the Purchaser's representative. For this purpose, the entire section to be equipped with Traction overhead equipment under contract will be divided into convenient Sub-section/Sub-groups as may be mutually agreed to. In case the Contractor is unable to cast all the foundation blocks on a particular Sub-section/Sub-groups, due to reasons accepted as justified by the purchaser, payments will be made to the extent of work done in the Sub-section/Sub-group. One more supplementary payment may be made in respect of left-over work when the work is completed.

(ii) On completion of erection of Mast/Portal/Boom and their grouting the Contractor shall receive payments to the extent of 95% against item No. 2 Schedule-1,Section-2, less payments made under Para-1.3.11(b)(i).

(iii) - Deleted –

(c) **MAST AND PORTALS**

(i) On completion of erection of masts and portals of each agreed sub-section, the Contractor shall receive payments to the extent of 85% of the prices for erection of masts and portals under item No.3 of Schedule-1, Section-3.

(ii) On completion of erection of SPS and Brackets, the Contractor shall receive payment to the extent of 95% against item No.3 of Schedule-1, Section-3 less payment made under para 1.3.11(c) (i) above. However, payment conditions can be relaxed by CPM / SAG officer Incharge of the project for Second Stage of Progress payment to the extent of 95% if the erection of SPS and Brackets gets delayed by more that TWO months purely on Railway's account. The decision taken in this respect by the Purchaser shall be final and suitable safeguard may be provided to protect Rly's interest.

(d) **OTHER ITEMS OF SUPPLY AND/OR ERECTION**

(i) On completion of erection of other items except item 6 included in schedule-1, Section-1 to Section-5, on each agreed sub-section, the Contractor shall receive payments to the extent of 85% of the erection prices included in schedule-1, Section-1 to 5.

(ii) On completion of stringing of catenary, contact and R.C. wire, the contractor shall receive payment to the extent of 95% against respective item of Schedule-1, Section-1 to 5, for that portion of work, less payment made for that item under para 1.3.11(d)(i) above. However, payment conditions can be relaxed by the CPM / SAG officer In-charge of the project to the extent of 95% second stage of progress payment if the stringing of catenary, contact wire, RC wire gets delayed by more than TWO months purely on Railway's account. The decision taken in this respect by the purchaser shall be final and suitable safeguard may be provided to protect Rly's interests.

(e) Progress payment for erected bracket assemblies (Item 4) of Pt.I, Ch. IVA, will be made even though the register arm dropper and steady arm are not erected and final revision and adjustment are not done. 85% of the progress payments due for overhead equipment (Item 6) of Pt.I, Ch. IVA, will be made when the catenary and contact wires are strung and droppers installed. 10% of the progress payment due for overhead equipment (Item 6) of Pt.I, Ch. IVA will be made only after the catenary and contact wires are finally adjusted for proper height and/or stagger and all other items of work included in this item are fully completed (vide explanatory notes part-I, chapter IV A,) and work of Switching stations in the respective section is completed. Progress payments for Item 5 and Item 7 to 37 of Schedule-1, Section-1 to 5, will, however, be made after the relevant/ equipments are in position even though the final revision and adjustments are not done.

However, payment conditions can be relaxed in exceptional circumstances for second stage of progress payment to the extent of 95% if adjustment activities of Catenary/contact wire or completion of other subsequent works related to this payment are delayed by more than TWO months purely on Railway's account. The decision taken in this respect by the purchaser shall be final and suitable safeguards may be provided to protect Rlys' interests.

(f) Deleted.

(g) **SWITCHING STATION BUILDING**

For each Switching station building, 95% payment of total payment due against item No.34(a) to 34(i) and item No.35 of Pt.I, Ch. IVA shall be payable on completion of these works. The contractor shall receive balance 5% payment against these items after issue of PAC.

Note: No on account payment shall be admissible on the items included in Schedule-1, Section-6 &7. However, progress payment shall be admissible as per provision in Para 1.3.11.

PAYMENT FOR ADDITIONAL SUPPLIES: 1.3.12

(a) The contractor shall receive payment for additional supplies ordered in para 1.2.34(c), if any, in accordance with the prices included in Schedule-3, on delivery of such supplies to the purchaser after due adjustment against 'On account' payment made in terms of para 1.3.9."

(b) Deleted.

TAX: 1.3.13

(a) All applicable tax, duties & levies (including Octroi etc.) arising out of the transactions between the Contractor and his sub-Contractors/Suppliers for this work will be included in the rates quoted by the Contractor in the relevant schedules.

(b) Wherever the law makes it statutory for the Purchaser to deduct any amount towards applicable tax on works contract, the same will be deducted and remitted to the concerned authority

(c) However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 17 & 17A of GCC and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.(d) Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

PAYMENTS ON PROVISIONAL ACCEPTANCE OF EACH SUB GROUP/ SUB-SECTION : 1.3.14

On issue of Provisional Acceptance Certificate for any sub-group/ section and on fulfillment of para 2.5.11, the Contractor shall receive payment of balance 5% of the price for supply and/or erection against item 2 to 37 of schedule 1, Section-1 to 5, in each section for the quantities for which progress payments under para 1.3.11 have already been made.

PAYMENTS FOR SURPLUS MATERIALS : 1.3.15

The Contractor shall receive payment on prices included in schedule 3 for the surplus materials taken over by the Purchaser (see para 1.2.53) on delivery of such materials to the Purchaser.

FINAL SETTLEMENT : 1.3.16

On expiry of the guarantee period and issue of the certificate of final acceptance of the entire installations (see para 1.2.50),the security deposit will be refunded or Bank Guarantee released to the Contractor after adjustment of any dues payable by the Contractor.

MEASUREMENTS : 1.3.17

(a) Payments for field work shall be made in accordance with approved designs and drawings and measured in relevant units except where provided or other wise. In case the dimensions of the work are more than those shown in approved designs and drawings, the Contractor will not be entitled to any extra payment unless dimensions were increased on account of physical impossibility of carrying out the work in accordance with approved drawings and designs. In case the dimensions of work are less than those shown in the approved designs and drawings and the work is accepted without being rejected, payment will be made as per work actually done.

(b) The measurements will be made generally in accordance with standard engineering practice and in conformity with the explanatory notes for schedule 1, Section-1 to 5 (Part I, Chapter IV A).

(i) It shall be open to the Contractor and the Railway to take specific objection to any recorded measurement or classification on any ground within seven days of the date of such measurements. Any re-measurements taken by the Engineer or the Engineer's representative in the presence of the Contractor or in his absence after due notice has been given to him in consequence of objection made by the contractor shall be final and binding on the contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the measurements.

(ii) If an objection raised by the Contractor is found by the Engineer to be incorrect the Contractor shall be liable to pay the actual expenses incurred in measurements.

MOBILISATION ADVANCE : 1.3.18

(a) If required by the Contractor, mobilisation advance limited to 10% of contract value shall be payable if estimated value of the tender is 25 Crores and above. This advance shall be payable in two stages as under:-

STAGE 1:- 5% of the total contract value on signing the contract.

STAGE 2:- 5% of the total contract value on satisfying the following requirements :-

(a) Setting-up of field and design office.

(b)Supply by purchaser of approved cross section drawing to the contractor for at least 25 RKMs and approval of cross section, general arrangement and foundation layout drawing for the first TSS **or** within six months of the award of contract whichever is earlier.

The Mobilisation Advance shall be against an irrevocable guarantee (Bank Guarantee, FDRs, KVPs/NSCs) of at least 110% of the value of the sanctioned advance amount. The Bank Guarantee shall be from a Nationalised Bank in India. This BG will be released after recovery/adjustment of the mobilisation amount from ONA and/or progress payments. Alternatively, contractor may initially submit the BG in four parts each of value 25% of the total Mob. Adv. claimed by them plus estimated interest during recovery period. Each part will be released to the contractor after adjusting the amount to the extent of that particular BG. Initially, interest calculation shall be done for one half of contract completion period on the Mob Adv claimed by the contractor. A watch shall be kept on interest accrual and if principal plus interest are likely to exceed the amount of BG submitted by the contractor, contractor shall submit additional BG to that extent. Initial validity of BG shall also not be less than one half of contract completion period.

Interest:-

The mobilisation advance shall carry an interest at the rate of 8.5% (Eight & Half percent) per annum and recovery of the mobilisation advance alongwith its interest shall be made from 'On Account' and progress bills including design payment and advance payments for foundations on pro-rata basis. The interest will be charged on balance outstanding on the first day of each month.

The recovery of the advance shall be commencing when the work to an extent of 15% of the provisional value of the contract is completed. The recovery of principal and interest shall be made at the rate of 15% of 'On Account' and/or progress payments such that the entire amount is recovered before total payment reach 85% of the value of the contract.

(b) In case principal and interest could not be deducted progressively from progress/'On Account' bills during the course of the year, the interest on mobilisation advance as accrued in the end of an year will be recovered within the first 30 days of the next year from the progress/ 'On Account' bills or any other bills which may be made by the Railways to the Contractor. If, for any reason whatsoever, no progress/ 'On Account' bill or any other amount is paid to the Contractor, he will still pay to the Railways the accrued interest in full within the said 30 days of the next year. Otherwise, the unpaid interest will be added on to the principal and interest for the next year will be charged on the balance comprising Principal as well as unpaid interest.

(c) In case of extension of the date of completion due to any reason whatsoever the interest on the mobilisation advance outstanding would continue to accrue as specified earlier and the Contractor/firm would make the payment against the advance in the same manner as specified in para (b) above.

(d) No advance/extra payment other than stated above shall be payable against the works.

(e) The tenderers shall specifically indicate in their offer whether mobilisation advance is required by them. In case no specific demand has been made in the offer, grant of mobilisation advance shall not be considered subsequently.

(f) --- DELETED ---

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PART - I

CHAPTER – III B

PRICES AND PAYMENT

Para No	Subject
1.3.1	- Scope
1.3.2	- Schedule of Prices
1.3.3	- Price of Equipments, components and materials
1.3.4	- Prices of additional supplies
1.3.5	- Payments and recoveries.
1.3.6	- Invoicing Procedure.
1.3.7	- Payments for designs.
1.3.8	- `On Account' Payments.
1.3.9	- Recoveries from the Contractor.
1.3.10	- Progress Payments for supply and erection.
1.3.11	- Payments for additional supplies.
1.3.12	- Tax.
1.3.13	- Payments on Provisional acceptance.
1.3.14	- Payment for surplus materials.
1.3.15	- Final settlement.
1.3.16	- Measurements.
1.3.17	- Mobilisation Advance. (Refer para 1.3.18, Pt.-I, Ch.-III A)

P A R T – I

CHAPTER – III B

TRACTION SUB-STATION

PRICES AND PAYMENT

1.3.1 SCOPE

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

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

1.3.2 SCHEDULE OF PRICES

a) **(i) Unit price for items with SOR.**

The unit prices given against various items of works in Schedule 1 Section- 8, 9 & 10 of the tender paper are standard schedule of rates (S.O.R.). The Tenderers are required to quote uniform percentage below/at par/above against the S.O.R. cost for these items while quoting Offered prices **on IREPS site.** The actual payment to be made against any item of Schedule 1 Section- 8, 9 & 10, shall be derived after loading the SOR prices with the tenderer' s quoted percentage. The prices so obtained shall be the unit prices for the various items of works given in Schedule-1, Section 8, 9 & 10.

a) (ii) Rates of NON SOR Items (Non schedule items)

The rates of NON SOR items have to quote separately in Performa given in Sch.1, Section-11. The tenderers are required to quote uniform percentage below/at par/above against the estimated cost for these items while quoting Offered prices **on IREPS site.** The actual payment to be made against any item of Sch.1, Section-11, shall be derived after loading the estimated cost with the tenderer' s quoted percentage. The prices so obtained shall be the unit prices for the various items of works given in Schedule-1, Section-11.

All Unit prices shall be FIRM irrespective of minor variations in basic quantities and use of alternative types of various components and fittings approved by the purchaser. Minor changes in basic designs shall not affect the unit prices, so long as such changes are mutually agreed to by the Purchaser and the Contractor. All Unit Prices shall be in RUPEES. The prices shall be for materials and erection except for the materials indicated in Annexure-4 for which only erection charges will be payable, and for execution of work in accordance with specifications and approved drawings and designs. The Contractor shall carefully note the items of materials, equipments, fittings and components which will be supplied by the Purchaser.

b) Unit Prices for materials

The unit prices indicated in supply column of Schedule-1 Section- 8, 9, 10 & 11 are inclusive of the prices of materials including all incidental charges for transport, loading/unloading and handling of materials, commission for arranging dispatch by rail direct from manufacturer's factory and completing all necessary formalities in this respect, such as submission of forwarding notes, arranging placement of wagons, collection of Railway receipts, all insurance premia, banker's charges for bank guarantee, indemnity bonds, inclusive of cost of stamps etc. as also siding or shunting charges, if any, levied by the Railway.

The prices shall include all taxes, duties and levies (including Octroi etc.) applicable on this works contract. Therefore, they should quote their prices taking into account the rate of taxes as leviable in the

event of sale through works contract to the Central Government organization in that State. It is clarified that required forms applicable for this purpose will be supplied to the contractor as applicable in the State where the contract is being executed. The prices shall also include provision for losses and wastages in transit and erection.

The unit prices indicated in erection column of Schedule-1 Section- 8, 9, 10 & 11, shall include cost of erection and testing to be done by the contractor to the extent indicated in Part-II, Chapter-VII and also cover all cost of administration of the contractor, insurance premia, banker's charges for guarantees, cost of stamps, cost of storage, loading and unloading and handling of materials, and for any road transport which the contractor may use for carriage of materials between his depot and depots and the site of work. The unit prices shall include cost of works and adjustments necessary to be done by the contractor during or after the tests, carried out by the Purchaser, as per Part-II, chapter-VII.

However, if the rates for existing GST or cess on GST for Works Contract is increased or any new tax/cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/ date of completion extended under clause 17 & 17(A) of GCC and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.
Further, if the rates of existing GST or cess on GST for Works Contract is decreased or any new tax/cess on Works Contract is decreased/removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

(c) **Other Price adjustments**

(I) (Refer para1.3.2 (d) (i) of Pt.-I, Ch.-III A)

(i) Price variation for Supporting Structures and small parts Steel including Zinc:

(Refer para1.3.2 (d) (i), 3.0 of Pt.-I, Ch.-III A)

(ii) Price variation for Cement (Concreting Part):

(Refer para1.3.2 (d) (i), 2.0 of Pt.-I, Ch.-III A)

(iii) Price variation for Power Transformer (Applicable only for Composite Electrical Contracts where Supply of Transformer is in the scope of Contractor)

Price variation, on account of variation in the price input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials as specified in the price variation clause given below. In case of any variation in these prices the price payable shall be subject to adjustment up or down in accordance with the following IEEMA formula.

$$P = \frac{Po}{100}\left\{10 + 29\frac{C}{Co} + 27\frac{ES}{ESo} + 7\frac{IS}{ISo} + 5\frac{IM}{IMo} + 7\frac{TO}{TOo} + 15\frac{W}{Wo}\right\}$$

P = Price payable as adjusted in accordance with the above formula.

Po = Price quoted/confirmed.

Co = Average LME settlement price of copper wire bars (refer notes)

This price is as applicable for the month, **ONE** month prior to the date of tendering.

ESo = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of tendering.

ISo = Average price of steel Plates 10 mm thick (refer note)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.

IMo = Price of insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.

TOo **=** Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.

Wo = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100)

This index number is as applicable on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in June 2015, applicable prices of Copper Wire Bars (C0), Transformer Oil (TO0), Steel Plates 10 mm thick (IS0), CRGO Electrical Steel Laminations (ES0) and Insulating material (IM0) should be as on 1st May 2015 and all India average consumer price index no. (W0) should be for the month of 1st March 2015.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_TRF/_/_ **ONE** month prior to the date of tendering.

C = Average LME settlement price of copper wire bars (refer notes)

This price is as applicable for the month, **TWO** months prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day for the month, **TWO** months prior to the date of delivery.

IS = Average price of Steel Plates 10 mm thick (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, **TWO** months prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100)

This index number is as applicable on the first working day of the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2015, applicable prices of Copper Wire Bars (C), Insulating material (IM), CRGO Electrical Steel Laminations (ES) should be as on 1st October 2015 and Transformer Oil (TO), Plates 10 mm thick (IS), should be 1st November 2015 and all India average consumer price index no. (W) should be for the month of September 2015.

The date of delivery is the date on which the transformer is notified as being ready for inspection/dispatch (in the absence of such notification, the date of manufacturer's dispatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension there to), whichever is earlier.

Note : (a) All prices of raw materials are exclusive of modvatable excise/CV duty amount and exclusive of all taxes (octroi etc., if any) transformers manufacturers import major raw materials like Copper, CRGO Steel Sheets and Plates etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD.

(b) All prices are as on first working day of the month.

(c) The details of prices are as under :-

(i) The LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

(ii) The price of CRGO is the price of CRGO Electrical Steel Lamination in Rs./MT suitable for Transformers of rating above 10 MVA or voltage above 33 KV up to 400 kV.

(iii) Price of steel is the average retail price of steel plates 10 mm thick as published by Joint Plant Committee (JPC) in Rs./MT as on 1st working day of month.

(iv) The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 10 mm thick, 3200 mm x 4100 mm is the average C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.

(v) The price of Transformer Oil (In Rs./K. Ltr) is the average price on ex-refinery basis as quoted by primary products for supply in drums.

(d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under :

$$P = \frac{Po}{93}\left\{10 + 29\,\frac{C}{Co} + 27\,\frac{ES}{ESo} + 7\,\frac{IS}{ISo} + 5\,\frac{IM}{IMo} + 15\,\frac{W}{Wo}\right\}$$

Where description of P, P0, C, ES, IS, IM, W etc. remains same as mentioned earlier.

(II) Price variation on erection

(Refer para1.3.2 (d) (ii) of Pt.-I, Ch.-III A)

NOTE:-

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

(a) payment/recovery for increase/decrease in GST on works contract or imposition/ removal of any tax/cess on Works Contract as per Clause 1.3.2,

(b) payment/recovery for overall market situation shall be made as per Price Variation Clause given hereunder.

(ii) No cognizance will be given for any sort of Fluctuations in taxes and other market conditions etc. for any individual items for the purpose of making adjustments in payment except as provided for in the under noted clauses.

(iii) Price Variation clause (PVC) shall be applicable only for contracts of value (contract agreement value) Rs. 5 crore and more, irrespective of the contract completion period. Materials supplied free of cost by Railway to the contractors shall fall outside the preview of Price Variation Clause. If, in any case, accepted offer includes some specific payment to be made to consultants or some materials supplied by Railway free or fixed rate, such payments shall be excluded from the gross value of the work for the purpose of payment/recovery of price variation.

(iv) **Price Variation During Extended Period of Contract**:

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

(a) In case, the indices increase above the indices applicable to the last month of original completion period or the extended period under clause 17-A of the General Conditions of Contract, the price adjustment for the period of extension granted under Clause 17–B shall be limited to the amount payable as per indices applicable to the last month of the original completion period or the extended period under Clause 17-A of the General Conditions of Contract; as the case may be.

(b) In case the indices falls below the indices applicable to the last month of original / extended period of completion under Clause 17-A of the General Conditions of Contract, as the case may be; then the lower indices shall be adopted for the price adjustment for the period of extension under Clause 17- B of the General Conditions of Contract .

(v) The base month for price variation clause shall be taken as month 28 days prior to of opening of tender including extension, if any, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month of following the month of opening of tender. The price variation shall be based on the average price index of the quarter under consideration.

Base month for applicability of PVC shall be only from the date of opening of the tender and not from the date of negotiation, if any.

(vi) The price variation as calculated for materials other than concreting materials will be calculated to the extent of 85% only of the total under supply column of Schedule-1 Section- 8, 9 & 10 for

respective items (for which on account payment is admissible). The value of price variation shall be increased on pro-rata basis for the remaining 15% of such materials for which on account payment is not admissible. Similarly, the value of price variation shall be reduced pro-rata in case of unused materials, but for which ONA payment has already been made.

(vii) Adjustment for variation in prices of material, labour, fuel, explosives, detonators, steel, concreting, ferrous, non-ferrous, insulators, zinc, and cement shall be determined in the manner prescribed.

(viii) Components of various items in a contract on which variation in prices be admissible, shall be Material, Labour, Fuel, Steel, Cement, Concreting, Ferrous, Non-ferrous, Insulators, Zinc, Erection etc. However, for fixed components, no price variation shall be admissible.

(ix) The demands for escalation of cost shall be allowed on the basis of provisional indices made available by Reserve Bank of India. Any adjustment needed to be done based on the finally published indices shall be made as and when they become available.

(d) Quantities.

The approximate estimated quantities of various items of work are included in Form-5, under col. Quantities.

(e) Supplement to Schedule of Prices.

-Deleted-

(f) Explanatory notes.

Explanatory notes for various items of work included in Schedule-1 Section- 8, 9, 10 & 11, are given in Part-I, Chapter-IV B.

(g) (1) New items of work

(1) If during the erection of the work the contractor is called upon to carry out any new item of work not included in Schedule-1 Section- 8, 9, 10 & 11 the contractor shall execute such work at such prices as may be mutually agreed with the Purchaser before commencement.

(2) before the rates are determined and agreed upon as lastly hereon-to-fore mentioned, then and in such a case the Contractor shall only entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of determination of the rates as aforesaid according to the rates as shall be fixed by the Purchaser. However, if the contractor is not satisfied with the decision of the Purchaser in this respect he may appeal to Chief Electrical Engineer within 30 days of getting the decision of the Purchaser, supported by analysis of the rates claimed. The Chief Electrical Engineer's decision after hearing both the parties in the matter would be final and binding on the contractor and the Railway Electrification.

1.3.3 PRICES OF EQUIPMENTS, COMPONENTS AND MATERIALS

The prices of individual equipments, components and materials required for the work inclusive of all taxes (Octroi etc., if any) and Insurance Premia under the Emergency Risk (Goods), Insurance Act in force (1.2.40)), if any, shall be included in Schedule-1 Section- 8, 9, 10 & 11 supply rate (See para 1.3.12).The prices shall be related to the actual prices of the components and materials. No adjustment of rates is permissible if alternative approved fittings are used for any reason whatsoever.

1.3.4 PRICES OF ADDITIONAL SUPPLIES

The additional supplies (Para 1.2.34) will be taken over from the Contractor at the prices indicated under supply rate of Schedule-1 Section- 8, 9, 10 & 11 as worked out after applying the overall percentage as applicable.

1.3.5 PAYMENTS AND RECOVERIES

Subject to any deduction or recoveries which the Purchaser may be entitled to make under the contract, the Contractor shall, unless otherwise agreed to, be entitled to get the following payments, subject to conditions stipulated in subsequent paragraphs:

i) Payment of mobilization advance.
ii) Payments for designs.
iii) On account payment.
iv) Progress payments for supply and erection.
v) Payments for additional supplies.
vi) Payments for surplus materials taken over.
vii) Payment on provisional acceptance.
viii) Final settlement.

1.3.6 INVOICING PROCEDURE

a) The contractor shall submit his invoicing procedure for approval of the Purchaser within two months from the date of receipt of Letter of Acceptance of Tender Separate invoices shall be submitted for different types of payments mentioned above. All invoices shall be submitted with original supporting documents or certified true copies of supporting documents, wherever these are acceptable to the Purchaser's Engineer. Where copies of original documents are required in support of several invoices, true certified copies of the original documents may be forwarded to the Purchaser's Engineer, with his consent.

"However, all these bills will normally be submitted once in a month only. More than one bill for one type of payment in a month can only be allowed on case to case basis by obtaining prior approval of Chief Project Manager/Project Incharge provided it is considered essential to expedite the progress of work".

b) Invoice shall be submitted only on the basis of agreed principles and prices, quantities and measurement of works completed shall be approved by the Purchaser's Engineer prior to the submission of invoices. For this purpose, the schedule of quantities and measurements submitted by the Contractor for approval of the Purchaser's Engineer may be only up to the extent of work completed except in the case of payments on provisional acceptance under Para 1.3.13(Pt. I, Ch. IVB).

1.3.7 PAYMENT FOR DESIGNS.

Payments for designs in respect of section shall be made on the basis of prices included in item 1, Schedule-1 Section- 8 & 9. Payment shall be made in two installments for each section, the first 50% being paid on fulfillment of clause 2.5.7 (a) & (b) and the balance 50% on fulfillment of clause 2.5.8.

1.3.8 ON ACCOUNT' PAYMENTS.

a) `On account' payment will be made for equipment, components, fittings, and materials required for the erection of the work of SOR items mentioned in Schedule-1 Section- 8, 9 & 10 . No on account payment will be made on supply of concreting materials and NS items. On account payments made will subsequently be adjusted against progress payments and against payments on provisional acceptance (Para 1.3.13, Pt. I, Ch. III B). On account payment shall be covered by standing Indemnity Bond in the approved form (see form No.16 Part V).

b) On Account payments, for components, fittings and material required for execution of the work, shall be made to the contractor at the rates indicated at supply column of Schedule-1 Section- 8, 9 & 10. This shall not apply to concreting, brick masonry material and other items no. 1,2,4,8,9,10, 24(f), 26(d), 27 and 28 of Schedule-1 Section- 8. On account payment for additional supplies will be made to the contractor at the rate of supply column of Schedule-1 Section- 8, 9 & 10.

All invoices shall be accompanied by the following:

i) Statement indicating the requirement of quantity of sub- station and quantity claimed in the bill.

ii) Supplier's challans.

iii) Inspection certificate granted by the purchaser's representative.

iv) Certificate of receipt of materials at the Contractor's depot duly accepted by the purchaser's Engineers.

v) Certificate that the stores have been insured.

c) On account payments for materials

The Contractor shall furnish a Bank Guarantee for 15% of the amount claimed under sub-para (b) above along with invoices. The Bank Guarantee shall be in the prescribed form from State Bank of India/any Nationalized Bank or from any Scheduled Bank duly conforming to requirement specified in Form-19 and valid for two months beyond the date of completion of work. In the event of extension to the time of completion that Contractor shall suitably extend the validity of the Bank Guarantee. In case the Contractor is unable to furnish the Bank Guarantee, equivalent cash would be held by the Purchaser from the payments due to the Contractor.

The Bank guarantee submitted for any ONA payment as mentioned above or equivalent cash held by the purchaser in absence of the Bank guarantee may be released progressively after approval of Chief Project Manager /Project In charge after adjustment of such ONA payment against the progress payment and/or against payment on provisional acceptance.

d) Limit for `On account' payment.

The total on account payment shall not exceed 85% of the value of the materials required to complete the work. For this purpose the total value of the materials required to complete the work shall be the total of item 3 to 35 of total supply portion of Schedule-1 Section- 8, 9 & 10 as per the latest approved assessment of quantities.
In case the contract covers more than one traction sub-station, the limit of “ON ACCOUNT” payment for each substation shall be computed separately.

e) ‘On Account’ payments will commence only when Schedule-1 Section- 8, 9 & 10 is approved by the Purchaser.

1.3.9 RECOVERIES FROM THE CONTRACTOR

a) All the recoveries for materials supplied and services rendered by the Purchaser to the Contractor and other refunds due from the Contractor, shall ordinarily be made, by deduction from payments due to the Contractor covering the value of supply and erection in the progress payments for erection (Para 1.3.10)(Pt. I, Ch.IIIB) from payments on provisional acceptance (Para 1.3.13) (Pt. I, Ch.IIIB).

b) The cost of materials supplied by the Purchaser under the second sub-para 1.2.20.2 (b) will be recovered in full by the Purchaser at the prices laid down in Note at the end of Para 1.4.5(Pt. I, Ch.IV B). Adjustment for quantity taken back by the Purchaser shall be made through the payments under Para 1.3.13(Pt. I, Ch.IIIB).

c) The cost of materials if supplied under para 1.2.21 will be recovered in the manner indicated in the sub-para (a) above.

d) The materials supplied under Para 1.2.20.2 (b) and 1.2.21 shall be covered by the standing indemnity bond (See Form 16 Part V).

e) The security deposit shall be as per item 4 of the preamble (Para 1.2.17). The amount over and above the initial

Deposit in the form of earnest money will be recovered from the ONA/progress payment bill of the contractor @10% till it reaches 5% of the contract value.

1.3.10 PROGRESS PAYMENTS FOR SUPPLY AND ERECTION

The progress payment for supply and erection will be effected as under:-

a) Only one progress payment will be made for each TSS, against each item of work in Schedule-1 Section- 8, 9, 10 & 11. In case, the Contractor is prevented from completing any item of work in a particular traction sub-station, for reason accepted as adequate by the Purchaser, progress payment will be made to the extent of work completed in that TSS. One more supplementary progress payment will be made in respect of the left over work when it is completed.

b) Foundation

On completion of foundations at each sub-station, the Contractor shall receive payments to the extent of 95% of the supply & erection prices for the foundations under item 2, of Schedule-1, section 8.

c) Other items of supply & erection

On completion of other items of work included in Schedule-1 Section- 8, 9, 10 & 11 on each sub-station, the contractor shall receive payments to the extent of 95% of the prices for supply and/or erection included in Schedule-1 Section- 8, 9, 10 & 11.

(d) The portion of progress payment towards the supply shall be progressively set-off against On account payment made under para 1.3.8(Pt. I, Ch. IIIB) until the entire On account payment are adjusted. Thereafter, the progress payment towards the supply shall commence. For the progress payment towards erection, the contractor shall receive payment to the extent of 95% of the erection price included in Schedule-1 Section- 8, 9, 10 & 11.

(e) All the above payments shall be subject to any recoveries, which may be due under para 1.3.9(Pt. I, Ch. IIIB).

1.3.11 PAYMENTS FOR ADDITIONAL SUPPLIES

a) The Contractor shall receive payment for any additional supplies covered under Para 1.2.34(c) at Schedule-1 Section- Section- 8, 9 & 10 supply rates on delivery of such supplies to the purchaser after due adjustment against `On account payment made in terms of Para 1.3.8 (Pt. I, Ch. IIIB).

1.3.12 TAX

a) All taxes, duties and levies (including Octroi etc., if any) arising out of the transaction between the contractor and his sub-contractors/suppliers for this work will be included in the rates quoted by the contractor in the relevant schedule.

b) Wherever the law makes it statutory for the Purchaser to deduct any amount towards applicable tax on works contract, the same will be deducted and remitted to the concerned authority.

c) However, if rates of existing GST or cess on GST for Works Contract is increased or any new tax /cess on Works Contract is imposed by Statute after the date of opening of tender but within the original date of completion/date of completion extended under clause 17 & 17A of GCC and the Contractor thereupon properly pays such taxes/cess, the Contractor shall be reimbursed the amount so paid.

d) Further, if rates of existing GST or cess on GST for Works Contract is decreased or any tax/cess on Works Contract is decreased / removed by Statute after the date of opening of tender, the reduction in tax amount shall be recovered from Contractor's bills/Security Deposit or any other dues of Contractor with the Government of India.

1.3.13 PAYMENT ON PROVISIONAL ACCEPTANCE

After completion and fulfillment of Para 2.5.8 of each traction substation of this tender and issue of PAC, the Contractor shall receive payment of balance 5% of prices for supply and/ or erection against all items of Schedule-1 Section- 8, 9, 10 & 11, excluding item No.1 of Schedule 1 Section - Section- 8, 9 & 10 for each traction sub-station for the quantities for which progress payment under Para 1.3.10 (Pt. I, Ch. IIIB) has already been made.

1.3.14 PAYMENT FOR SURPLUS MATERIAL

The Contractor shall receive payment on prices included under supply rate of Schedule-1 Section- Section- 8, 9 & 10 for the surplus materials taken over by the Purchaser (See 1.2.53) on delivery of such materials to the Purchaser.

1.3.15 FINAL SETTLEMENT

On expiry of the guarantee period and issue of the certificate of final acceptance of the entire installations (See 1.2.50), the Security Deposit will be refunded or Bank Guarantee released to the Contractor after adjustment of any dues payable by the Contractor to the Purchaser and after the conditions under Para 1.2.56 have been satisfied.

1.3.16 MEASUREMENTS

a) Payments for field work shall be made in accordance with approved designs and drawings and measured in relevant units, except where provided or otherwise. In case the dimensions of the work are more than those shown in approved designs and drawings, the Contractor will not be entitled to any extra payment unless the dimensions are increased on account of physical impossibility of carrying out the work in accordance with approved drawings and designs, subject to approval by the Purchaser before execution. In case the dimensions of work are less than those shown in the approved designs and drawings and the work is accepted without being rejected, payment will be made as per work actually done.

b) The measurement will be made generally in accordance with standard engineering practice and in conformity with the explanatory Notes for Schedule-1 Section- 8, 9,10 & 11 (Part-I, Chapter-IV B).

(i) It shall be open to the Contractor to take specific objection to any recorded measurement or classification on any ground within seven days of the date of such measurements. Any re-measurements taken by the Engineer or the Engineer's representative in the presence of the Contractor or in his absence after due notice has been given to him in consequence of objection made by the contractor shall be final and binding on the contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the measurement.

(ii) If an objection raised by the Contractor is found by the Engineer to be incorrect the Contractor shall be liable to pay the actual expenses incurred in measurements.

1.3.17 MOBILISATION ADVANCES: - (Refer para 1.3.18, Pt.-I, Ch.-III A)

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PART - I

CHAPTER- III C

-DELETED-

PART-I

CHAPTER-IV A

1 **PART- I**

1.4 **CHAPTER-IV "A"**

EXPLANATORY NOTES OF SCHEDULE
(FOR OHE, SWS, BT STATION & LT SUPPLY TRANSFORMER STATIONS)
SCHEDULE OF PRICES

Part "A"- OHE GENERAL

1.4.1 Explanatory notes for various items of work in Schedule-1 are given below:

1.4.2 The basic quantities of components and materials required to make up a unit of work for selected items, are indicated for guidance only. There may be minor variations to suit erection but no adjustment in prices of Schedule -1 (Pt. I, Ch. IVA) shall be made on that account. In estimating the prices for various items of work, provision for loss and wastage in transit and erection should be provided for over and above the basic quantities of components and materials required to make up a unit of work, indicated herein, except where otherwise specified for materials supplied by the Purchaser.

1.4.3 In the explanatory notes given in Part-"B"- Particular of this Chapter, the term 'Small parts steel work' is meant to cover fabricated steel work made from rolled steel sections, complete with bolts and nuts and washers where required for fastening the small parts steel work to any structural member. The term "attachment" wherever used is intended to cover castings, forgings, machined or welded components or fittings, which are attached directly to a structural member, or mounted on small parts steel work and shall include bolts and nuts for fastening the attachment to the structural member or small parts steel work.

1.4.4 In the explanatory notes given in Part-"B"- Particular of this chapter, the term "bimetallic connection" is meant to cover any connection between a copper conductor and an aluminium conductor. The clamps used for such connections shall be made of a suitable aluminium alloy or copper alloy and the copper/aluminium conductor shall be wrapped with a bimetallic (aluminium copper) strip to prevent direct contact between aluminium and copper.

1.4.5 Special notes for measurements are included in Part-"B"- Particular of this chapter under various items, where necessary.

1.4.6 Reconciliation of materials supplied by the Purchaser (see para 1.2.20)

(a) The following procedure shall be adopted for the final reconciliation of the various equipments, materials, fittings and conductors supplied by the Purchaser in terms of para 1.2.20.1 (see Annexure 4) for OHE..

(b) All the materials supplied by the Purchaser shall be correctly accounted for and quantities reconciled on completion of the work by the Contractor. On completion of work, all surplus materials supplied by the Purchaser together with the ones found defective or that have become defective or broken on account of defective materials and/or workmanship shall be returned to him by the Contractor.

(c) DELETED
(d) DELETED

(e) **(i) SOLID-CORE-INSULATORS**: Cost of insulators will be paid in Schedule-1, Section-5.
(e) (ii) In case the Purchaser chooses to supply to the Contractor the following galvanised steel tubes for bracket assembly, the procedure to be adopted would be as under:-

(1) Standard bracket tube (m 29.9/38.0 mm).
(2) Large bracket tube (m 40.9x49.0 mm).
(3) Stay & register arm tube. (m 28.4mm/33.7 mm).

Soon after the approval of layout plan and cross section drawings the Contractor shall assess the quantity of the above types of tubes required for the work and submit his assessment indicating the phased requirement of each type of tubes in total running lengths for verification by the Purchaser. Based on this verified assessment the Purchaser will supply the tubes in random lengths varying from 5.5 metre to 6.40 metre meeting either the phased requirement or the entire requirement. On completion of work the Contractor shall return to the Purchaser all the uncut tubes or cut pieces having length more than 2.5m, which have not been utilised.

The cut pieces having length less than 2.5 m need not be returned. For final reconciliation the total length of the tubes deemed to have been utilised for the work shall be as calculated on the basis of total length

arrived at as per `As erected' structure, erection drawings plus 7% wastage/working allowance. The total length of the tubes supplied to the Contractor less the total length returned by the Contractor shall in no case exceed the total length deemed to have been utilised for the work as stated above. In case it exceeds, the Purchaser shall be entitled to recover the cost of such excess length of tubes as per the provision specified in note at the end of para 1.4.6 (f) (Pt. I, Ch. IVA).

(e) **(iii) SUPPLY OF STEEL BY RAILWAYS** : In case the Purchaser chooses to supply galvanised, rolled steel masts, gantry masts, fabricated steel works, to the Contractor, the cost of rolled steel masts, gantry masts, fabricated steel work damaged or falling short will be recovered at rates specified in NOTE at the end of para 1.4.6 (f) (Pt. I, Ch. IVA).

(e) **(iv) SUPPLY OF COPPER CONDUCTORS BY RAILWAYS** : In case the Purchaser chooses to supply copper wires and conductors to the contractor, the procedure to be adopted would be as under:-

Soon after the approval of layout plan and cross section drawings the Contractor shall assess the quantity of the wires and conductors required for the work and submit his assessment indicating the phased requirement of each type of wires and conductors in total running lengths or in MT for verification by the Purchaser. The Purchaser will supply to the Contractor all wires and conductors required for the work based on unit quantities, inclusive of erection allowances in accordance with column 6, Annexure-6 together with the lengths of finished wires and conductors for new items of work (see para 1.3.2 (j) (Pt. I, Ch. IIIA) and the lengths of wires and conductors under items 31(h) of Schedule-1 (Pt. I, Ch. IVA). Out of the quantity as calculated above, the contractor shall return to the Purchaser wires and conductors in longest possible bits or in the form of scrap, as calculated on the basis of the final quantities of items of work of Schedule-1 (Pt. I, Ch. IVA) and the quantities specified in column 5, Annexure-6. The total length of finished wires and conductors deemed to have been erected will be the difference, viz., as calculated on the basis of the final quantities of Schedule 1(Pt. I, Ch. IVA) and the bare unit lengths specified in column 4, Annexure-6 together with the lengths of finished wires and conductors for new items of work (see para 1.3.2 (j) (Pt. I, Ch. IIIA) and the lengths of wires and conductors under item 31(h) of Schedule-1 (Pt. I, Ch. IVA).

Notwithstanding the above, it is a general condition that the Contractors shall return to the Purchaser all wires and conductors which have been supplied to him but not utilised on works. Should the Contractor be unable to do so, the Purchaser shall be entitled to recover the cost of such wires and Conductors as specified in NOTE at the end of para 1.4.6 (f) (Pt. I, Ch. IVA). For the purpose of reconciliation the length of wire or conductor deemed to have been supplied by the Purchaser to Contractor will be the length stenciled on the drum and the length deemed to have been returned by the Contractor will be the actual length of cut-pieces and/or the length calculated on the basis of the actual weight of cut pieces scrap and linear density specified in column 2, Annexure-6.

(e) **(v) SUPPLY OF ATs & INTERRUPTERS BY RAILWAYS**: In case the Purchaser chooses to supply Auxiliary Transformers and Interrupters to the Contractor, the contractor shall return the unused equipments to purchaser on completion of the work. The cost of shortages or damages if any, will be recovered at rates specified in NOTE at the end of para 1.4.6 (f) (Pt. I, Ch. IVA).

(f) **OTHER EQUIPMENTS, FITTINGS AND COMPONENTS:**

The Purchaser will supply the requirement of the various other equipments, components or fittings listed in Annexure-4. If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the prices inclusive of all charges as specified in note below:-

NOTE : (1) If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the book rate or the last purchase rate or the prevailing market rate, whichever is higher, plus 5% on account of initial freight, 2% on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material freight and incidental charges. Freight between the Purchaser's source of supply and the Contractor's depot or RE siding shall be to the Contractor's account.

(2) No recovery/reconciliation shall however, be made as per the preceding paras if the items stated under clause 1.4.6 (Pt. I, Ch. IVA) are made contractor supply by including the respective optional items in the contract.

□□□□□□

Part "B"

OHE PARTICULAR
Schedule-1, Section-1 to 5

(1) Notwithstanding anything to the contrary in this section, the entire requirement of the equipments components and fittings for the work, listed in Annexure - 4 will be supplied by the Purchaser to the Contractor (see para 1.2.20.1(b). The prices in Schedule-1, Section 1 to 5 shall be exclusive of cost of supply of these items mentioned in Annexure-4 of Part-IV.

(2) In the case of wires, conductors, etc., the prices for erection shall include any assembly work to be done in the Contractor's depot prior to erection at site, such as fabrication of droppers etc to shapes and sizes required.

ITEM No.1 (a) Preparation of designs and drawings for overhead equipment and verification of Purchaser's pegging plans.

The price shall cover verification of Purchaser's overhead equipment pegging plans indicating location of structures which will be furnished by the purchaser, in stages, and preparation of all drawings and designs required to be finalised by the Contractor. The price shall include the following:-

(i) Making minor modifications with the approval of the Purchaser to the layout of the structures and overhead equipment, if necessary, and submission of overhead equipment layout plans, including stagger, location of cut in insulators etc.

(ii) Preparation of cross section drawings and structure erection drawings for each structure locations [see para 2.5.6(f)].

(iii) Choice of type and size of foundations to suit soil and loading conditions, except for the ones which are considered as "Works under other Agencies" (see para 1.2.37).

(iv) Preparation of long section drawings of overhead equipment where such drawings are required including detailed study of overline structures such as foot over bridges, road over bridges etc. for maintaining the specified height of contact wire and requisite clearances.

(v) Preparation of other designs and drawings including drawings of small parts steel work (other than those for which RDSO standard drawings are available) and detailed designs for booster transformer stations and LT. Supply Transformer stations (see para 1.2.23).

(vi) Supply of requisite no. of copies of all drawings, including completion drawings specified in part - II, Chapter V to the Purchaser.

(VII) Preparation, design, development of Bonding Plans based of Track Circuit plans supplied by the purchaser, clearly specifying the location of various bonds, +ve, -ve rails and other relevant details as required for bonding plan and supply of requisite number of copies of Bonding Plans drawings.Î

In case preparation of the overhead equipment pegging plans by the Purchaser for any part of the section is delayed, the Contractor may be asked to prepare pegging plans for the section. No extra payment will be made for the preparation of such pegging plans. The total length of track for which the Contractor may be asked to prepare such pegging plans will not exceed 2% of the final total quantity against this item. This price shall also cover soil investigation and testing in an approved manner.

NOTES FOR MEASUREMENTS : *For the purpose of payment against this item, the length of track shall be measured as under :-*

1. General: *By the difference in the chainages of the length under consideration, as incorporated in the layout plans.*

2. Turnouts: *The track taking off shall be deemed as starting from the toe of the switch of the Turnout.*

3. Cross-overs : *The length of track shall be taken as the difference in the chainages of*

the toes of switches of the two turnouts constituting the crossover.

4. Diamond crossing with or without slips: *The two tracks crossing each other shall be measured independently as per note 1 above as though there were no crossing. No extra shall be provided for slip points.*

5. Dead ends and tops of loops: *The lengths for payment under this item shall be upto the chainage of anchor mast of the terminating OHE.*

6. Feeders and return feeders from grid sub-station to feeding station

This item will also be applicable independently in case of feeders/return feeders/ conductors from grid substation 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 item (a) shall be measured by the distance between the 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.1 (b) Preparation of designs and drawings for switching stations (FP/SP/SSP)

The price shall cover on a flat rate basis per switching station, survey, investigation of soil bearing pressure, preparation of cross section drawings, preparation of general arrangement drawings, detailed layout of equipment, bus-bar connections and insulators, layout of earthing system and earth connections, cable run layout, detailed designs and drawings for steel work and structural support, excluding the ones for which supply is made by the Purchaser, suitable concrete plinths for equipment and drawings for equipments, components, fitting and materials supplied by the Contractor. The price shall include supply of requisite number of copies of all drawings, including completion drawings as specified in Part -II, Chapter-V to the Purchaser (see para 1.2.23).

ITEM No. 2 (a) (i) Concrete for foundation and plinth in hard soil.
(ii) Concrete for foundation and plinth in rocky soil.
(For concrete mix of M 10 and M 15 Grade in Foundation)

The price shall cover excavation, supply and handling of all materials and accessories, temporary arrangements for excavation in hard soil and concrete/masonry drains/walls requiring use of chisel and hammer 2(a)(i) or requiring blasting 2(a)(ii), Shoring where necessary, casting concrete including frame work where necessary, tamping of concrete, grouting of masts and finishing the top of concrete foundation or anchor blocks. The price also includes dismantling of all connected temporary arrangements, back filling with earth and compacting the same to the required height and width as per drawing to ensure safety of foundation, confining the exposed height of foundation block to within 10 cm., and removal of spoil.

The Purchaser's Engineer shall certify where use of chisel and hammer or blasting has been necessary. The contractor shall arrange for supply of explosives and all tools 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 foundations shall be paid for under item 2(a)(i) or 2(a)(ii) as the case may be. If half of the depth or width of the excavation is in hard soil/concrete/masonry drains/walls and the other half is in rock, the entire foundation shall be paid under item 2(a)(ii). The price shall include the cost of cement.

Notes for measurement for items 2 (a) (i) and (ii):-

1. The payable volume of the foundations under item 2(a)(i) and (ii) shall be the designed one as shown in the drawings for which the hole has been blasted, irrespective of the actual configuration assumed by the latter due to the blasting.
2. The depth of the excavation shall be measured from the formation level to the maximum excavated point.

ITEM No. 2 (az) (i) Concrete for foundation and plinth in hard soil.
(ii) Concrete for foundation and plinth in rocky soil.
(for concrete mix of M 15 and M 20 Grade in Foundation)

Same as 2(a)(i) and 2(a)(ii) above.

ITEM No. 2 (b) Concrete for foundation and plinth in other than hard soil and rock.
(for concrete mix of M 10 and M 15 Grade in Foundation)

The price shall include all works mentioned in item 2(a) in all classes of soil except hard soil, concrete or masonry drains and walls and rock.

ITEM No. 2 (bz) Concrete for foundation and plinth in other than hard soil and rock.
(for concrete mix of M 15 and M 20 Grade in Foundation)

Same as 2(b) above.

ITEM No. 2 (c) Reinforced concrete for foundation and plinth in other than hard soil and rock
(Grade M-15)

The price shall cover excavation and all reinforced concrete work for foundations excluding supply of steel for reinforcement {which will be paid separately under Item 3(g)} and including other materials shoring where necessary, casting concrete including frame work where necessary, grouting and finishing the tops of foundation blocks. The price shall also include dismantling of all connected temporary arrangements, back filling as required and removal of spoil. The price shall also cover all concrete work for foundation (including that of Height Gauge) or anchor blocks on bridge piers, irrespective of whether they are actually reinforced or not, and counter weight foundations. Rails and fasteners required for counter weight foundations shall be supplied by the Purchaser free at the Contractor's depot or work spot according to convenience of the Purchaser. Dowel bars as may be required for bond with bridge structures shall be supplied and erected free of cost by the Purchaser. Dowel bars will not be considered as reinforcement for the purpose of this item. The price shall, include the cost of cement.

Note : Erection charges for CC/RCC in Hard Soil & rock shall be payable @ erection charges of Item 2(a)(i)/2(az)(i) & item 2(a)(ii)/2(az)(ii) respectively.

ITEM No. 2 (cz) Reinforced concrete for foundation and plinth in other than hard soil and rock
(Grade M-20)

Same as for Item 2(c) above except Concrete mix shall be M-20.

Note : (i)Erection charges for CC/RCC in Hard Soil & rock shall be payable @ erection charges of Item 2(a)(i)/2(az)(i) & item 2(a)(ii)/2(az)(ii) respectively.

(ii) Cost of steel for reinforcement if any, shall be payable under item 3(g).

Item No. 2(czz) : Re-inforced cement concrete grade M-25 for foundation and plinth.

This item is exclusively applicable for casting foundation with Reinforced cement concrete of Grade M-25 suitable for special portal structures at stations and yards. Foundation shall be cast as per drawing no. CERC-6575-RC-CE-DC-001 applicable for special portal structures. The prices includes following activities.

[i] Excavation of pit of appropriate size.
[ii] Provision of PCC in grade M-10.
[iii] Casting of RCC in M-25 grade concrete.
[iv] Provision of 36 mm dia foundation bolts.
[v] Provision of Reinforcement.
[vi] Re-filling, compaction, ramming of pit after casting of foundation.

The price shall cover excavation, supply and handling of all materials and accessories, temporary arrangements for excavation in concrete/ masonry drains/ walls requiring use of chisel and hammer, shoring wherever necessary, casting concrete, finishing the top of foundation after erection of portal structures. The price also includes dismantling of all connected temporary arrangements and removal of spoil after completion of casting work.

Note: [i] 75 mm thick PCC ratio 1:3:6 (M-10) required for foundation bed shall be paid under item 34 (b).

[ii] Cost of supply of steel Reinforcement shall be payable against item 3(g) including cutting, straightening, hooking, bending, binding, erecting and placing and keeping in position including all lead and lift and including cost of binding wire.

[iii] Cost of supply of 36 mm dia Bolts, nuts, washers etc. shall be payable against item 3(m), however, erection price is inclusive in this item.

[iv] Price is inclusive of re-fillings, compaction, ramming of pit after casting of foundation.

ITEM No. 2 (d) Deleted-

Notes for items 2 (a) to (c)

1. The prices under item 2 shall be same for any shape or size of concrete blocks. In calculating the individual volume of concrete, fraction of a cubic metre beyond the third decimal shall be rounded off to the next nearest third decimal.

2. The prices under items 2(a), (b) and (c) shall apply for concreting of all foundations for mast, gantries, portals, anchor blocks for guy rods, and fencing uprights.

3. For purposes of computation of volume of concrete under item 2, the volume of steel work embedded in the foundation block shall be ignored.

4. Cost of all concrete will be paid for only under item 2 and the prices of other items shall not include cost of concrete except for Item-17.

5. For purpose of computation of volume of concrete under item-2. 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 utilised in sand core foundations, the volume of the sand and bitumen used in core hole should be deducted from the total volume of the foundation.

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

7. The prices under items 2 (a), (b) and (c) shall also include the cost of concrete cable trenches and trench covers at the switching stations as well as embodiment of drain pipes, where required.

8. The prices under items 2 (a),(b) and (c) shall also cover the cost of diversion of masonry/earth drain wherever necessary for casting of foundations.

9. Concrete mix for foundation and grouting/muffing under item 2(a),(b) and (c) will be as per para 2.2.4.

10. In case Ready Mix concrete is used, no extra payment shall be payable to the contractor. Payment shall be done at the rates given in the contract irrespective of concrete is nominal or Ready Mix.

ITEM No. 2 (e) Extra for supply & sinking of concrete shells

The price shall cover extra on items 2(a),(b) and (c) for supply and sinking of a concrete shell before casting of concrete for traction structure foundations or anchor blocks including pumping of water where necessary. Purchaser's Engineer shall decide whether sinking of concrete shells is necessary.

NOTE : The above price shall be per concrete shell of standard size specified in para 2.2.7. If more than one concrete shell is used in a foundation, the price shall be proportionately augmented.

Item No.2 (f): Casting of Foundations using mechanised Augur:

The price shall cover excavation, supply and handling of all materials including supply and erection of steel for reinforcement, accessories/temporary arrangements and all associated operations for casting of foundations by mechanised Augur in all type of soils except rocks. All machines, tools and equipment needed for the above shall be supplied by the Contractor at his own cost. The price shall include the cost of cement.

NOTE : 1. The payable volume of the foundation shall be the designed one as shown in the drawings for which the pit has been excavated irrespective of the actual configuration assumed by the latter after auguring.

2. The depth of the excavation shall be measured from the formation level to the maximum excavated point.

ITEM No. 2(h)(i) : -DELETED-

Item 2(j): Concrete for Cylindrical type side bearing foundations (M-15 and M-20) (SBC - 11000 kgf/sqm)

Cylindrical type foundation for side bearing locations for 11000 kgf/sqm safe bearing capacity (SBC) as an alternative to Conventional Side Bearing type foundation for conventional and High Rise OHE as per RDSO's drawing Nos.

(i) TI/DRG/CIV/FND/RDSO/00002/17/0 Rev-0 for Conventional OHE.
(ii) TI/DRG/CIV/FND/RDSO/00003/17/0 Rev-0 for High Rise OHE.

The price shall cover excavation of pits with the help of mechanized augar, supply and handling of all materials and accessories including re- enforcement steel (epoxy coated) conforming to IS: 432 Part -1. The price shall include cutting, bending and binding of re-enforcement bars.

Price shall include shoring if required, concrete grouting of mast and finishing the top of foundation of mst. The price shall also include dismantling of all temporary arrangement and removal of spoil.

Machinery/Plant and Augur required for digging of pit shall be arranged by contractor at their own cost.

ITEM No. 3(a)(i) :Supply and Erection of traction masts fabricated from Rolled mild steel beam (BFB) of size 152mm x 152mm x 37.1 Kg/m and galvanised in length 9.5 m or 8.5 m long.

The price shall cover the cost of supply of finished traction mast fabricated from Rolled mild steel beam (BFB) 152mm x 152mm x 37.1 Kg/m designated SC-150, table 3.1of IS-808/1989 duly drilled as per RDSO's Drawing No. ETI/OHE/G/00144,Sh.No.3 Mod-C, with latest mod. and galvanised as per Specification No. ETI/OHE/13 (4/84) with A&C Slip No.1 to 3 with latest spec. The length of mast will be 9.5 or 8.5 meter as required. The steel shall be conforming to IS-2062/2006 (latest) Gr 'A' SK Zinc conforming to IS-209/1992 (or latest).

The price shall cover cost of erection, alignment and setting before grouting of individual traction masts. The price shall also include the cost of repairing of platform shelters in case the shelter is dismantled/removed/damaged during the course of erection of a mast at platforms.

ITEM No. 3(a)(ii): Supply and Erection of traction masts, main mast of Switching stations and Booster transformer stations fabricated from Rolled mild steel Joist (RSJ) of size 203 mm x 152 mm x 52.0 kg/m and galvanised in various lengths.

The price shall cover the cost of supply of traction mast, main mast of Switching stations and Booster transformer stations fabricated from Rolled mild steel joist (RSJ) 203mm x 152mm x 52.0 Kg/m designation WB-200, table 2.2 of IS-808/1989 duly drilled as per RDSO's Drawings given below for various types of masts and galvanised as per Specification No. ETI/OHE/13 (4/84) with A&C Slip No.1 to 3, with latest spec. The steel shall be conforming to IS-2062/1992 (latest) Gr 'A' SK Zinc conforming to IS-209/1992 (or latest).

Drg No. (i) ETI/OHE/G/00144, Sh.No.3 latest Mod 9.5 M long

(ii) ETI/C/0030 latest Mod	11.4 m (S1)
(iii) ETI/C/0031 latest Mod	11.4 m (S2)
(iv) ETI/C/0036 latest Mod	8.0 m (S4)
(iv) ETI/C/0181 latest Mod	12.4 m (S6)
(iv) ETI/C/0184 latest Mod	9.4 m (S9)

The price shall also cover the cost of supply of any other structures fabricated out of RSJ beam.

The price shall cover cost of erection, alignment and setting before grouting of individual traction masts and main masts of Switching and Booster Transformers stations including those for head spans. The price shall also include the cost of repairing of platform shelters in case the shelter is dismantled/removed/damaged during the course of erection of a mast at platforms.

ITEM No. 3(b)(i) :Supply and erection of fabricated and galvanized structures (O,N&R type portals) with necessary components other than masts.

The price shall cover the cost of supply of O, N and R type portals with components as per RDSO's Drg. No. :

(i) ETI/C/0008 Sheet No.1 latest Mod for 'N' type
(ii) ETI/C/0017 Sheet No.1 latest Mod for 'O' type
(iii) ETI/C/0011 Sheet No.1 latest Mod for 'R' type

The structures shall be fabricated from steel conforming to IS:2062/2006, Gr.E-250 (Fe 410 W), Quality-A, IS-808/1989 and galvanised as per RDSO's specification No.ETI/OHE/13 (4/84) with A&C slip Nos 1 to 3 , with latest spec.

The price shall cover, cost of erection, alignment and setting before grouting, wherever required, of portals assembly of boom components and erection of the same. The prices shall also include supply and erection of galvanised bolts, nuts washers etc. wherever required as per approved designs and drawings. The price shall cover assembling, adjustment and erection of all types of booms including TTC booms and any special structures across the track, not covered under item 3(b)(iii). The price shall also include the cost of repairing of platform shelters in case the shelter is dismantled/ removed/damaged during the course of erection of a portal at platforms.

ITEM No. 3(b)(ii) : Supply and erection of structural steel (traction mast) fabricated and galvanized, of all type B-Series Mast.

The price shall cover the cost of supply of B-Series traction mast 9.5 m and/or 11.4 m long i.e. B-Series Mast fabricated and galvanized as per RDSO Drg No. ETI/C/0071 (Mod-E), TI/DRG/CIV/B-Mast/00001/ 13/0 with latest mod and specification No. ETI/OHE/13 (4/84), with latest spec. Steel shall be conforming to IS-2062/2011 Gr. A and Zinc conforming to IS-209 latest.

The price shall also cover the supply of all size of B-Series mast required which has not been mentioned.

The price shall cover cost of erection, alignment and setting before grouting of individual traction masts and main masts of Switching and Booster Transformers stations including those for head spans. The price shall also include the cost of repairing of platform shelters in case the shelter is dismantled/removed/damaged during the course of erection of a mast at platforms.

Note: 11.4 m long masts shall have provision for erection of Brackets (Cantilevers) for conventional as well as for High Rise OHE.

ITEM No. 3(b)(iii) Supply and erection of special fabricated & galvanised steel structure other than portals and traction masts not covered under item 3(b)(i) & 3(b)(ii).

The price shall cover the cost of supply and erection of special fabricated & galvanised steel structures (other than BFB/RSJ/B-Series masts and portals) for conventional and High Rise OHE. The structure to be supplied under this item shall be TTC, G-type, BFB type portals, Bridge masts, emergency masts and double/fabricated “S” series masts such as S3, S5, S7, S8, S-100, S-101, T-150, Dwarf Masts etc. Any other similar structure required during the execution of work shall also be supplied under this item.

The price shall include the cost of steel, fabrication, galvanisation, and supply at site for erection. Steel shall be conforming to IS-2062 Gr.’A ‘ SK 2011 (latest), Zinc conforming to IS- 209/1997 (latest) and

galvanisation to RDSO's specification No. ETI/OHE/13(4/84) with A&C slip No.1 to 3, with latest spec. The various structures covered under this item are:-

SN	Description	Drg No.	Mod
1	TTC with 5.5/8.0m boom	ETI/C/0009 sheet 1	Latest
2	G-type portal upright & end pieces	ETI/C/0056	Latest
3	BFB portal	ETI/C/0026 Sh.1	Latest
4	S-7,12.4m	ETI/C/0182	Latest
5	S-8,12.4m	ETI/C/0183	Latest
6	S-100, for LT, transformer at SWS	ETI/C/0043	Latest
7	S-101, for Isolators inside SWS	ETI/C/0044	Latest
8	S-3,11.4m	ETI/C/0180	Latest
9	S-5,11.4m	ETI/C/0042	Latest
10	T-150, for LT supply transformer	ETI/PSI/037	Latest
11	Dwarf Mast	ETI/OHE/G/1402	Latest
12	Special BFB Portal for 5 tracks (General Arrangement) for High Rise OHE	TI/DRG/CIV/BFB-POTAL/00001/13/0 Sh. No. 1	Latest
13	G-Type Portal Special Upright and End Piece for High Rise OHE	TI/DRG/CIV/G-PORTAL/00001/13/0	Latest
14	Two Track Cantilever Structure (TTC) General Arrangement for High Rise OHE	TI/DRG/CIV/TTC/ 00001/13/0 Sh.-1	Latest

The price shall cover, cost of erection, alignment and setting before grouting , wherever required, gantries, including tower/ steel tower/steel work for feeders for traction sub-station, drop arms, standard super masts and suspension brackets for feeders and return conductors, dwarf masts or stub masts for anchoring, complete with anchor plates drilled and welded in position, multiple cantilever cross arm, chairs, adopters for bracket assemblies and all other small part steel works, the erection of which is carried out by the Contractor irrespective of whether they are supplied by the Purchaser or the Contractor. The prices shall also include supply and erection of galvanised bolts, nuts washers etc. wherever required as per approved designs and drawings. The prices shall also include the cost of repairing of platform shelters in case the shelter is dismantled/ removed/damaged during the course of erection of a mast/portal at platforms.

Note for Item 3(a)(i), 3(a)(ii), 3(b)(i), 3(b)(ii) & 3(b)(iii) :

(i) The price for the items 3(a)(i), 3(a)(ii) and 3(b)(i), 3(b)(ii) , 3(b)(iii) shall also include the cost of stenciling of location number on masts/portal uprights in the manner as directed by the Purchaser. The price shall also include straightening of masts/portals uprights wherever approved by the purchaser and cutting of mast/portals/upright to suit the site condition.

(ii) For the purpose of payment for supply and/or erection, the black weights as per respective RDSO drawing for individual traction masts (RSJ, BFB & B series, S-1, S4, S-6 & S-9), head span, Portal structures (O, N & R type), special steel structures (TTC, BFB, G & P type portal, Dwarf masts, S3, S5, S8, S100, S101, T-150 etc) shall be payable to the contractor.

(iii) For the purpose of payment for supply and/or erection, of bridge mast or any other structures which are not covered in RDSO's drawings, if any, the black weights of such structures including all components as shown in respective approved drawing, shall be payable to the contractor by purchaser.

(iv) No payment is permissible for increased weight of any structure or their components on account of galvanization.

(v) The payment shall be made on the basis of the final lengths/weight of the structures, in case the same are cut or modified as indicated above before erection.

(vi) In case of any dispute in unit weights mentioned in drawings, the matter will be decided by the CPM of the project and decision taken in the matter will be final and binding on to the contractor.

Item 3(b) (iv) : Design, Supply, Fabrication, Erection & Painting of Height Gauge at level crossings (for clear span up to 7.3m and / or above 7.3m upto 12.2m)

The price shall cover supply of Height Gauges duly fabricated painted complete in all respect. However, provision of particular type of Height Gauge at various level crossings shall be decided and advised by the purchaser during execution of work. Contractor shall procure the structures/Steel required for the work accordingly. Following RDSO/ CORE drawings are applicable for different types of Height Gauges.

SN	Description	RDSO/CORE Drg. No.
1	Standard Plan, Details of Height Gauge for span 7.3 m to 10.0 m, Details of structure and foundation.	CORE Drawing No. RE/CIVIL/S/148-2011 Mod-1 & 2 OR TI/DRG/CIV/HGAUGE/RDSO/00001/14/0 Mod-A
2	Standard Plan, Height Gauge for level crossing (For clear span up to 7.3 m) Details of structures and foundation.	TI/DRG/CIV/HGAUGE/RDSO/00001/05/0
3	Standard plan, Height Gauge for level crossing (For clear span above 7.3 m up to 12.2 m) Details of structures and foundations.	TI/DRG/CIV/HGAUGE/RDSO/00002/05/0

Price shall cover supply of various steel sections conforming to IS 2062/2011, IS 808/1989, Fabrication at site or supply duly fabricated from CORE/IS approved sources for structures & SPS. Price shall cover supply of bolts, nuts & washers etc necessary for fastening the components of Height Gauge.

Price shall cover cost of painting of Booms & upright with Red Oxide / Zinc Chromate to IS: 2074 as first coat and 2nd coat with enamel paint to IS: 2933-1975 Black and white colour alternatively 300 mm wide band.

Crash Barrier and Rail Barricading shall be provided as required and as per provision in drawings.

The price shall cover cost of erection, alignment and setting while grouting of upright and side supports. The price shall cover labour charges required for welding / fabrication of side supports / uprights and other components at site.

Note:-

(i) For the purpose of payment against item 3(b)(iv) for all the components (upright, boom, side supports, crash barrier / Barricading etc.), weight of structures/ fabricated steel works will be calculated according to standard unit weight of respective sections for required quantity. Contractor will be required to submit Bill of materials for each type of Height Gauge along with Black weight thereof for approval by the purchaser before claiming the payment.

(ii) In case of any dispute in unit weights, the matter will be decided by the CPD of the project and decision taken in the matter will be final and binding on to the contractor.

(iii) No crane / tools & Plants will be provided by purchaser for fabrication, erection or transportations of Height Gauge or black steel required for the work.

(iv) Prices for foundation works (CC & RCC) shall be admissible under item 34(b) and 2(cz) respectively.

Item 3(b)(v) : Supply and Erection of special type portal structures including uprights, Booms and components.

The price shall cover the cost of supply of special type portal structure with components as per Drawing to be supplied by the purchaser.

The structure shall be fabricated from steel confirming to IS - 2062/ 2006 No. E - 250 (Fe 41OW) quality- A, IS - 808 / 1989 and galvanised as per RDSO specification No. ETI/OHE/13 (4/84) with A&C slips Nos 1 to 3.

The price shall cover, cost of erection, alignment and setting before grouting, wherever required of portal assembly of boom components and erection of the same. The prices shall also include supply and erection of galvanised bolt, nuts, washers etc wherever required as per approved designs and drawings. The price shall cover assembling, adjustment and erection of booms. The price shall also include the cost of repairing of platform shelters in case the shelter is dismantled/ removed/ damaged/ during the course of erection of a portal at platform.

The Price shall also cover the cost of stenciling of location number on the portal upright in the manner as directed by the purchaser. The price shall include cost of straightening of uprights/Booms if required.

ITEM 3 (c) : Supply only of fabricated steel work other than mast

The price shall cover the cost of supply only of all fabricated steel work excluding fasteners which are required to be supplied by the Contractor. The cost of erection for such steel work, if carried out by the Contractor shall be paid for under item 3(b)(iii).

For standard fabricated steel work for which RDSO'S approved drawings are available, the weight of steel work as specified in RDSO'S drawing shall be considered for payment. However, in case the unit sectional weight of any member indicated in RDSO's drawing is not in conformity with the unit sectional weight as per the latest IS specification, the weight of the fabricated steel work shall be calculated on the basis of latest IS specification and the same will be considered for payment. For the non-standard fabricated steel work, the calculated weight to be considered for payment under this item shall be included in the relevant drawing based on, latest IS sectional weight at the time of submitting the designs for approval of the Purchaser.

The price shall include the cost of supply of bracket top and bottom mast fittings suitable for PSC masts.

ITEM No. 3(d) - DELETED-

Notes for Items 3(a)(i), 3(a)(ii), 3(b)(i), 3(b)(ii), 3(b)(iii) & 3(c)

1. For the purpose of payment against items 3(a)(i), 3(a)(ii), 3(b)(i), 3(b)(ii), 3(b)(iii) & 3(c), weight of structures or fabricated steel work will be calculated according to the weight of black steel given in section books for the lengths of various members shown in the approved drawings. There will be no addition for increased weight due to galvanizing or painting or weld material or reduction for holes or skew cuts.

2. The rates against item 3(b)(iii) shall be applicable to the erection of small part steel work, which are not covered under the various other items of work. Unless specifically indicated none of the other items of work shall include the cost of supply and/or erection of small part steel work, which will invariably be paid for under item 3(b)(iii) or and 3(c) as applicable.

ITEM No. 3(e)(i) : Supply and erection of a Guy Rod Assembly

The price shall cover supply and erection of Guy Rod Assembly, for both conventional and High Rise OHE, 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.

COMPONENTS REQUIREMENT

Rly. Id. No.	Description of components	Qty. per unit
3232	Mast guy rod fitting (welded) complete with 4 short bolts, nuts, lock nuts and washers for attachment to mast/S.P.S including appropriate fittings.	1 off
5001/ 5001-1/ 5001-3	Anchor bolts (complete with nuts lock nuts and split pins)	1 Set
5002	Guy rod stirrup	1 off
5004 or 5005 or 5005-2 or 5006-1 or 9070 or 9071 or 5006-2	Guy rod with nut, lock nut, washer and split pin	1 off
5007-1	Anchor 'v' bolt	2 off

5008	Anchor	2 off
5220	Guy rod double strap assembly	1 off or 2 off (as required)

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.

2. Supply and erection of guy rod assembly at anticreep portals will also be paid for under this item.

ITEM No. 3(e)(ii) : Supply and erection of Anchoring Arrangement of traction mast with Galvanised steel stranded wire

The price shall cover supply and erection of Anchoring Arrangement with Galvanised steel stranded wire of required length for traction masts, feeder line towers or supports complete with mast guy rod fittings, Galvanised steel stranded wire of 9.3 or 9.7 m and part/s be grouted in the anchor block as per RDSO's drawing No. TI/DRG/OHE/GSSW/0002/09/0. 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.

COMPONENTS REQUIREMENT

Rly.Id.No.	Description of components	Qty. per unit
3232	Mast guy rod fitting (welded) complete with 4 short bolts, nuts, lock nuts and washers for attachment to mast/S.P.S including appropriate fittings	1 of
5023-1	Eye Bolt (complete with M24 nut, Lock nut Plain washer, thimble and split pins 5x40	1 Set
5002	Guy rod stirrup	1 off
5004-1or 5005-1	Galvanised Steel Stranded Wire 12.5 mm dia	1 off
5007-1	Anchor 'v' bolt	2 off
5008	Anchor loop	2 off
5220	Guy rod double strap assembly	1 off or 2 off (as required)

Item No.3(f) : **Erection of PSC Mast.**

The erection price shall cover cost of erection, alignment and getting before grouting of individual PSC masts wherever these are to be located. The price shall also include the cost of stenciling of location number on masts in the manner directed by the purchaser.

Item No.3(g) : Supply of steel reinforcement for RCC work including cost of cutting , straightening, bending , biding, erecting and placing & keeping in position including all lead & lift & including cost of binding wire

The item covers the price of supply of tested quality of steel for reinforcement of appropriate size and for reinforcement steel above 8 mm or suitable dia shall be High strength deformed steel bars conforming to IS:1786/1985 and below 8 mm dia shall be mild steel and medium tensile steel bars conforming to IS:432(Pt.I)/ 1982.

Price shall cover the cost towards cutting, straightening hooking, bending, binding, erecting and placing and keeping in position including all lead and lift and including cost of binding wire.

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

Item No.3(h)(i) : **-DELETED-**

Item No. 3(h)(ii) : **-DELETED-**

Item No.3(i) : Supply and Erection of 25 kV Caution Boards/Plates

The price shall cover price of material including Caution Boards, SPS items, nuts, bolts etc. as required and erection charges Caution Boards shall be of two types.

(i) General Caution Notice at entrance to Railway station (Hindi & English). No. ETI/OHE/G/7551 latest Mod.

(ii) Caution Plate 25000 V. No. ETI/OHE/G/7531 latest Mod.

Price shall be inclusive of Sales tax, Excise duty, Freight etc. Boards shall required to be installed on a steel structure/Rail post/wall of a building therefore mode of erection shall be as per requirement of the site.

ITEM No.3(j) : Supply and erection of protective screen on ROBs/FOBs

The price shall cover on per track basis on both sides of ROB/FOB, the cost of all material required for fabrication of protective screen including angle, Tee, expanded metal (Jali), GI sheet, paints etc. The price shall also include the labour cost for fabrication, erection and painting at various locations. The fabrication and erection work shall be done as per RDSO Drg.No.ETI/C/0068 latest Mod.

Item 3(k) Supply and erection of Danger Plate on a Height Gauge

The price shall cover supply of Danger Board (as per RDSO drawing No. ETI/C/0069 Rev-C) including necessary Bolts, Nuts, Washers etc and erection thereof on the boom of each Height Gauge

ITEM No.4(a) (i) : Supply without Insulator and erection of a single bracket assembly

The price shall cover on a flat rate basis any bracket assembly on a traction mast or support on drop arm and shall include those on high/low level platform, in the vicinity of turnouts, over bridges or and at locations with reduced encumbrance or terminating wires. The price shall include the cost of supply of all components including galvanised steel tube, dropper wires, bolts and nuts etc. but excluding small parts steel work and solid core insulators. Cost of insulators will be paid in Schedule-1, Section-5 and cost of SPS will be paid under item 3(c) of Schedule-1, Section-3. The price shall cover erection of all components including insulators, small parts steel work and dropper wires. However, this does not include the anticreep arrangement at masts/structures. The price shall include:

Rly. Id No.	Description of components	Qty. per unit
3020-1	Mast fitting for hook insulator (Forged)with 2 off bolts, nuts, lock nuts and washers of 16 dia.	1 set
2400	Tubular stay arm assembly (including galvanised steel tube).	1 set
2110/ 2130/ 2380	Catenary suspension bracket assembly or hook bracket	1 off
1160)	Suspension clamp	1 off
2120, 2140, 2040, 2080	Bracket tube assembly complete with tube cap and sleeve where required (including galvanised steel tube).	1 set
3070-1/2)	Mast bracket fitting assembly including 2 off bolts, nuts, lock nuts and washers of 16 m for attachment to structure or to small part steel work.	1 set
2151-2, 2152-2, 2161-2, 2162-2	Register arm hook Top & Bottom complete (Forged) with bolts, nuts and lock nuts.	1 off
2420 or 2430, 2270-4 or 5	Register arm assembly or raised register arm assembly (including galvanised steel tube).	1 set
2460 Style 02 or 2470-Style 02	Register arm dropper assembly including dropper wire complete with bolts, nuts etc.	1 set
2391-1, 2540/2520	Steady arm hook (BFB) (Forged) or bent steady arm (where required)	As required
2361-1, 2491-2, 2492-2	25 mm drop bracket (Forged) with bolts & locknuts. 25 mm Steady arm clamp (Forged) with bolts & locknuts.	-do-

1220/1370/-1	Contact wire swivel clip or raised register arm clamp	1 off
2550-1/2	Antiwind clamp	As required

ITEM No. 4(a)(ii) : Extra on 4(a) (i) for supply and erection of additional fittings on a single bracket assembly for supporting two OHEs

The price is applicable as an extra to item 4(a) (i) or 4(a) (v) for the provision of additional fittings required to support an additional OHE on a single bracket assembly payable under item 4(a)(i) or 4(a)(v). The price shall include supply of all extra fittings excluding the double contact wire swivel clip. The price shall include erection of all extra fittings, including the double contact wire swivel clip.

ITEM No. 4(a)(iii) : Supply without insulator and erection of a single bracket assembly suitable for tramway type overhead equipment (regulated).

The price shall cover on a flat rate basis any bracket assembly, on a traction mast or support on drop arm, and shall include those on high level platform, in the vicinity of turnouts, over bridges or over-laps and at locations with reduced encumbrance or terminating wires. The price shall include the cost of supply of all components including galvanised steel tubes, dropper wires, bolts and nuts etc. but excluding small parts steel work and solid core insulators (Cost of insulators will be paid in Schedule-1, Section-5). Cost of SPS will be paid under item 3(c) of Schedule-1, Section-3. The price shall cover erection of all components including insulators, small part steel work and dropper wires. However, this does not include the anticreep arrangement at masts/structures. The price shall include:

Rly. Id. No	Description of Component.	Qty. per Unit.
3021-1	Mast fitting for hook insulator (Forged) with 2 off bolts, nuts, lock-nuts & washers of 16 mm dia.	set 1
2400	Tubular stay arm (including galvanised steel tube).	set 1
2403-1, 2402	Tubular stay sleeve with Adjuster.	set 1
2380	Hook bracket	set 1
2140	Large catenary direct clamp	set 1
2160-1	Large register arm hook	set 1
2080	Large bracket tube assembly (49 mm) (including galvanised steel tube).	set 1
3070-1/2	Mast bracket fitting assembly including 2 off, bolts, nuts, lock-nuts and washers 16 mm.	set 1
2540-1	BFB steady arm assembly	set 1
2550-3	Standard anti-wind clamp	set 1
1220	Contact wire swivel clip	set 1

ITEM No.4(a)(iv) : Extra on item 4(a)(iii) for supporting two tramway type OHE (Regulated).

The price is applicable as an extra to item 4(a)(iii) for the provision of additional fittings required to support an additional OHE on complete bracket assembly payable under item 4(a)(iii). The price shall include supply of all extra fittings, excluding the double contact wire swivel clip.

ITEM No.4(a)(v) : -DELETED-

Item No.4 (ax): Supply of Insulators for item Nos.4 (a)(i) & 4 (a) (iii).

The price shall cover only supply of the following Insulators mentioned against each items required for execution of work covered under items 4(a)(i) & 4(a)(iii). Erection cost of insulators are inclusive in items 4(a)(i) & 4(a)(iii) respectively.

Item No.	Insulator
4(ax)(i)	Stay Arm Porcelain (CD-1050 mm)
4(ax)(iv)	Bracket Porcelain (CD-1050 mm)
4(ax)(ii)	Stay Arm Composite (CD-1050 mm)
4(ax)(v)	Bracket Composite (CD-1050 mm)
4(ax)(iii)	Stay Arm Composite (CD-1600 mm)
4(ax)(vi)	Bracket Composite (CD-1600 mm)

ITEM No. 4(b)(i) : **Supply without insulator and erection of pull-off arrangement for one OHE**

The price shall cover supply of all components required for a pull-off arrangement to pull one equipment only including supply of copper conductors, small jumper(50) wire, head-span mast fittings complete with M.S. angle, equalising plate assembly, steady-arm, catenary dropper clip, contact wire swivel clip and fittings excluding solid core insulators (Cost of insulator will be paid in Schedule-1, Section-5). The price shall cover erection of all components including solid core insulators, small jumper wire and conductors.

NOTE : (i) For composite OHE' a catenary dropper clip with necessary bimetallic strip/ washer to be used in place of catenary dropper clip (Id. No.1192).

(ii) 5 mm diameter Hard drawn Copper wire shall be used for Register Arm Dropper for all locations except for those on long Girder Bridges, where wear rate is high for which 7 mm diameter Hard drawn Copper wire shall be used for Register Arm Dropper.

ITEM No. 4(b)(ii): Extra for each additional equipment pulled.

The price shall cover as an extra to item 4(b)(i) supply and erection of all additional fittings required including the supply of required conductors/ jumper wires, in case the pull off pulls more than one equipment the prices applicable for each extra equipment pulled.

ITEM No. 4(b)(iii) Supply without insulator and erection of a pull-off arrangement for regulated Tramway type OHE.

The price shall cover supply of all components including conductors required for a pull off arrangement to pull one equipment only, complete with steady arm, contact wire swivel clip and fittings, including solid core insulator (Cost of insulator will be paid in Schedule-1, Section-5), . The price shall cover erection of all components including solid core insulators, small jumpers.

ITEM No. 4(b)(iv) : DELETED

ITEM No.4 (bx) : Supply of Insulators for item Nos. 4 (b)(i) & 4 (b)(iii)

The price shall cover only supply of following Insulators mentioned against each item required for execution of work covered under items 4(b)(i) & 4(b)(iii). Erection cost of insulators are inclusive in items 4 (b)(i) & 4 (b)(iii) respectively.

Item No.	Insulator
4(bx)(i)	Porcelain 9 Tonne (CD-1050 mm)
4(bx)(ii)	Composite 9 Tonne (CD-1050 mm)
4(bx)(iii)	Composite 9 Tonne (CD-1600 mm)

ITEM No. 5(a)(i) : **Supply and erection of mounting arrangement for span wire.**

The price shall cover supply of all components including adjusters, terminal fittings and mast attachments required to attach a span wire or a head-span wire or a cross span wire or a steady span wire or a support span wire for supporting contact wire only, at both ends, to traction masts/structures or special brackets. The price shall include the cost of solid core insulators (Cost of insulator will be paid in Schedule-1, Section-5), and small parts steel work, if any. The price shall cover erection of all components including mounting arrangements for span wire and solid core insulators but excluding small parts steel work, if any.

ITEM No. 5(a)(ii): Supply and erection of a span wire

The price shall cover supply and erection of a span wire per meter. The payable length in case of head span wires shall be the horizontal distance between the inner faces of all traction masts/structure on which the mast attachments are mounted, and in case of Large Span Wire, the actual length shall be measured at the time of erection. No extra payment shall be made on account of the sag. The price is applicable for all types of span wires including Large Span Wires. Erections of a meter beyond the first decimal shall be rounded off to the nearest first decimal.

ITEM No. 5(az)(ii): Supply and erection of a span wire

Same as item 5(a)(ii) but excluding supply of Catenary wires

NOTE : The quantity for which the payment is made for the supply and erection of large span wire under this item shall be deducted from the corresponding length in the span for which payment is made under item 6(a).

ITEM No. 5 (b): **Supply without insulator and erection of suspension of one conventional OHE/ composite OHE from headspan**

The price shall cover supply of a suspension assembly to carry complete all copper OHE/ Composite OHE on head spans inclusive of all dropper assemblies (exclusive of dropper wire) and from head-span, cross-span steady wire attachment, steady arm/rod, catenary suspension clamps and other fittings required to make complete suspension arrangements for copper OHE/Composite OHE on head span. The price shall cover the erection of all components, fittings, and droppers for suspension of OHE from head span.

ITEM No. 5 (c) : **Supply of without insulator and erection of Suspension /registration of contact wire only**

The price shall cover supply dropper wire and supply and erection of all fittings required for suspension/ registration of a contact wire only whether under head spans carrying other types of OHE or not or on any bracket for carrying contact wire only. The price shall include the followings:-

(i) Vee clamp or double vee clamp with adjuster, or steady arm with steady wire clamp.
(ii) Contact wire swivel clip.

ITEM No.5 (ax): Supply of Insulators for item 5(a)(i), 5(b) and 5(c)

The price shall cover only supply of any of the following Insulators mentioned against each item required for execution of item covered under items 5(a)(i), 5(b) and 5(c). Erection cost of insulators are inclusive in items 5(a)(i), 5(b) and 5(c) respectively.

Item No.	Insulator
5(ax)(i)	Porcelain 9 Tonne (CD-1050 mm)
5(ax)(ii)	Composite 9 Tonne (CD-1050 mm)
5(ax)(iii)	Composite 9 Tonne (CD-1600 mm)

ITEM No. 6 (a): Supply and erection of overhead equipment only.

The price shall cover the supply of contact wire (107 Sqmm HDGCC), catenary(65 Sq. mm 19/2.1mm), dropper wire(5mm), jumper wires (50 Sq.mm, 19/1.80mm or) as per the specifications indicated under para 2.4.9 of the tender paper.

The price shall cover supply of all components including dropper clips, parallel clamps for jumpering and splices (where their use is approved) and small parts steel works complete with bolts and nuts etc. for attachment of number plates to mast/structure, if any. The price shall cover erection of all components and wires and conductors including contact wire, catenary, droppers, jumpers and terminating wires, if any, but excluding small parts steel work, if any. The price shall be excluding the cost of erection of large span wire, which will be paid under item 5(a)(ii).

The price shall include provision of Retro reflective number plates on traction masts or structures. The prices shall exclude supply of small parts steel work for fixing of retro reflective number plate (like as Clamps & plates) will be paid under item no.3(c). The price shall include bolts and nuts for attachment of Retro reflective number plates to masts/ structures. The price shall also include the cost of painting the setting distance and rail level on masts/structures, stenciling of symbol for direction of emergency telephone socket. The price shall not include termination of conductors which will be paid for under item 8.

Rly. Ident No.	Description of components	Qty. for unit
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-
7501/7503	Enameled/ Retro reflective number plates complete with 2 Galv. MS. bolts m 10x35/30,	-do-

	nuts and lead washer for m 10 bolts but excluding SPS for attachment of number plate to masts/structures.	
1110-2	Contact wire ending clamp	-do-
1120	Catenary ending clamp	-do-
1140	Large span wire clamp (130)	-do-
5020-1/5020-2	9-T, Adjuster (Forged)	-do-
5030	Anchor double strap assembly	-do-
5191/5192	Compensating plate/equalizing plate	-do-

ITEM No. 6 (az) : Supply and erection of overhead equipment only

Same as item 6(a) but excluding supply of Contact and Catenary wires.

ITEM No. 6 (ax)(i) : Supply of Hard Drawn Grooved Copper Contact Wire 107 Sq. mm required for item nos. 6(az), 6(bz), 6(cz), 10(az), 10(bz), 10(cz), 12(az), 12(cz) and 31(gz).

The price shall cover only supply of 107 Sq. mm Hard Drawn Grooved Copper Contact Wire required for item nos. 6(az), 6(bz), 6(cz), 10(az), 10(bz), 10(cz), 12(az), 12(cz) and 31(gz) in MT.

ITEM No. 6 (ax)(ii) : Supply of Cadmium Copper Catenary Wire 65 Sq. mm, 19/2.10mm required for item nos. 5(az)(ii), 6(az), 9(dz), 9(ez), 10(az), 10(bz), 10(cz), 12(cz), 15(az)(iii) and 31(gz).

The price shall cover only supply of 65 Sq. mm, 19/2.10mm, Cadmium Copper Catenary Wire required for item nos. 5(az)(ii), 6(az), 9(dz), 9(ez), 10(az), 10(bz), 10(cz), 12(cz), 15(az)(iii) and 31(gz) in MT.

ITEM No. 6(b) : **Supply and Erection of contact wire only**

The price shall cover the supply of contact wire (107 Sqmm HDGCC as per the specifications indicated under para 2.4.9 of the tender paper, and erection of contact wire only. The price shall exclude termination which will be paid for under item 8. The price shall include provision of Retro-reflective and enameled number plates on traction masts/structures and painting of setting distance structures and rail levels on masts/structures. The price shall exclude the supply of small part steel works complete with bolts and nuts for attachment of enameled number plates to masts/ structures.

Description	Qty. for unit	Supplied by
Contact wire (107 Sq mm)	As required	Contractor
Retro-reflective and Enameled number plates	As required	Contractor

ITEM No. 6(bz) : **Supply and Erection of contact wire only**

Same as item 6(b) but excluding supply of Contact wires.

ITEM No. 6(c) : **Supply and Erection of contact wire only (regulated with briddle wire)**

The price shall cover the supply of contact wire (107 Sqmm HDGCC), dropper wire (5mm), 7/2.10, 20 Sq.mm Briddle wire as per the specifications indicated under para 2.4.9 of the tender paper, erection and provision of briddle wires with clamps and two droppers including clips, Retro-reflective and enameled number plates on traction masts/structures, painting of setting distance and rail levels on masts/ structures, stenciling of symbol for direction of emergency telephone socket if required. The price shall exclude supply of required small part steel works complete with bolts and nuts for attachment of enameled number plates to masts/ structures. The price shall exclude termination which will be paid for under item 8.

ITEM No. 6(cz) : **Supply and Erection of contact wire only (regulated with bridle wire)**

Same as item 6(c) but excluding supply of Contact wires.

ITEM No. 6(d) : **DELETED**

Note : All bolts and nuts below 14mm dia on current carrying parts of OHE shall be stainless steel.

Note for Measurement:

1. For the purpose of payment against item 6(a), (b), (c), & (d) the length of over head equipment, which shall include terminating wires, shall be measured from the center lines of the traction masts/structures at which the two ends of each tension length of over head equipment are anchored.
2. The length shall be the difference between the actual chainages of the two traction masts/structures at which the ends of each tension length are anchored or by the sum of the actual spans between the same two points whichever is higher as included in the "As Erected" layout plans. No extra payment will be made on account of either due to sag in these wires/conductors or scraps generated.. The price under items 6(a),6(b),6(c) & 6(d) does not cover the cost of supply and erection of cut-in-insulators, the supply and erection of which shall be paid for under item 11.
3. For the purpose of progress payment reference to layout plans "As Approved" shall be made. However, the price under this item shall be adjusted according to the final length of OHE indicated in the "As Erected" layout plan.

Note for Number Plates:

(i) Retro-reflective OHE number plates should be provided generally at all locations. (Reference-Railway Board's letter No. 2001/Elect(G)/170/1 Dated 22/23.12.2016)

(ii) Sigma Board in fogg prone area only, for identification of all signals shall be provided two masts prior to all signal locations for easy identification during foggy weather. (Reference-Railway Board's letter No. 2001/Elect(G)/170/1 Pt. Dated 07.05.2012)

ITEM No. 7(a): Supply and Erection of all Aluminum 25 KV feeder/return conductor (Single Spider)

The price shall cover supply and erection of Hard-drawn stranded All Aluminium conductor conforming to IS-398(Pt.I) with ammendment-1 and of size 19/3.99mm (240 Sq.mm) feeder/return conductor (along or across the tracks). The price shall not include the cost of suspension assembly (which will be paid for under item-11) and termination (which will be paid for under item-8.) and small part steel work, complete with bolts and nuts etc, if any. The price shall also cover on a flat rate basis, the cost of supply of splices to the extent required.

ITEM No. 7(b) DELETED -

ITEM No. 7(c) : **Supply and erection of earth wire**

The price shall cover supply and erection of earth wire made of 7/4.09 mm steel reinforced aluminium conductor (RACCOON) excluding termination which will be paid for under item 8 and shall include cost of fittings on structures for supporting the earthwire including bonding of the earth wire to the structure and the structure to earth electrodes or a non-track circuited running rail or impedance bond which will be provided by the Purchaser. The price shall include disc insulators, cut-in-insulator to isolate sections of earth wire which will be paid for under item 11(c) and the cost of small part steel works complete with bolts and nuts to attach the earth wire mast clamp to masts/structures, if any.

Note for Measurement:

1. The prices under items 7(a) and (b) shall not include. Termination which will be paid for under item 8. The connection (a) between feeders, or return conductors and (b) of feeders, or return conductors to a bus bar, overhead equipment or isolator switch which will be paid for under item 15, & cut-in-insulators and suspension insulators which shall be paid for under item 11.
2. For the purpose of payment against item 7 (a) and (b) the length of feeders, return conductors or earth wire shall be measured from the center lines of the mast/structure at which the two ends of each length of feeder or conductor run are anchored, by adding actual spans. In case of feeders/return conductors crossing a track, the length shall be measured between the faces of traction masts/structures at which the two ends of the cross feeder or return conductors are anchored, as indicated in the as erected structure erection drawings for traction masts/structures. No payment will be made for the extra length of the conductor/s on account of sag or scrap.

3. For purposes of progress payment reference to "As Approved" drawings shall be made. However, the price under this item shall be adjusted according to the final length of OHE indicated in the "As Erected" layout plan/drawings

Item No.7(d): Supply and Manual Erection of All Aluminium 25 kV Feeder/Return (Single Spider).

Same as item 7 (a) but the work is to be executed manually instead of with wiring train.

Item: 7(e) : **Supply and Erection of Copper cross feeder wires (37/2.25 mm HDBC) across the track at SP/SSP/FP/BT locations.**

The price shall cover the supply and erection of 25KV feeder wire across/ along the track at the location of SP/SSP/FP/BT/Gantries stations. Feeder wire shall be made of hard drawn bare copper conductor of size 37/2.25 mm. The price shall be inclusive of cost of feeder wire but exclusive of termination (which will be paid under item 8(b)(ix) and small parts steel work complete with bolts, nuts etc if any.

ITEM No. 8(a)(i) : DELETED

ITEM No. 8(a)(ii) : DELETED

ITEM No. 8(a)(iii) : DELETED

ITEM No. 8(a)(iv) : DELETED

ITEM No. 8(a)(v) : **Supply and erection of regulating equipment (3 pulley type) with Counter weight assembly for conventional/composite OHE.**

The price shall cover supply and erection of counter weight assembly (for both conventional and High Rise OHE) including 5 ton adjuster with double strap assembly and normal/anti-theft guide tube assembly, the supply of regulating equipment and stainless steel wire rope (of various length as required) required for the regulating equipment and small part steel work, if any. The price shall also cover adjustment of the entire regulating equipment. The price shall not include supply and erection of termination, which will be paid for under item No. 8(b).

ITEM No. 8(a)(vi) : **Supply and erection of a regulating equipment (3 Pulley type) with counter weight assembly for Tram Way Type OHE (Regulated)**

Same as 8(a)(v) above but with counter weight assembly conforming to style – 01 of the relevant termination arrangement drawing No.: ETI/OHE/G/04212, with latest mod.

ITEM No.8(a)(vii) : DELETED
ITEM No. 8(a)(viii) : DELETED
ITEM No.8(a)(ix) : DELETED

ITEM No. 8(a)(x) : **Supply and erection of a regulating equipment (3 Pulley type) with counter weight assembly for conventional/ composite OHE**

Same as item 8(a)(v) but excluding stainless steel wire rope required for the regulating equipment. For shorter tension lengths OHE (like Emergency x-overs) GI Sleeve of 20 mm dia to be inserted in the hexagonal tie rod of ATD of cross-over OHE in accordance with RDSO's SMI No.TI/MI/0035 (Rev-O).

ITEM No. 8(a)(xi) : **Supply and erection of a regulating equipment (3 pulley type) with counter weight assembly for tramway type OHE (Regulated)Same as item 8(a)(vi) but excluding stainless steel wire rope required for the regulating equipment.**

Same as item 8(a)(vi) but excluding stainless steel wire rope required for the regulating equipment. For shorter tension lengths OHE (like Emergency x-overs) GI Sleeve of 20 mm dia to be inserted in the hexagonal tie rod of ATD of cross-over OHE in accordance with RDSO's SMI No. TI/MI/0035 (Rev-O).

ITEM No. 8(a)(xii) : **Marking of 'Y' measurement at BWA locations**

The price shall cover marking/ painting of temperature and 'Y' measurement on OHE masts at BWA locations including cost of paint.

ITEM No. 8(b)(i) : **Supply without Insulator and erection of materials for termination of single conductor of overhead equipment or a terminating wire.**

The price shall cover supply of all material necessary for the termination of single conductor of overhead equipment or terminating wire on a traction mast or structure, including appropriate mast anchor fittings, clevis assembly, adjuster, anchor double straps, ending clamp for the catenary or contact wire or terminating wire and fittings including 9 ton insulator (Cost of insulator will be paid in Schedule-1, Section-5), assembly and terminating wire, if any. The price shall cover erection of all materials including the 9 ton insulator assembly and terminating wire, if any.

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

ITEM No. 8(b)(ii) : **Supply without Insulator and erection of materials for termination of double conductors.**

The price shall cover supply of all materials necessary for the yoked termination of two overhead equipment conductors on a traction mast or structure, including appropriate mast anchoring, clavis assembly, two adjusters, ending clamps for catenary and contact wires, anchor double strap assembly, equalising/ compensating plate and fittings including 9 ton insulator (Cost of insulator will be paid in Schedule-1, Section-5), assembly and terminating wire, if any. However, the price shall cover erection of all materials including the 9 ton insulator assembly.

ITEM No. 8(b) (iii): **Supply without Insulator and erection of materials for termination of all Aluminum 25 KV feeder/return conductor (single SPIDER).**

The price shall cover supply of all materials required for the termination of an All Aluminium 25 KV feeder/return conductor (SPIDER), including appropriate mast anchor fittings adjuster, strain clamp end fitting including 3 KV cut-in-insulator and 9 ton insulator assembly. However, the price shall cover erection of all materials including the 9 ton insulator (Cost of insulator will be paid in Schedule-1, Section-5) assembly and 3 KV cut-in-insulator(Cost of insulator will be paid in Schedule-1, Section-5).The price shall be include the cost of 9 ton insulator assembly and erection cost thereof.

ITEM No. 8(b)(iv) : DELETED

ITEM No. 8(b)(v) : **Supply without Insulator and erection of materials for termination of an earth wire**.

The price shall cover supply and erection of all materials required for the termination of an earth wire including appropriate mast anchor fittings, adjuster, terminal clamp and fittings.

ITEM No. 8(b)(vi) : **Supply without Insulator and erection of materials for termination of tramway type OHE (Regulated).**

The price shall cover supply and erection of all materials required for the termination of a single contact wire (regulated) and will exclude the parts covered under item 8(a)(iii)/(vi).

ITEM No. 8(b)(vii) : **Supply without insulator and erection of materials for termination of double conductors for composite OHE.**

The price shall cover supply of all materials necessary for the yoked termination of two overhead equipment conductors on a traction mast or structure including appropriate mast anchor fittings clevis assembly three adjuster, ending clamps for aluminium Alloy catenary and copper contact wires, anchor double strap assembly, unequal tension compensatory plate and fittings excluding the 9 ton insulator (Cost of insulator will be paid in Schedule-1, Section-5), assembly and terminating wire, if any. The price shall cover erection of all materials including the 9 ton insulator assembly.

ITEM No. 8(b)(viii) : **Supply without insulator and erection of materials for termination of an aluminium conductor of the composite overhead equipment.**

The price shall cover supply of all materials necessary for the termination of single Aluminium conductor of composite OHE or terminating wire on a traction mast or structure, including appropriate mast anchor fittings, clavis assembly, adjuster, anchor double straps, ending clamps for the aluminium catenary or terminating wire and fittings including 9 ton insulator(Cost of insulator will be paid in

Schedule-1, Section-5), assembly and termination wire, if any. The price shall cover erection of all materials including the 9 ton insulator assembly and termination wire, if any.

Item : 8(b)(ix) : **Supply without insulators and erection of materials for termination of copper cross feeder with gantries.**

The price shall cover the supply of all materials required for termination of copper cross feeder wire (37/2.25 mm HDBC) including appropriate mast anchor fitting (3231), 18 mm Single clevis (5040), 9-Tone adjuster (5020-2), Feeder ending clamp (1130), double clevis (3010) and other components as necessary excluding 9-Ton insulator (Cost of insulator will be paid in Schedule-1, Section-5), assembly. The price shall also cover the erection of all materials including 9-Ton insulator assembly and termination of cross feeder at either ends. Fittings/components required for termination of one cross feeder at both ends constitute one set.

Notes to item 8 :

(1) Small parts steel work complete with bolts and nuts wherever required, will be paid under item 3(a) or 3(b) and 3(c) as applicable and shall not be including in this item.

(2) The prices under item 8(b)(iii) shall not include the cost of jumper connection (i) between feeders or return conductors and (ii) or feeders or return conductors to a busbar, overhead equipment or isolator switch which will be paid for under item 15.

(3) The prices under items 8(b)(i) to 8(b)(viii) shall also include the cost of double eye distance rod (ID no. 5183), if provided for any type of terminations.

(4) Supply and erection of materials for termination of catenary wire on either side of the portals at anticreep locations, will also be paid for under this item.

ITEM No. 8 (bx) : Supply of 9-T Insulators for item 8(b)(i), (ii), (iii), (vi), (vii), (viii) & (ix)

The price shall cover only supply of following 9 tonne insulator assembly required for termination of OHE covered under item 8(b)(i), 8(b)(ii), 8(b)(iii), 8(b)(vi), 8(b)(vii), 8(b)(viii) & 8(b)(ix). Erection cost of insulators are inclusive in items 8(b)(i), 8(b)(ii), 8(b)(iii), 8(b)(vi), 8(b)(vii), 8(b)(viii) & 8(b)(ix) respectively.

Item No.	Insulator
8(bx)(i)	Porcelain 9 Tonne (CD-1050 mm)
8(bx)(ii)	Composite 9 Tonne (CD-1050 mm)
8(bx)(iii)	Composite 9 Tonne (CD-1600 mm)

ITEM No. 9(a) : **Supply without Insulator and erection of anti creep with Galvanised steel wire**.

The price shall cover supply of all materials for anti-creep including adjusters, galvanised steel wire, mast anchor fittings at its terminations on either side on structures, ending clamps and fittings excluding 9 ton insulator assembly (Cost of insulator will be paid in Schedule-1, Section-5) and small parts steel work, if any. Cost of SPS will be paid under item 3(c) of Schedule-1,Section-3. The price shall cover erection of all materials including 9 ton insulator assembly and small parts steel work, if any.

RLY.IDENT No.	DESCRIPTION OF COMPONENTS	QTY. PER UNIT
-	Galvanised steel wire (19/2.50 mm)	As required
6020	9 ton insulator assembly.	As required
1360	Steel wire ending clamp	2 off
5020-1/5020-2	9 ton adjuster (Forged)	2 off
5030	Anchor double strap assembly	As required
3010/5040	Clevis assembly	2 off
3231	Mast anchor fitting with bolts, nuts etc.	2 sets.
1170	Double suspension clamp	1 off
Less 1160	Suspension clamp	(-)1 off
5183	Double eye distance rod	As required.

ITEM No. 9(b) : **Supply without insulator and erection of anti-creep with galvanized Steel wire suitable for tramway type overhead equipment (Regulated)**

The price shall cover supply and erection of all materials (Cost of insulator will be paid in Schedule-1, Section-5) for anti-creep for the tramway type equipment (Regulated) similar to the fittings catered for an item 9(a).

ITEM No. 9(c) : **DELETED**

NOTE for 9(a) & 9(b) :

1. The price shall include the cost of any additional cut-in or suspension insulator which will be paid for under item 11(a) (i) or 11(a) (ii) as applicable.

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

ITEM No. 9(d) : **Supply without Insulator and erection of anti-creep with cadmium wire in polluted area.**

The price shall cover the supply of all materials for anti-creep including adjusters, mast anchor fittings at its terminations on either side, structure ending clamps, fittings and cadmium copper catenary wire but excluding 9-ton insulator assembly and small parts steel work, if any. The price shall cover erection of all materials including cadmium copper catenary wire, 9- ton insulator assembly and small parts steel work, if any.

RLY. Ident No.	Description of components	Qty. per unit
-	Cadmium copper catenary wire (65 sq.mm)	As required
6020-1	9 ton insulator assembly	As required
1120 or 1122or1123	Catenary ending clamp (65)	2 off
5020-1/5020-2	9 ton adjusters (Forged)	2 off
5030	Anchor double strap assembly	As required
3010/5040	Clevis assembly	2 off
3231	Mast anchor fitting with bolts, nuts etc.	2 sets
1170	Double suspension clamp	1 off
Less 1160	Suspension clamp	(-) 1 off
5183	Double eye distance rod.	As required

ITEM No. 9(dz) : **Supply without Insulator and erection of anti-creep with cadmium copper catenary wire in polluted area.**

Same as item 9(d) but excluding supply of Catenary wire.

ITEM No. 9(e) : **Supply without Insulator AND Erection of anti-creep with cadmium copper catenary wire suitable for tramway type OHE (Regulated) in polluted area.**

Same as ITEM 9(d) (Cost of insulator will be paid in Schedule-1, Section-5) with the following changes:
- Id No. 2140, large catenary contact clamp to be used in place of Id. No. 1170

ITEM No. 9(ez) : **Supply without Insulator AND Erection of anti-creep with cadmium copper catenary wire suitable for tramway type OHE (Regulated) in polluted area.**

Same as item 9(e) but excluding supply of Catenary wire.

NOTE :- Note 1&2 given under item 9(a) shall also be applicable for item 9(b) to 9 (ez).

ITEM No.9(ax) : **Supply of 9-T Insulators for Items 9(a), 9(b), 9(c), 9(d) and 9(e)**

The price shall cover only supply of any of the following 9 tonne insulator assembly to be supplied at site for execution of work under items 9(a), 9(b), 9(c), 9(d) and 9(e). Erection cost of insulators are inclusive in items 9(a), 9(b), 9(c), 9(d) and 9(e) respectively.

Item No.	Insulator
9(ax)(i)	*Porcelain 9 Tonne (CD-1050 mm)*
9(ax)(ii)	*Composite 9 Tonne (CD-1050 mm)*
9(ax) (iii)	*Composite 9 Tonne (CD-1600 mm)*

ITEM No. 10 (a), (b) & (c) : **Extra on item 6(a), 6(b) & 6(c).**

(i) For supply and erection of additional fittings. &
(ii) Required at a turnout, diamond crossing or over-lap.

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. The price shall cover supply of required copper conductors & jumper wires and 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 equaliser jumpers at insulated overlaps and neutral sections.
The price shall not include extra bracket assemblies, overhead equipments, termination of overhead equipment and cut-in-insulators in the case of insulated overlaps and neutral section which will be paid for under items 4, 6, 8, and 11 respectively.

ITEM No. 10 (az), (bz) & (cz) : **Extra on item 6(az), 6(bz) & 6(cz).**

Same as item 10(a), (b) & (c) but excluding supply of Contact and Catenary wire.

NOTE : A cross-over shall be paid for as 2 off of Item 10, 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. 11(a)(i) : **Supply without insulator and Erection of a cut-in (9 Tonne) insulator**

The price is applicable to the provision of the an additional 9 Tonne cut-in-insulator on a flat rate basis such as in a head-span, cross span or in span wire or an overhead equipment conductor at an insulated overlap, anti-creep not provided for in other items.

The price shall cover supply of all components required for the cut-in-insulators assembly, including appropriate terminal fittings for the conductor but excluding the cost of 9 ton insulator assembly. This price shall cover erection of all components, including the 9 ton insulator. This price shall also be applicable as an adjustment price for non-provision of insulators under items 8(b)(i) to 8(b)(viii).

ITEM No. 11(a)(ii): Supply without insulator and Erection of a suspension insulator.

The price is applicable to the provision of 9 ton suspension insulator assembly for suspension of an All Aluminium 25 kV feeder (single or double SPIDER), 130 sq.mm or 65 sq.mm overhead equipment conductor or any other similar type of suspension.

The price shall cover supply of all components, required for the suspension assembly including the appropriate suspension clamp but excluding 9 ton insulator assembly and small parts steel work with bolts nuts etc,. if any. The price shall cover erection of all components, including the 9 ton insulator assembly but excluding small parts steel work, with bolts and nuts etc. if any.

The price shall include the cost of provision of a flat armour tape only to be used in connection with suspension of 'SPIDER' conductor.

ITEM No. 11(ax) : Supply of 9-Tonne Insulators for Item 11(a)(i) & 11(a)(ii)

The price shall cover only supply of any of the following 9 tonne insulator assembly to be supplied at site for execution of work under items 11(a)(i) & 11(a)(ii) respectively. Erection cost of insulators are inclusive in items 11(a)(i) & 11(a)(ii) respectively.

Item No.	Insulator
11(ax)(i)	Porcelain 9 Tonne (CD-1050 mm)
11(ax)(ii)	Composite 9 Tonne (CD-1050 mm)
11(ax) (iii)	Composite 9 Tonne (CD-1600 mm)

ITEM No. 11(b): Supply without Insulator and Erection of a 25 kV Post Insulator.

The price is applicable to the provision of a 25 kV Post Insulator to support copper or aluminium jumper/busbars. The price shall cover supply of all components and fittings/angle iron (outrigger) to support the jumpers but excluding post insulator and small parts steel works with bolts and nuts etc., if any. The price shall cover erection of all components required for the assembly, including post insulator, but excluding small parts steel work with bolts and nuts etc. if any.

ITEM No. 11(bx): Supply of a 25 kV Post Insulator for Item 11(b)

The price shall cover only supply of 25 kV Post insulator to be supplied at site for execution of work under items 11(b). Erection cost of insulators is inclusive in items 11(b).

ITEM No. 11(c): Supply without insulator and Erection of a 3 kV Disc Insulator.

The price is applicable to the provision of a 3 kV Disc Insulator for suspension of an All Aluminium return conductor or any other similar type of suspension. The price is also applicable to a 3 kV cut-in-insulator for earthwire.

The price shall cover supply and erection of all components required for the assembly, including appropriate suspension clamp, ending clamp for cut-in-insulator on earth wire, but excluding 3 kv Disc Insulator and small parts steel work, with bolts and nuts etc., if any. The price shall include the cost of provision of a flat armour tape to be used in connection with the suspension of SPIDER/RACCOON conductor.

ITEM No. 11(cx) : Supply of 3 kV Disc Insulator for Item 11(c).

The price shall cover only supply of 3 kv Disc Insulator to be supplied at site for execution of work under items 11(c). Erection costs of insulators are inclusive in items 11(c).

ITEM No. 11(d) : Supply without insulator and Erection of a 11 kV Post Insulator.

The price shall cover, on a flat rate basis for supply of all necessary fittings for erection of 11 KV post insulator to support return conductor, Aluminium or copper busbars or return conductor jumper connections but excluding 11 KV post insulator and small parts steel work with bolts and nuts etc. if any. The price includes the erection of all the fittings including 11 kV Post Insulator.

ITEM No. 11(dx) : Supply of 11 kV Post Insulator for Item 11(d).

The price shall cover only supply of 11 kV Post Insulator to be supplied at site for execution of work under items 11(d). Erection cost of insulator is inclusive in item 11(d).

ITEM No. 12(a) : **Supply without Insulator and erection of a Section Insulator Assembly.**

The price shall cover supply of all components required for a standard section insulator assembly (serving both the overhead equipment conductors) including supply of copper conductors, dropper wires for special droppers for supporting the equipment and all terminal fittings for conductors and the section insulator assembly including 9 ton Insulator (RI No.6020) (Cost of insulator will be paid in Schedule-1, Section-5) on the catenary and Sectioning insulator (RI No.6110). The price shall cover erection and adjustment of all components including section insulator assembly, 9 ton insulator on the catenary, Sectioning Insulator and droppers.

Rly. Ident. No.	Description of components	Qty. per Unit
1120/or SK/ or 1122 & 1123	Catenary ending clamp	2 off
1192/ETI/OHE/SK/333.	Catenary dropper clip assembly.	As required
6170	Parallel clamp for double contact wire	12 off
6180	Section insulator dropper assembly.	3 sets
6100	Section insulator assembly	To be supplied by the Contractor.
6020	9 ton insulator assembly	To be supplied by the Contractor.

ITEM No. 12(az) : **Supply without Insulator and erection of a Section Insulator Assembly.**

Same as item 12(a) but excluding supply of Contact and and dropper wires.

ITEM No.12(ax) : Supply of 9 Tonne and Sectioning Insulators for Item 12(a) & 12(az)

The price shall cover only supply of Sectioning Insulator with any of the following 9 Tonne Insulator for execution of work under item 12(a). Erection cost of insulators is inclusive in items 12(a).

Item No.	Insulator
12(ax)(i)	Porcelain 9 Tonne (CD-1050 mm) & Sectioning Insulator
12(ax)(ii)	Composite 9 Tonne (CD-1050 mm) & Sectioning Insulator
12(ax)(iii)	Composite 9 Tonne (CD-1600 mm) & Sectioning Insulator

ITEM No. 12(b) : **Supply without Insulator and erection of a double wire section insulator assembly.**

The price shall cover supply of all components required for a double wire section insulator assembly (to serve both wires of two overhead equipments and special droppers, including supply of dropper wires, for supporting this equipment) at any location, including terminal fittings for the conductors and the double wire section insulator assembly including 9 ton insulator (Cost of insulator will be paid in Schedule-1, Section-5). The price shall include erection and adjustment of the entire assembly including double wire section insulator assembly, droppers and the 9 ton insulators.

ITEM No.12(bx) : Supply of 9 Tonne and Sectioning Insulators for Item 12(b)

The price shall cover supply of 2 Nos Sectioning Insulators and any of the following 9Tonne Insulator only for execution of work under item 12(b). Erection cost of insulators is inclusive in items 12(b).

Item No.	Insulator
12(bx) (i)	Porcelain 9 Tonne (CD-1050 mm) & Sectioning Insulator
12(bx)(ii)	Composite 9 Tonne (CD-1050 mm) & Sectioning Insulator
12(bx)(iii)	Composite 9 Tonne (CD-1600 mm) & Sectioning Insulator

ITEM No. 12(c) : **Supply without Insulator and erection of a Section Insulator Assembly suitable for tramway type OHE (Regulated)**

The price shall cover supply of all components required for a standard Section Insulator Assembly including special arrangements for supporting the equipment and terminal fittings for conductors and the section insulators assembly as required with Sectioning Insulator (RI No.6110) (Cost of insulator will be paid in Schedule-1, Section-5). The price shall cover the supply of required copper conductors, erection and adjustment of all components including sectioning insulator.

ITEM No. 12(cz) : **Supply without Insulator and erection of a Section Insulator Assembly suitable for tramway type OHE (Regulated)**

Same as item 12(c) but excluding supply of Contact and Catenary wires.

NOTE : (1) The same price will apply if the section insulator is provided in the tramway type equipment (contact wire only).

(2) The supply and erection of a bracket assembly shall be paid under item 4(a) (iii). No adjustment of price due to non-provision of steady arm, in this case, shall be made.

ITEM No.12(cx):Supply of Sectioning Insulators for Item 12(c) and 12 (cz)

The price shall cover only supply of Sectioning insulator for execution of work covered under item 12(c) and 12 (cz). Erection cost of insulators are inclusive in items 12(c).

ITEM No. 12(d): Supply and erection of Ceramic/ beaded Glass fibre type (PTFE) short neutral section assembly.

The price shall cover Supply of Ceramic/Glass fibre or PTFE type short neutral section assembly and erection and adjustment of Glass Fibre or PTFE type short neutral sections, which will be supplied by

the Contractor. The price would cover fittings for contact and catenary wire as necessary including supply of required dropper wire.

ITEM No. 13(a) & (b) : Supply without Insulator and erection of 25 KV SP Isolators without earth contact assembly.

The prices under sub-items (a) and (b) shall cover supply and erection of Isolator switches of approved make, complete with arcing horns, operating rods, operating rod guides, mounting base including cost of 25 KV Solid Core Post and Operating rod insulator (Cost of insulator will be paid in Schedule-1, Section-5).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.

ITEM No. 13(c): Supply without Insulator and erection of 25 KV Double Pole Isolator.

The price shall cover supply and erection of a Double Pole Isolator complete with mounting base, operating rod and operating rod guides including the cost of Operating Rod Insulator and 25KV Solid Core Post Insulator required for the operation of the isolator (Cost of insulator will be paid in Schedule-1, Section-5). The price shall also cover supply and erection of Al-Cu strips, a padlock and a number plate of approved design for each isolator. The price shall not include supply and erection of small parts steel work for support of isolators and for support of operating rods on gantries masts.

ITEM No. 13(d) : **Extra for supply and erection of an earth contact assembly in an isolator**.

The price shall be payable as extra for 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. 13(e): Extra on item 13(a), (b) or (c) for an interlocking device.

The price shall cover supply and erection of an inter locking mechanism on an isolator to permit working of two or more isolators or an isolator and an interrupter in a desired sequence. This item shall be applicable individually for each isolator or interrupter.

NOTE: Prices under item 13 do not include the cost of supply and erection of (i) any post insulator to support jumpers/busbars which shall be paid for under item 11(b), (ii) flexible jumper connection which will be paid for under item 15 and (iii) busbar/bus-rod terminals which will be paid for under item 26(b) or (c). The price does not include also the cost of supply and erection of an aluminium/copper busbar or a copper bus rod the cost of which will be paid for under item 26(a)(i) or 26(a) (ii), as applicable.

ITEM No. : 13(ax), 13(bx) and 13(cx) : Supply of Post and Operating Rod Insulators for Single and Double Pole Isolator for Item 13(a), 13(b) & 13(c)

The price shall cover only supply of 25 kV Solid Core Post and Operating Rod Insulators for execution of work covered under item 13(a), 13(b) & 13(c) respectively. Erection cost of
insulators are inclusive in items 13(a), 13(b) & 13(c).

ITEM No. 14: **Supply and erection of connection between return conductor and the rail.**

The price shall cover fabrication and erection of connections between all aluminium return conductor to cross rail/impedance bond (both of which as required will be supplied by the Purchaser free of cost at the Contractor's Depot) excluding the aluminium jumper connections from the return conductor to the steel flat which will be paid for under item 15(b) and any 11 KV post insulator for supporting the jumper which will be paid under item 11(d).
The price shall include the cost of necessary supports on the traction structure, terminal connections and covering the mild steel flats with two coats of red oxide zinc chromate primer to IS:2074, CNSL based and finished with 2 coats of Bitumen 85/25 blown grade.

ITEM No. 15(a)(i): **Supply and erection of 105 Sq. mm (19/7/1.02 mm) Large copper jumpers**.

The price shall cover the supply of Large jumper wire size 105 Sq.mm(19/7/1.02mm) made of annealed stranded 100% pure copper conductor as per RDSO's specification No.ETI/OHE/3(2/94) with A&C Slip No 1(latest spec.), and on a flat rate basis, the supply of all components and fittings required for providing a

flexible copper large jumper connection, including supply of parallel clamps, bi-metallic and Aluminium Copper Al-Cu strips, wherever required, and bolted type terminal connectors where ever required.
The price shall also cover the erection of the complete jumper assembly including jumper wire. The price shall not, however, be applicable for jumper connections already including under item 6(a) and 10, but shall be applicable for any jumper of 105 Sq.mm (19/7/1.02mm) connections in any combination between feeders, lightening arrestors, isolators and boosters stations. Continuity jumper at Boom anchor anti-creep will be payable under this item.

ITEM No. 15(a)(ii):**Supply and erection of 50 Sq.mm(19/1.8 mm) small copper jumpers**.

The price shall cover supply of Small jumper wire size 50 Sq.mm(19/1.80 mm) made of annealed stranded 100% pure copper conductor, and on a flat rate basis, the supply of all components and fittings required for providing a flexible small copper jumper connection, including supply of parallel clamps, bi-metallic and Aluminium Copper Al-Cu strips, wherever required, and bolted type terminal connector where ever required.
The price shall also cover the erection of the complete jumper assembly including jumper wire. The price shall not, however, be applicable for jumper connections already including under item 6(a) and 10, but shall be applicable for any small jumper connection in any combination required for lightening arresters and isolators etc. Anti-theft jumper as per drawing No. ETI/OHE/G/ 05107, with latest mod. for connecting out-of-run OHE with the in running OHE at insulated/un-insulated over-lap locations and also anticreep locations at polluted zone wherever considered necessary will be payable under this item.

ITEM No. 15(a)(iii): Supply and erection of a copper jumpers (65 Sq mm catenary)

The price shall cover the supply of 65 sq mm catenary wire & 50 sq mm Small Jumper and on a flat rate basis, the supply of all components and fittings required for providing a flexible copper jumper connection, including supply of parallel clamps, bi-metallic and Aluminium Copper Al-Cu strips, wherever required and bolted type terminal connector where ever required.
The price shall also cover the erection of the complete jumper assembly including jumper wire. The price shall be applicable for jumper connections using 65-Sqmm catenary wire in any combination required for lightening arresters and isolators etc., not included under item 6(a), 10, 15(a)(i), and 15(a)(ii). The supply of all components and fittings including catenary wire and the erection of all the components and fittings including the catenary wire for providing double catenary contact wire in place of catenary under overline structures as per DRG. No. ETI/OHE/SK/446 and ETI/OHE/SK-529, with latest mod. respectively will also be payable under this item, treating the double catenary as one jumper irrespective of its length including the catenary/contact wire ending clamp.

ITEM No. 15(az)(iii): Supply and erection of a copper jumpers (65 Sq mm catenary)

Same as item 15(a)(iii) but excluding supply of Catenary wire.

ITEM No. 15(a)(iv) : Supply and erection of copper jumpers (5 mm dia dropper wire).

The price shall cover supply of conductors/ jumper wires, and on a flat rate basis, the supply of all components and fittings required for providing a single strand / flexible copper jumper connections not included under items 6(a), 10, 15(a)(i), 15(a)(ii) & 15(a)(iii), including supply of parallel clamps, bi-metallic and Aluminium Copper Al-Cu strips, wherever required, including supply of bolted type terminal connector where ever required.

The price shall also cover the erection of the complete jumper assembly including jumper wire, to be provided between the Over head equipment and L.T. Transformers, drop out switch.

NOTE for items 15(a)(i), 15(a)(ii) & 15(iii): Please see the note under item 15(e).

ITEM No.15 (b) : **Supply and erection of an aluminium jumper.**

The price shall cover on a flat rate basis the supply and erection of an aluminium jumper complete with all components and fittings required for providing jumper connection, including parallel clamps, bimetallic ALCU strips wherever required, and terminal or tee clamps at either end. The price shall be applicable for any aluminium jumper/connections in any combination between feeders, return conductors, overhead equipment, isolators and out going busbars or switching stations and booster stations. Jumper connections for 25 KV feeders at angle tower traction sub-station or at feeding stations will also be paid under this item.

ITEM No.15 (c) : **Supply and Erection of Insulated Catenary cable in the span under Over-Line Structure.**

The price shall cover supply of insulated catenary wire, catenary splice (1090) for each location and required dropper clip and erection of the same for each location. The prices shall also cover erection and adjustment of special droppers wherever required. The insulated catenary wire to be supplied shall be as per RDSO's specification No.ETI/OHE/75(04/95) with A&C slip Nos.1&2(with latest spec.). The work shall be executed in accordance with drawing No.ETI/OHE/ SK/570, with latest mod. The price shall also cover the cutting of existing Catenary wire, supply and erection of all materials and components including adjustment of dropper wires.

Item : 15 (d) : **Supply of materials and erection of a large copper jumper 160 Sq. mm between Aluminium bus and cross feeder.**

This jumper shall be provided between 36 mm Aluminium bus and the copper cross feeder at SP/SSP/FP/BT locations. The price shall cover the supply of 160sqmm flexible copper jumper wire, made of annealed stranded 100% pure copper conductor as per RDSO's specification ETI/OHE/3(2/94) with A&C Slip No 1 (latest spec.), all components and fittings required for providing a flexible copper jumper (160 Sq. mm) and connection between 36 mm Aluminium bus and cross feeder including Terminal connector 19mm multiple hole bolted type (1009), parallel clamps (1050-3), Al-Cu bimetallic strips, fasteners. The price shall also cover the erection of the complete jumper assembly including jumper wire.

Item : 15 (e) : **Supply of materials and erection of a large copper jumper 160 Sq. mm between cross feeder and OHE.**

This jumper shall be provided between copper cross feeders and OHE. The price shall cover supply of 160 sqmm flexible copper jumper wire, made of annealed standard 100% pure copper conductor as per RDSO's specification ETI/OHE/3(2/94) with A&C Slip No 1(latest spec.), and all components and fittings required for providing a flexible copper jumper (160 Sq. mm) between copper cross feeder and existing OHE, including Parallel clamps (1030-3 & 1050-3) complete with fasteners etc as required. The price shall also cover the erection of the complete jumper assembly including jumper wire.

ITEM No.16 (a)(i) : **Supply and erection of a structure bond**

The price shall cover supply of all materials including mild steel flat required to provide a structure bond connecting a traction mast or structures to the nearest non-track circuited rail, or earth electrode, including all fasteners at both ends. The price shall include shaping and drilling of the bond and erection of all materials including the bond. The price shall also include provision of heat shrinkable PVC tube for structure bond under track circuited rail. This would also cover connection or earthing terminals of equipments like L.T. Transformers with structure and then to rails as per relevant drawings.
The price shall cover provision of buried rail to running rail as per RDSO drawing No.ETI/OHE/G/05306, with latest mod and shall include supply, fabrication and erection of all connections (including drilling at both ends) and refilling of buried rail pit. The digging up of 1 m deep pit for the purpose of buried rail shall be done by the Railways.

ITEM No.16 (a)(ii) : **Supply and erection of a Galvanised steel stranded Wire structure bond**

The price shall cover supply of all materials including **Galvanised steel stranded wire** required to provide a structure bond connecting a traction mast or structures to the nearest non-track circuited rail including all fasteners at both ends as per RDSO's drawing No. TI/DRG/OHE/GTBLUG/ RDSO/0001/04/0. The price shall include fixing of lugs and drilling of the rails and erection of all materials including the bond.
The price shall also include provision of heat shrinkable PVC tube for structure bond under track circuited rail. This would also cover connection or earthing terminals of equipments like L.T. Transformers with structure and then to rails as per relevant drawings.

ITEM No. 16(b): Supply and erection of longitudinal bond

The price shall cover the supply of all materials including mild steel flats, fasteners etc. required to provide longitudinal bond connecting two rails at the rail joint at the locations to be specified by the Purchaser. The price shall include shaping and drilling of the bond and erection of all materials including the bonds.

ITEM No.16(c) : **Supply and erection of transverse and special bond**

The price shall cover supply of all materials including mild steel Flats, fasteners etc. required to provide transverse bond connecting rails of the same/ adjacent tracks at the locations to be specified by the Purchaser. The price shall also cover the supply of all materials including mild steel flat to provide special bonds at a level crossing, foot over/road over bridge/protective screen etc. for which the location will be specified by the Purchaser. The price shall include shaping and drilling of the bond and erection of all materials including the bond.

ITEM No. 17(a) : **Supply and erection of single earth electrode**

The price shall cover supply and erection of an earthing station with a single pipe embedded into the ground by driving or otherwise complete with protective concrete box and lugs suitable for directly connecting two mild steel flats of minimum size 50 mm x 6 mm.

ITEM No. 17(b) : **Extra for special embodiment of earth electrode.**

The price shall be payable as extra on item 17 (a) where an earth electrode is embedded by driving or otherwise in an earth pit filled with charcoal and salt. The price shall cover supply and erection of all additional materials required for embedding the earth pipe.

ITEM No. 17(c) : **Supply and erection of earth bus.**

The price shall cover the supply of all materials including 50 mm x 6 mm mild steel flats for providing earth bus. The price shall also cover erection of earth bus either buried at a depth of 300 mm below ground level painted with 2 coats of red oxide zinc chromate primer and 2 finishing coats of bitumen as per the particulars specified in para 2.1.49 or fixed on wooden gutties on walls. It shall include connecting the earth bus to earth electrodes and to various floor-or-wall-mounted equipments or structures to be earthed and also connections to non-track-circuited rails, wherever required it shall also cover the cost of making recesses in concrete foundation blocks or floor or cubicles and covering them up. The connection of earth strips to each other shall be made either by riveting or by welding. The connection of earth strips to various equipment, structures or fencing post shall be made with G.I. bolts and nuts and spring washer/ lock-nuts.

ITEM No. 17(d) : **Supply and erection of copper strips for equipment earthing.**

The price shall cover supply and erection of 25mmx3mm copper strips to connect the earth terminals of equipments like potential transformers, lightening arrestors, L.T. supply transformers and booster transformer to the main masts of the gantries on which they are mounted. The price shall cover all fastenings required for fixing the copper strips along any structure member of the gantry.

ITEM No. 17(e) : **Supply and erection of 8 SWG G.I WIRE for earthing.**

The price shall cover supply and erection of 8 SWG G.I wire per Meter, used for earthing at remote control cubicles and fencing panels.

ITEM No. 18(a) : **Supply and Erection of 25 kV, SF-6 gas filled Interrupters**.

The price shall cover supply of 25 KV, AC, 50 Hz, Single Pole, outdoor type, SF-6 Gas Interrupters complete with all accessories and components as per RDSO's specification No.ETI/PSI/167(09/97), with latest spec. at site and erection of the same complete with supporting frame-work and terminal connectors. The price for erection shall include alignment and grouting of the Interrupter on its foundation block and mounting of accessories, if any, in their respective positions. The required SF-6 gas will be supplied by the Contractor and make his own arrangements for filling of the same. The price shall also cover supply and erection of enameled number plates. All necessary tools, equipments instruments, including power supply required for carrying out necessary checks, tests and commissioning shall be arranged by the Contractor.

NOTE : The replenishment of SF6 gas required due to leakages during the warranty period shall be done by the Contractor at his own cost.

ITEM No. 18(b) : **Supply and Erection of 25 kV, vacuum type Interrupters.**

The price shall cover supply of 25 kV, AC, 50 Hz, Single Pole, outdoor type, vacuum Interrupters complete with all accessories and components as per RDSO's specification No.ETI/PSI/167(09/97), with latest spec.

at site and erection of the same complete with supporting frame work and terminal connectors. The price for erection shall include alignment and grouting of the Interrupter on its foundation block and mounting of accessories, if any, in their respective positions. The price shall also cover supply and erection of enameled number plates. All necessary tools, equipments, instruments including power supply required for carrying out necessary checks, tests and commissioning shall be arranged by the contractor.

ITEM No. 19 : **Supply and erection of 25 KV Potential Transformers (Type-I).**

The price shall cover supply and erection of a 25 kV potential transformer type-I complete with all fittings and accessories as per relevant specifications, including terminal connectors and fixing bolts. The price for supply and erection shall include proper alignment of the transformer in position. The price shall also cover the supply and erection of an enameled number plate and fixing bolts. The price shall not include the cost of any small parts steel work.

ITEM No. 20(a) : **Supply and erection of 42 kV lightening arrestors.**

The price shall cover supply and erection of 42 kV lightening arrestors complete with all fittings and accessories as per relevant specifications including terminal connectors. The cost of supply and erection shall include proper alignment of the lightening arrestor in position. The price shall not cover supply and erection of cadmium copper jumper (65) which will be paid under ITEM No 15.The price shall not include the cost of any small parts steel work.

ITEM No. 20(b) : **Supply and erection of lightening arrestors 7.5 kV.**

The price shall cover supply and erection of 7.5 kV lightening arrestor complete with all fittings and accessories. The cost of supply and erection shall include proper alignment of the lightening arrestor in position. The price shall not include the cost of any small parts steel work.

ITEM No. 21 : **Supply and erection of terminal boards in control cubicles.**

The price shall cover supply and erection of a wall mounted terminal board with six numbers of two-way terminal blocks for connecting the cables from the outdoor equipment of a switching station as per Railway Drawing given in Annexure-1(Part-IV).

ITEM No. 22(a) : **Supply and erection of an iron clad 110 V D.C. fuse box.**

The price shall cover supply and erection of a 15A, 110V iron clad two way fuse box on the wall inside the remote control cubicles. The fuse box shall be complete with two fuse carriers and bases.

ITEM No. 22(b) : **Supply and erection of iron clad 230 V A.C. fuse box.**

The price shall cover supply and erection of a 15A, 230V,A.C. iron clad 4-way fuse box on the wall inside the remote control cubicle, for heater supply of interrupters. The fuse box shall contain four fuse carriers and bases.

ITEM No. 23 : **Supply and erection of lead acid batteries.**

The price shall cover supply and erection of 110V, 40AH lead acid battery complete with stand, accessories and a tool board. The price for erection shall include installation and connecting up of the battery, but exclude the cost of connecting cables (cable will be supplied by the purchaser), erection of which will be paid for under item 25. Price shall include supply of 110V, 40AH lead acid battery complete with accessories and connectors as per relevant RDSO's specification given in Annexure-1. Price shall also cover supply of Mild Steel stand, electrolyte and Tool Board with thermometer, hydrometer & wrench.

ITEM No. 24 : **Supply and erection of battery chargers.**

The price shall cover supply and erection of battery charger for a 110 V, 40 AH lead acid battery complete with connecting lead and plug for connection to 230 V A.C. supply. The price for erection shall include mounting of the charger in position and connecting it up to the 230 V A.C. distribution boards, which will be provided by the Purchaser in the control cubicles. The price shall not include supply and erection of any cable for connecting the charger to the 110 V battery which shall be paid for under item 25.

ITEM No. 25: Supply and Installation of Cables for:-

ITEM No. 25 (a) Control and Indication.

The price shall cover supply, installation and connecting up of cables for control and indication from the interrupter to the terminal board. The price shall include supply and erection of terminal connectors at both ends, if required the conduits may be provided where it is necessary.

ITEM No. 25 (b) Heater Supply.

The price shall cover supply, installation and connecting up of heater supply cable from interrupter to interrupter or from the interrupter to the 230V A.C. fuse box mounted on wall inside the control cubicle and from this fuse box to L.T. distribution board inside the control cubicle. The price shall include cost of supply and erection of terminal connectors at each end, if any required, and conduit, if any at the interrupter end.

ITEM No. 25 (c) Catenary Indication

The price shall include supply, installation and connecting up of cable for catenary indication, between potential transformer Type-I and the terminal board inside the control cubicle. The price shall include supply and erection of terminal connectors at both the ends if required and conduit to be embedded between the steel work based and the cable trench and shall include all fastenings on masts and structural members to support them.

ITEM No. 25 (d) L. T. Power Supply

The price shall cover supply, installation in trenches and connecting up of L.T. Power supply cable between the L.T. supply transformer at switching station and L.T. distribution board, inside the control cubicle. The price shall cover supply and erection of suitable cable boxes, if required, and connectors at both ends.

ITEM No. 25 (e) 110 V D. C. Supply

The price shall cover supply, installation and connection up of cable between 110V battery charger and battery, between battery and the D.C. fuse box and between the D.C. fuse box and terminal board. The price shall include terminal connectors, wherever required.

NOTE : *1. The length of cables shall be the actual distance measured along the lengths of the cable between the starting and terminating points of each cables.*

2. for purposes of payment fraction of a metre in the total length of cable of each type used at a switching station shall be rounded off to the next higher metre.

3. Price under item 25 do not include cost of concrete cable trenches which will be paid for under item 2(c).

ITEM No. 26(a) : **Supply and erection of bus bars**

(i) Aluminum bus bar 36 mm x 28 mm

The price shall cover supply and erection of aluminium bus bars 36mm x 28mm including bending, shaping and clamping on to insulators, connectors or equipment terminals.

(ii) Solid copper bus bar 18 mm

The price shall cover supply and erection of solid copper busbar 18mm including bending and shaping.

NOTE:- The price under item 26(a)(i), (a)(ii) does not cover the cost of terminal connectors which will be paid for under items 26(b) or (c) as applicable.

ITEM No. 26(b) (i) to (vii) : **Supply and erection of aluminium bus-bar connectors**

The price shall cover supply and erection of bus-bar junctions and connectors of various types specified, including bolts, nuts etc, required at junctions or terminations of bus-bars.

ITEM No. 26(c) (i) to (iv) : **Supply and erection of solid copper bus-bar connectors**
The price shall cover supply and erection of solid copper bus-bar junctions and connectors of various types specified, including bolts, nuts, etc, required at junctions or terminations of solid copper bus-bars.

ITEM No. 27(a) : **Supply, Erection, oil filtration, testing and commissioning of 25 kV/240 V 10 kVA L.T. supply transformers.**

The price shall cover Supply of 25 kV/240V 10 kVA LT supply transformers, at site, as per the RDSO's specification indicated in Annexure-1 of Part-IV of this tender paper, and erection of the same complete with terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. The price shall also cover supply and erection of an enameled number plate of approved design. The price shall also cover oil filtration and pre- commissioning tests as approved by the railways. The contractor shall make his own arrangement for oil filtration equipments, as well as power supply required for the same. All necessary tools, equipments, instruments required for carrying out oil filtration/ checks/tests and commissioning shall be arranged by the contractor.

ITEM No. 27(b) : **Supply, Erection, oil filtration, testing and commissioning of 25 kV/240 V, 5 kVA L.T. supply transformers.**

The price shall cover supply of 25 kV/240 V, 5 kVA LT supply transformers, at site, as per the RDSO's specification indicated in Annexure-1 of Part-IV of this tender paper, and erection of the same complete with terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. The price shall also cover supply and erection of an enameled number plate of approved design. The price shall also cover oil filtration and pre- commissioning tests as approved by the railways. The contractor shall make his own arrangement for oil filtration equipments, as well as power supply required for the same. All necessary tools, equipments, instruments required for carrying out oil filtration/ checks/tests and commissioning shall be arranged by the contractor.

ITEM No. 27(c) : **Supply, Erection, oil filtration, testing and commissioning of 25 kV/240 V, 25 kVA L.T. supply transformers.**

The price shall cover Supply of 25kV/240V 25 kVA LT supply transformers, at site, as per the RDSO's specification indicated in Annexure-1 of Part-IV of this tender paper, and erection of the same complete with terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. The price shall also cover supply and erection of an enameled number plate of approved design. The price shall also cover oil filtration and pre- commissioning tests as approved by the railways. The contractor shall make his own arrangement for oil filtration equipments, as well as power supply required for the same. All necessary tools, equipments, instruments required for carrying out oil filtration/checks/tests and commissioning shall be arranged by the contractor.

ITEM No. 27(d) : **Supply, Erection, oil filtration, testing and commissioning of 25 kV/240 V, 50 kVA L.T. supply transformers.**

The price shall cover supply of 25kV/240V, 50 kVA LT supply transformers, at site, as per the RDSO's specification indicated in Annexure-1 of Part-IV of this tender paper, and erection of the same complete with terminal connectors on a mast or gantry. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. The price shall also cover supply and erection of an enameled number plate of approved design. The price shall also cover oil filtration and pre- commissioning tests as approved by the railways. The contractor shall make his own arrangement for oil filtration equipments, as well as power supply required for the same. All necessary tools, equipments, instruments required for carrying out oil filtration/checks/tests and commissioning shall be arranged by the contractor.

NOTE for item 27(a), 27(b), 27(c) & 27(d): The replenishment of the transformer oil on account of testing and leakages during the warranty period shall be done by the Contractor at his own cost.

ITEM No. 28 : **Supply without Insulator and Erection of 25 kV D.O. Fuse Switch**

The price shall cover supply and erection of 25 kV drop out fuse switch complete with all mounting accessories and terminal connectors as required but without the cost of the supply of 25 kV solid core insulator. The price shall not include erection of small parts steel work.

ITEM No.28(x) : Supply of Post Insulators for Item 28

The price shall cover only supply of 25 kV Solid Core Insulators (Post Insulators) for execution of work covered under item 28. Erection cost of insulators are inclusive in item 28.

ITEM No. 29(a) : **Erection, oil filtration, testing and commissioning of Booster Transformers**

The price shall cover erection of a 150 or 100 KVA booster transformer supplied by the purchaser complete with terminal connectors on a gantry. The price shall include proper alignment of the transformer on the gantry, but shall exclude any steel work required for mounting the transformer. The price shall also cover supply and erection of an enameled number plate. The price shall also cover oil filtration and pre-commissioning tests as approved by the Railways. The contractor shall make his own arrangement for oil filtration equipments as well as power supply required for the same. All necessary tools, equipments, instruments required for carrying out oil filtration /checks/tests and commissioning shall be arranged by the contractor.

ITEM No. 29(b) : **DELETED**

ITEM No. 30(a)(i) : **Supply and erection of fencing panels at Switching Stations**

The price shall include supply and erection of fencing panels painted with two coats of red oxide zinc chromate primer to IS:2074:1979 and finished with two coats of aluminium paint. The prices shall not include supply and erection of fencing up-rights, anti-climbing devices but shall include the cost of fasteners and the price shall be for a metre length of the panels, 2.4 meter height measured in the plan view of the appropriate approved drawings.

(ii) Supply and erection of fencing uprights

The price shall cover supply and erection of fencing uprights panels painted with two coats of red oxide zinc chromate primer to IS:2074:1992 and finished with two coats of aluminium paint. The price shall be on the basis of black weight of the steel with no deduction for holes or skew cut or no increase for weld materials. The cost of foundation of uprights will be paid under item-2.

ITEM No. 30(b) :

(i) Supply and erection of anti-climbing device at Switching Stations

The price shall cover supply and erection of an anti-climbing device consisting of galvanised steel fixtures mounted on the fencing panels as per approved design. The price shall be per metre length of the panel.

(ii) Supply and erection of anti-climbing device for B.T. Stations

The price shall cover on a lump sum basis the supply and erection of anti-climbing device consisting of galvanised steel fixtures mounted on the masts, of the gantry below the transformer. The price shall be for each B.T. Station provided with the device.

(iii) Supply and erection of anti-climbing devices for L.T. Supply Transformer Stations.

The price shall cover on a lump sum basis the supply and erection of anti-climbing device consisting of galvanised steel fixtures mounted on the masts below the transformer. The price shall be for each mast provided with the devices.

(iv) Supply and erection of Anti Monkey Menace.

The price shall cover supply and erection of anti monkey menace consisting of Hot dip galvanized fixtures (MS angle 60mm x 60mm x 8mm) including all bolts, nuts, MS Flat and barbed wire as per requirement, mounted on masts as RDSO's drawing Nos. TI/SK/OHE/ANTIMON/RDSO/00001/08/0 & TI/SK/OHE/ANTIMON/RDSO/00001/09/0. The location for provision of **''Anti Monkey Menace''** if any shall be advised by the concerned project after award of the contract. All components shall be hot dip galvanized after fabrication and take approval from the project with the type of mast also.

ITEM No.31 : **Modifications to erected equipment**

The price under this item shall cover various modifications required to be carried out, in a section of completely erected overhead equipment energised or fit to be energised, certified as such by the

Purchaser's Engineer provided such modifications are not on account of non-compliance of specifications, approved drawings and instructions given by the Purchaser for the execution of the work from time to time, during the progress of the work. All the prices are on a flat basis and cover only the important and most frequent type of modifications required to compensate the contractor for additional work involved. No payments shall be admissible for other minor modifications which may be necessary in the course of work. All work originally done shall be paid for at normal rates for items 1 to 30 of schedule 1 as applicable. Dismantling of foundations and masts/structures shall be done by the Purchaser at his own cost.

In all the following cases, the dismantled equipment shall be handed over by the contractor to the Purchaser's Engineer at the spot of dismantlement or at the contractor's Depot, as required by Purchaser's Engineer. Where prices under this item are applicable, the Contractor shall finalise the quantities of work jointly with the Purchaser's Engineer before taking the work in hand.

ITEM No. 31(a) Transfer of equipment from one mast or support to another

The price shall cover transfer of overhead equipment to a bracket assembly on a new mast or support and dismantling of the erected bracket assembly from the old mast of support and consequent adjustment to overhead equipment required such as re-spacing of droppers (including cost of dropper wire), leveling etc. the foundation and steel work and bracket assembly for the new mast or structure will be paid for under appropriate items 2,3 and 4 respectively.

ITEM No. 31(b) : Provision of an additional bracket assembly/assemblies on mast or support

The price shall cover dismantling of an existing bracket assembly/assemblies and provision of a multiple cantilever cross arm wherever required, supplied free of cost by the Purchaser and erection of bracket assemblies on the multiple cantilever cross arm. The price shall include any consequential adjustment to traction overhead equipment such as re-spacing of droppers, leveling, etc. This prices shall not include the price for supply and erection of any additional bracket assemblies, which will be paid for under item 4.

ITEM No. 31(c): Re-adjustment of a head-span

The price shall cover the re-adjustment of the head span polygon to enable the additional equipment/s to be suspended from the head span. Payment for the suspension of additional overhead equipment shall be made for under item 5 as extra to item 31(c).

ITEM No. 31(d): Dismantling of overhead equipment

The price shall cover cost of dismantling of equipment including Terminations, tensioning devices, guy rod assemblies, bracket assemblies and associated small parts steel work(excluding components embedded in concrete).

ITEM No. 31(e): Dismantling of feeder/return conductor

The price shall cover dismantling of feeder, or return conductor including guy rods, terminations, suspension assemblies, super masts and associated small parts steel work.

ITEM No. 31(f): Splicing and extension of anchored overhead equipment

The price shall cover splicing of terminated overhead equipment for extension and consequent adjustment of the affected equipment. The dismantled equipment (excluding portions embedded in concrete) shall be returned to the Purchaser's Engineer. The cost of dismantling of overhead equipment would be paid for under item 31(d) for the whole length of the anchoring span irrespective of the physical position of the splices. The extended overhead equipment shall be deemed as starting from the center line of the structure preceding the old terminating structure and the extended overhead equipment shall be paid for under item 6(a) or 6(b) or 6(c) as applicable.

ITEM No. 31(g): Dismantling of a section insulator

The price shall cover cost of 107 sq mm contact wire, 65 sq mm catenary wire, dropper wire and dismantling of an section insulator, splicing of catenary and contact wires and the necessary

adjustments to droppers. The price shall include the supply of required copper conductors for the adjustment. The dismantled equipment shall be handed over to the Purchaser's Engineer at the spot of dismantling or at the contactor's Depot/s.

ITEM No. 31(gz): **Dismantling of a section insulator**

Same as item 31 (g) but excluding supply of Contact and Catenary wires.

ITEM No. 31(h): Slewing and putting back of OHE in original shape

The price shall cover for temporary slewing or lowering of erected OHE adjusted and /or unadjusted to ground for special works, at the request of the Purchaser and restoration and re-adjustment of the equipment after completion of special works. The price shall be per span or part thereof, including anchoring spans.

Additional components or materials used during such restoration or re-adjustment will be paid for at rates included in schedule 3 plus handling charges of 10% provided such use has, in the opinion of the Purchaser, become necessary due to reasons beyond the control of the Contractor.

ITEM No. 31(i) Dismantling of an isolator

The price shall cover cost of dismantling of an isolator, single or gang-operated, including dismantling of connections to the overhead equipment and associated small parts steel work.

ITEM No. 31(j) Dismantling of a post/pin insulator

The price shall cover cost of dismantling of a pedestal pin insulator including dismantling of jumper connections, if any and associated small parts steel work.

NOTES FOR ITEM No. 31 : All claims under this item have to be supported by the following certificate to be furnished by the Contractor on the connected bill.

(a) The modifications are not on account of non-compliance of specifications approved and instructions given by the Railways for execution of works.

(b) The quantities of work involved for modification have been finalised jointly with the Railway's Engineers before taking the work in hand.

(c) The dismantled material have been handed over to the Purchaser's representative.

Item No. 31 (m)(i) & 31(m)(ii):

Manning of Switching Stations/Traction Sub-stations

The prices shall cover the payment/wages to the staff to be deployed at each switching station and traction sub-station as directed by purchaser's Engineer. Manning shall be done round the clock. The staff to be deployed must be skilled and fully conversant with operation of various equipments installed in switching station and traction sub-stations. The staff shall be deployed after test and trial by purchaser and on issue of competency certificate. The staff deployed shall act in accordance with instructions/ directions given by Traction Power Controller/representative of purchaser. The staff shall not leave the working place (Switching station and Traction Sub-station) in any case without prior permission of purchaser's representative. The price shall cover conveyance charges to the staff for going and coming to the working place. The period of manning shall be decided by the purchaser during execution of contract and manning shall commence on receipt of intimation in writing from the purchaser one month in advance.

Note: In case Feeding Post is situated in adjacent to TSS same will also be included for manning alongwith TSS.

ITEM No. 32: **Extra on erection rate for work under a power block**

The price under this item cover extra charges over and above erection rates of item 3 to 15 and 18 to 31 of Schedule 1, (Pt. I, Ch. IVA) for erection of equipment in the vicinity of energized overhead equipment and feeders or erection of equipment with joints equipment already energized or on energized equipment which calls for a power block (shut off of traction power).The price payable under this item shall be 100% extra over the erection rates of the item referred to above, provided such work is

not called for on account of non-compliance with specifications, approved drawings and instructions given by the Purchaser from time to time.

The extra erection rate under this item will not be payable, if power block is given for a total duration of a 4 hour or more in a day. Where the prices under this item are applicable, the Contractor shall finalise the quantities of various items of work to be done under a power block, jointly with the Purchaser's Engineer prior to taking the work in hand.

ITEM No. 33(a):

Extra on erection rates for stringing work manually under Item No. 6(a) to 7(c)
The price under this item covers extra charges over and above the erection rates of item 6(a) to 7(c) of Schedule-1(Pt. I, Ch. IVA) without use of Wiring Train/Tower Wagon. The price payable under this item shall be 50% extra over the erection rates of the items referred to above, provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the Purchaser from time to time.

ITEM No. 33(b) : **Extra on erection rates for steel work manually under Item 3(a)(i), 3(a)(ii), 3(b)(i), 3(b)(ii) & 3(b)(iii)**

The price under this item covers extra charges over and above erection rates of item No. 3 (a) (i), 3 (a)(ii), 3 (b)(i), 3 (b)(ii) & 3 (b)(iii) of Schedule-1(Pt. I, Ch. IVA) without use of rail crane. The price payable under this item shall be 50% extra over the erection rates of items referred to above, provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the purchaser from time to time.

Note : Where the works under these item 33(a) i.e "Manual Stringing" and 33(b) i.e "Manual Erection of Masts" are feasible, the Contractor shall finalise the quantities of various items of work jointly with the purchaser's engineer prior to taking up the work in hand, subject to a maximum of two percent each for item 6(a) to 7(c) and 3 (a) (i), 3 (a)(ii), 3 (b)(i), 3 (b)(ii) & 3 (b)(iii) of Schedule-1.

Item No.34(a): **Supply of materials and construction of Super-structure of SP/SSP building**

The price shall cover the construction of Control room of SP/SSP building above plinth and will include labour and material cost for the following works:-

i) RCC work in plinth, lintels, chajja, Roof slab.
ii) Pre-cast RCC slab, RCC jali.
iii) Cement concrete in flooring and cable trench.
iv) Brick masonary in walls.
v) Plastering works.
vi) Provision of Doors, windows grills, Rolling shutters, water pipe line ventilators and painting thereof.
vii) White washing and colour washing.
viii) Acid proof or painting of floor and wall in battery room.
ix) Spreading of stone metal.
x) Provision of RCC pipe etc.
xi) Any other item of work required to complete the work which has not been mentioned/included above shall also be done by the contractor and nothing extra shall be paid the same.

Construction of switching station shall be done strictly as per RDSO's drawing **No.ETI/C/0067** (Latest version as given in Annexure-1) and Technical specification included in Part-II Chapter-VIII of the Tender Papers.

The price shall cover the provision of all shuttering, frame works, arrangement of water, all tools and plants required for the work, consumable materials etc.

The materials used for the work such as brick, sand, stone aggregates, steel for door frame, grill/Rolling shutters, RCC pipe shall be of best quality in accordance with Railways specification.

The price shall also cover the provision of suitably sized of opening on the wall, for installation of Exhaust fan in the battery room.

Item No.34 (b) : **Cement concrete for foundation with stone ballast 40 mm nominal size rammed in layers not exceeding 15 cm thick in cement and sand, ratio 1:3:6 :-**

The price covers the supply of all necessary materials for casting cement concrete including cement, sand, ballast, arrangement of water and labour. The price shall cover the arrangement of all tools and plants such as mixer, vibrator (mechanical/electrical).
The price shall cover provision of shuttering and dismantling thereof. The price shall cover cost of screening and washing of aggregate mixing as well grinding of mortar, preparation, deposition and curing of concrete and rendering or finishing the exposed surface were required. The price shall cover the cost of transportation of all materials, tools and plants to the site or from the site.

Item No. 34 (c) : **RCC work of foundation**

The price shall cover the price of reinforcement concrete work for construction of column including supply of cement, concrete, structuring arrangements and dismantling thereto but excluding cost of steel required for reinforcement which has been covered under item 3(g). The concrete mixture shall also be before casting in accordance with IS:456/2000.

Item No. 34(d) : **Brick work in foundation, plinth ,Retaining walls and drainage**

The price shall cover all labour and materials including cement and brick. The price covers supply, fixing, erecting, and removal of scaffolding, timber or steel frame work, shuttering, centering etc. The price covers arrangement of water at site, mixing of mortar, soaking bricks and all watering during the work and prescribed period of curing afterwards. The price shall cover the arrangement of all tools and plants required for work. The price shall cover all consumable materials e.g. fuel, oil, string, rope, wedges etc.

Item No. 34(e)(i):

Construction of retaining wall with Random rubble masonary in cement & sand 1:6

The price shall cover all labour and materials including cement. The price shall cover supplying, fixing, erecting, and removal of scaffolding, timber or steel frame work, Shuttering, centering etc. The price shall cover watering during the work. The price covers the arrangement of water at site.

NOTE:- In case the stone rubbles are not available nearby the work site then the Retaining wall shall be constructed by Brick Masonary work and the payment should be made to the contractor under item 34 (d).

Item No. 34(e)(ii) : Construction of retaining/baffle wall with RCC M-20

The price covers the supply of all necessary materials for casting cement concrete (RCC) including cement, sand, ballast, arrangement of water and labour. The price shall cover the arrangement of all tools and plants such as mixer, vibrator (mechanical/electrical).

The price shall cover provision of shuttering and dismantling thereof. The price shall cover cost of screening and washing of aggregate mixing as well grinding of mortar, preparation, deposition and curing of concrete and rendering or finishing the exposed surface where required. The price shall cover the cost of transportation of all materials, tools and plants to the site or from the site. The price shall be exclusive of the cost of Steel required for Reinforcement which shall be paid under Item 3(g). The price shall also include dismantling of all connected temporary arrangements, back filling as required and removal of spoil.

Note: Normally construction of retaining/Baffle wall requires digging for base preparation. Erection charges up to ground level will be paid as per erection rate of item 2(b)/2(bz) for soil other than hard soil & rock. For hard soil & rock, erection rate for base preparation up to ground level shall be paid as per erection rate of Item 2(a)(i)/2(az)(i) & item 2(a)(ii)/2(az)(ii) respectively.

Item No. 34(f) : **Earth work in excavation and filling**

The price shall cover the earth filling at the site of SP/SSP control room at specified area upto required level. The price covers all labour and materials required including arrangement of necessary tools and plants required for the work. This price also includes the transportation cost of earth in case, earth is not available for filling up the nearby area. The price covers the watering and ramming of levelled/ filled earth

either manually or by mechanical means. The price shall cover arrangement of necessary water required for the work.

Item No. 34(g) : **Earth work in excavation for foundation**
Same as for above, item No.34(f) except that no watering and ramming of earth is required in this case, but includes the disposal of excavated earth /leveling etc. for foundations, drainage etc.

Item No. 34(h) :

Excavation of pile 100 to 200 mm dia with Single under ream up to 3.5 m deep

The price shall cover the cost of all labour tools and plants required at site during making of a 100 to 200 mm dia bare hold along-with single under ream upto a depth of 3.50 metre. The excavated earth from the bare hole shall be disposed off and leveled all around. The price shall also cover the cost of all consumable materials and water required at site during execution of work.

Item No. 34(i) : **Plastering of Retaining wall**

The price shall cover the supply of all materials and labour cost including cement for plastering of Retaining wall either constructed by Ruble masonary work or by Brick work. Plastering work shall be done by cement mortar in 1:4 (1cement and 4 sand). The price shall also cover the cost of arrangement of necessary water required for the work. The price shall cover the cost of necessary tools and plants required for the work and necessary consumable items. Nothing extra shall be paid to the contractor for any rehandling of materials from the place of delivery to place of work. The price shall cover the cost of cleaning and wetting the surface of the work. The price shall also cover the cost of curing of the plastered surface as per extent practice.

Item No. 35 : **Supply & Erection of materials for Internal and External Lighting of Switching Station Building (SP/SSP).**

The price shall cover all cost of labour and materials required for the work. Wiring work shall be done in accordance with IE rules, IS-732 and specifications given in Part-II Chapter-VIII of the tender paper. The price shall also cover the cost of testing and commissioning of the installations. The various activities involved in the work are as follows:-

Fixing of MS conduits on wall and drawing of wires for circuit and point wiring.
Provision of C.I. Switch boxes of appropriate size concealed in wall at appropriate height with phenolic laminated (Hylum) sheet for fixing of switches, plugs etc.
Provision of Main Board and Distribution Boards and connection thereof.
Provision of light fittings, Exhaust fan, Outdoor luminaries complete with tubes and bulbs.
Provision of Earthing station and connection between earthing station to Main Board with the help of 8 SWG GI wire. Earthing work shall be done in accordance with IS:3043/1987.
Materials such as light fittings, Exhaust fan, switches sockets, Ceiling Rose, Socket outlets all shall be with ISI mark and shall be one of the make mentioned in technical specification.
Provision of Switches, sockets out lets, Ceiling Roses on respective switch boards and points in appropriate numbers and connection thereof.
Provision of 150 Watt HPSV street light fitting complete in all respect including lamp on the wall of the building.
After completion of wiring work necessary testing of wiring and Earthing station shall be done and results submitted to the site-in-charge duly signed by representatives of both the contractor and purchaser.

Item 36 (a) : **Unloading of all type of Steel Structures :**

The price shall cover unloading charges for all type of steel structures (BFB/ RSJ, B-Series, Spl structures, N,O, R type structures etc) from BFR/ trailor/ truck over and above the requirement given by the contactor for the completion of the present work or actual qty utilised in the completion of work; whichever is higher.

Item 36(b): **Loading of all type of Steel Structures** :

The price shall cover loading charges for all type of steel structures (BFB/ RSJ, B-series, Spl structures, N,O & R type structures etc) into BFR/ trailor/ truck over and above the requirement given by

the contactor for the completion of the present work or actual qty utilised in the completion of work; whichever is higher.

Item 37 (a) : **Unloading of all type of Copper & Aluminium conductors :**

The price shall cover unloading charges for all type of copper conductors (contact wire, catenary wire, Dropper, Briddle wire, Jumpers etc) and Aluminium conductors (spider conductor etc) into BFR/ Tower wagon/ trailer/ truck over and above the requirement given by the contactor for the completion of the present work or actual qty utilised in the completion of work; whichever is higher.

Item 37 (b) : **Loading of all type of Copper & Aluminium conductors :**

The price shall cover loading charges for all type of copper conductors (contact wire, catenary wire, Dropper, Briddle wire, Jumpers etc) and Aluminium conductors (spider conductor etc) into BRF/ Tower wagon/ trailor/ truck over and above the requirement given by the contactor for the completion of the present work or actual qty utilised in the completion of work; whichever is higher.

Schedule-1, Section-6

EXPLANATORY NOTES TO NON SCHEDULE ITEMS FOR SUPPLY & ERECTION OF DIFFERENT TYPES OF CAUTION BOARDS

-DELETED-

Schedule-1, Section-7

EXPLANATORY NOTES TO NON SCHEDULE ITEMS FOR PROVISION OF SAFETY ITEMS FOR SWITCHING STATIONS & RAILWAY

-DELETED-

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PART-I

CHAPTER-IV B

1 **PART-I**
1.4 **CHAPTER-IV "B"**

EXPLANATORY NOTES OF SCHEDULE
(FOR TRACTION SUB-STATION WORKS)
SCHEDULE OF PRICES
PART "A"-TSS General

1.4.1 Explanatory notes for various Items of work in Schedule-1(Pt. I, Ch. IVB) are given below:-

1.4.2 **(a)** Wherever an item of work covers supply of materials and/or erection, such items shall include all bolts, nuts, locknuts, washers etc. except as provided for in Annexure-4.

(b) The equipment and materials to be supplied by the Contractor against various items should conform to RDSO's specification and drawings given in Part-IV.

1.4.3 Erection of any item of equipment, whether supplied by the Contractor or by the Purchaser will include proper connecting, testing, commissioning and bringing the equipment into operation in accordance with Part II, Chapter VII and to the satisfaction of the Purchaser.

1.4.4 Special notes for measurements are included in of this Chapter under various items, where necessary.

1.4.5 Reconciliation of materials supplied by the Purchaser (See 1.2.20).

(a) The following procedure shall be adopted for the final reconciliation of the various equipments, materials, fittings and conductors supplied by the Purchaser in terms of Para 1.2.20 (See Annexure-4).

(b) All the materials supplied by the Purchaser shall be correctly accounted for and quantities reconciled on completion of the work by the Contractor. On completion of the work all surplus materials supplied by the Purchaser together with ones found defective or that have become defective or broken on account of defective materials and/or Workmanship shall be returned to him by the Contractor.

(c) Other Equipments, fittings & components:

The Purchaser will supply the requirement of the various other equipments, components and materials listed in Annexure-4. If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the prices inclusive of all charges as specified in the note below.

NOTE: If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the issue rate or market rate prevailing at the time of supply, whichever is higher plus 5% on account of initial freight, 2% on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material freight and incidental charges. Freight between the Purchaser's source of supply and the Contractor's depot or rail head shall be to the Contractor's account.

PART-"B"

TSS - PARTICULARS
Schedule-1, Section-8

Item: 1(a)
Designs and Drawings for Traction Sub-stations.

The price shall cover on a flat rate basis per substation, survey, investigation of soil bearing pressure and soil resistivity, preparation of cross section drawings, preparation of general arrangement drawings, detailed layout of equipment, bus-bar connections and insulators, layout of cable trenches outdoor and inside the control room, layout of earthing system and earth connections, layout of earth screen wire, design of supporting structures for 220kV, 132kV or 110/25kV equipments, detailed drawings for steel work and structural support, suitable concrete pedestals, plinths and foundations for equipment and structural support and drawings/ designs for equipments, components, fittings and materials. The price shall include supply of requisite number of copies of all drawings, including completion drawings to the Purchaser, as specified in Part-II.

NOTE The design for Oil Soak pit and drain water sump will also be got approved from the purchaser.

Item: 1 (b)

Preparation of designs and drawings for feeding stations :

The price shall cover on a flat rate basis per feeding station, survey, investigation of soil bearing pressure, preparation of cross section drawings, preparation of general arrangement drawings, detailed layout of equipment, bus-bar connections and insulators, layout of earthing system and earth connections, cable run layout, detailed designs and drawings for steel work and structural support, excluding the ones for which supply is made by the Purchaser, suitable concrete plinths for equipment and drawings for equipments, components, fittings and materials supplied by the Contractor. The price shall include supply of requisite number of copies of all drawings, including completion drawings as specified in Part-II.

Item: 2 (a)

(i) Concrete for foundation & trench in hard soil:

(ii) Concrete for foundations and trench in rock:

The price shall cover excavation, supply and handling of all materials and accessories, temporary arrangements for excavation in hard soil and concrete/masonry drains/walls, requiring use of chisel and hammer for item 2 (a) (i) or requiring blasting for item 2 (a) (ii), shoring and shuttering where necessary, casting concrete including frame work, grouting gantry/portal columns and steel supports and finishing the top of concrete foundation with required slope/muff. The price shall include dismantling of all connected temporary arrangements, back filling required and removal of soil. The Purchaser's Engineer shall certify where use of chisel and hammer or blasting has been necessary. The Contractor shall arrange for supply of explosives and all tools and plants for blasting operations at his own cost. If half or more of the depth and width of excavation is in hard soil, concrete /masonry/drains/ walls or rock, the entire foundation shall be paid for under item 2(a),if it is less than half, payment for the entire foundation shall be made at the rate for the type of soil in which the majority of the foundation is placed. The price shall include the cost of cement also. Cement shall not be supplied by the Rlys.

NOTE: For measurements for item 2 a(i) & (ii).

1) The payable volume of the foundations under item 2a (ii) shall be limited to the designed one as shown in the drawings for which the hole has been blasted, irrespective of the actual configuration assumed by the latter due to blasting.

2) The depth of excavation shall be measured from the formation level of the substation to the maximum excavated point.

2 (b) Concrete for foundation and trench other than hard soil and rock:

The price shall include all work mentioned in item 2(a) in all classes of soil, including black cotton and loose soils, except hard soil, concrete/masonry/drains/walls and rock. The price shall include the cost of cement also. Cement shall not be supplied by the Rlys.

2(c) (i) Reinforced concrete for foundation & trench:

The price shall cover excavation and all reinforced concrete work for foundations including supply of steel for reinforcement and other materials including bending/binding, laying of reinforcement, shoring and shuttering where necessary, casting concrete including frame work where necessary, grouting and finishing the tops of foundation blocks with the required slope/muff. The price shall include dismantling of all connected temporary arrangements, back filling as required and removal of soil. The price shall also cover all concrete work for cast-in- situ piles and pedestals/columns for mounting equipment. The volume of cast-in-situ piles and pedestals columns shall be added to the volume of foundation block for purposes of payment. Dowel bars will not be considered as reinforcement for the purpose of this item. The price shall include the cost of cement also. Cement will not be supplied by Rlys.

(ii) Cable trench covers:

The price shall cover casting of cable trench covers in reinforced concrete as per drawing in Annexure-1. The cable trench covers will be casted in an angle iron frame of angle size 40x40x5. The price shall include the supply of steel for reinforcement angle iron for the frame work fabrication of angle iron frame etc. The price shall include positioning and dressing up of the trench covers, if required. The price shall include the cost of cement also. Cement will not be supplied by Rlys.

Item: 2 (d)
Reinforced Brick work for Baffle Wall:

(i) Reinforced Brick work

The price shall cover excavation and construction of reinforced brick work laid in cement mortar 1:3 mix for the baffle wall. The price shall include supply of steel for reinforcement and other materials. The price shall also include bending/binding and laying of reinforcement, shoring, shuttering and scoff-folding arrangement, required for the construction of brick wall and its curing. The price shall also include dismantling of all connected temporary arrangements, back filling required and removal of spoil. The price shall include the cost of cement also. Cement will not be supplied by Rlys.

(ii) Plastering of brick work:

The price shall cover supply and handling of all materials, scaffolding arrangements, raking out joints, curing and finishing of plaster (12 mm. thicknesses with cement mortar 1:4 mix.) on the Baffle wall. The price shall also include dismantling of all connected temporary arrangements and removal of spoil. The price shall include the cost of cement also. Cement will not be supplied by Rlys.

Notes for item 2

(1) The prices under item 2 shall be same for any shape or size of concrete blocks, cable trenches & brick wall. In calculating the individual volume of concrete and brick wall fraction of a cubic meter beyond the third decimal shall be rounded off to the nearest third decimal.

(2) The prices under item 2(a), (b) & (c) (i) shall apply for concreting of all pedestals, plinths and foundations for gantries/portals and supporting steel work and cable trenches.

(3) For purpose of computation of volume of concrete and brick wall under item 2, the volume of steel work embedded in the foundation block or muff shall be ignored.

(4) Cost of all concrete will be paid for only under item 2 and the prices of other items, except item 24(a) shall not include cost of concrete.

(5) The volume of each muff will be included in the volume of concrete for the respective foundation for purposes of computation of volume of concrete.

(6) The prices shall include cost of embodiment of drain pipes, conduits for cable or earthing flats where necessary.

(7) In respect of concrete for cable trenches the price shall not include the cost of cable supports and trays, which shall be supplied and erected by the Contractor and shall be paid for under item 3.

(8) Dowel bars in special foundations and nominal reinforcement in black cotton soil foundations will be necessary. Such nominally reinforced foundations in black cotton soil will be payable under item 2(b) and not under item 2(c)(i). The steel for nominal reinforcement and dowel bars will be supplied by the Contractor and the concrete mixture in such a case shall be as for normal foundations 1:3:6 (See Para 2.2.4).

(9) At each Traction substation one number Oil soak pit for main transformers and one drain water sump for the cable trenches will be provided by the contractor. Payment for this work will be made under item 2(d).

(10) The Tenderer may quote alternative rates in **Form-4**, for anchoring the structures with anchor bolts to hard rock, in terms of Para 2.2.3. The price shall include the supply of anchor bolts and the special high strength grouting metal.

(11) The foundations for the main traction transformer shall include provision of a suitable apron under the transformer and construction of a suitable drain connecting the apron to the oil sump.

Item: 3
Supply, fabrication, galvanization and erection of steel gantries/portals, supporting structures and small parts steel work:

The price shall cover supply, fabrication, galvanization and erection of steel gantries/portals, supporting structures and small parts steel work required in the traction substation. The price shall include alignment setting and grouting of steel work and supply of all necessary galvanized steel bolts, nuts, lock-nuts, washers etc. wherever required as per approved designs and drawings and assembly of the fabricated steel work at site to the extent necessary. The calculated weight to be considered for payment under this item shall be included in relevant drawings at the time of submitting designs for approval of the Purchaser.

Notes for Item 3

1) All gantries/portals and supporting steel structures and small parts steel work will be supplied by the Contractor. The term "Small parts steel work" is meant to cover fabricated steel work made from rolled steel sections such as cross beams, base-plates, backing angles, knee brackets etc. Including bolts, nuts, locknuts and washers etc. for fastening the small parts steel work to any structural member.

2) For purposes of payment, the weight of fabricated steel work shall be calculated according to the weight of black steel given in section books for the lengths of various members, as shown in approved drawings. There will be no addition for increased weight due to galvanizing or painting or reduction for holes or skew cuts. An addition of 1% will, however, be made to the calculated weight to cover weight of bolts, nuts, locknuts and weld materials etc. The weights of holding-down bolts, calculated on the basis of standard weight tables shall be separately included in the payable weight of steel under this item.

3) The steel supporting frame of equipment supplied along with the equipments will not be reckoned for purposes of payment under this item unless specifically indicated. None of the other items of the work shall include the cost of supply and erection of small parts steel work which will invariably be paid for under item 3 as applicable.

Item No. 3(b):
Erection of traction masts, main masts of Switching station and L.T. Supply Transformer Stations:

The price shall cover cost of erection, alignment and setting before grouting of individual traction masts, main masts of Switching stations and masts for L.T. supply transformer stations whether rolled or fabricated including those for head spans. The price shall also include the cost of repairing of platform shelters in case the shelter is dismantled/removed/damaged during the course of erection of a mast/portal at platforms.

NOTE : For the purpose of payment, the terms and conditions mentioned in "Note for Item 3(a)(i), 3(a)(ii), 3(b)(i), 3(b)(ii) & 3(b)(iii)" below Item 3(b)(iii) of the Part-I, Chapter-IV A, Part-B shall be applicable.

INDICATIVE UNIT WEIGHTS FOR STANDARD MASTS INCLUDING GALVANISTION

S.N.	TYPES OF MASTS	WEIGHT in kg per meter including galvanization
1	6"x6"x25.15 BFB	38.03
2	162x154x27.1 BFB	38.00
3	200x200x49.9 BFB	51.20
4	8"x6"x35 RSJ	53.39
5	S1	53.30
6	S3	76.40
7	S4	53.39
8	S5	111.53
9	S6	53.39
10	S7	76.40
11	S8	111.53
12	K100	23.70
13	K125	30.30
14	K150	38.18
15	K175	43.72
16	K200	49.87
17	K225	57.50
18	K250	66.72
19	B100	27.71
20	B125	32.47
21	B150	39.07
22	B175	44.61
23	B200	50.76
24	B225	61.50
25	B250	70.72
26	S100	23.72
27	S101	19.98

Note: The price for the items 3(b) shall also include the cost of stenciling of location number on masts/portal uprights in the manner as directed by the Purchaser. The price shall also include the straightening of masts/portal uprights bent during transit and cutting of masts/portal uprights to suit the site conditions.

Item: 4
Erection, testing & commissioning of 132 KV or 110 KV Double Pole SF-6 Gas Circuit Breakers:

The price shall cover erection of 132 KV or 110 KV double pole SF-6 Gas Circuit Breakers, complete with operating mechanism, all fittings and accessories including terminal connectors. The price shall cover grouting the supporting frame and Mechanism box on foundations block and mounting of other accessories in their respective places. It shall also cover first gas filling (gas required for first filling shall be supplied by the Purchaser), testing and commissioning of the circuit breaker. The price shall also cover the supply and erection of an enameled number plate. The Contractor shall make his own arrangement for filling of the SF-6 gas and power supply required for testing purpose. All necessary tools, equipments, instruments required for carrying out necessary checks, tests and commissioning shall be arranged by the Contractor.

Item: 5 (a)
Supply and Erection of 132 KV Double Pole Isolators (Manually operated).

The price shall cover supply & erection and connecting up of a 132KV single phase double pole Isolator with manually operated mechanism complete with mounting base and all accessories/ required for its operation including terminal connectors. The price shall include supply and erection of an enameled number plate and padlock. The price shall include mounting of the Isolator and the operating rod in position and their alignment for smooth and trouble free operation. The prices shall also include the cost of 132KV solid core post insulator and operating rod.132 KV Double Pole

Isolators (Manually operated) shall conform to RDSO specification No. ETI/ PSI/ 122(3/89) with A&C slip No.1 or latest amendments.

Item: 5 (b)
Extra for supply and erection of earthing blade assembly for 132 KV Double Pole Isolators (Manually operated)

The price shall cover supply and erection of earthing blade assembly for 132KV Isolators. The price shall be extra on item 5 (a) and applicable individually for each Isolator.

Item: 6
Supply & Erection of 132 KV Current Transformers (400-200/5A)

The price shall cover supply & erection and connecting up of a 132KV Current Transformer complete with all fittings and accessories including terminal connectors. It shall also include mounting of the transformer in position, and supply and erection of an enameled number plate. 132 KV Current Transformers shall conform to RDSO specification No.ETI/PSI/117 (7/88) with A&C slip No.1 to 9 or latest amendments.

Item: 7
Supply & Erection of 132 KV Lightning Arrestors:

The price shall cover supply & erection and connecting up of a 132KV Lightning arrestor with surge counters complete with all fittings and accessories including terminal connector. It shall also include mounting of the Lightning arrestor in position and supply and erection of and enameled number plate. 132KV Lightning Arrestors shall conform to RDSO specification no. ETI/ PSI/ 137(8/89) with A&C slip No.1 to 7 or latest amendments.

Item: 8
Erection, testing & commissioning of 25 KV single Pole Vacuum Circuit Breaker.

The price shall cover erection of 25kV Vacuum Circuit breaker , complete with operating mechanism, all fittings, and accessories including terminal connectors. The price shall cover grouting the supporting frame and mechanism box on foundation block and mounting of other accessories in their respective places. It shall also cover testing and commissioning of the circuit breaker. The price shall also cover the supply and
erection of an enameled number plate. All necessary tools, equipments instruments required for carrying out necessary checks and tests and commissioning shall be arranged by the Contractor.

Item: 9
Erection, testing and commissioning of 25KV Vacuum Interrupters.

The price shall cover erection of 25 KV Vacuum Interrupters complete with operating mechanism, all fittings and accessories including terminal connectors. The price shall cover grouting the supporting frame and mechanism box on foundation block and mounting of other accessories in their respective places. It shall also cover testing and commissioning of the Interrupters. The price shall also cover the supply and erection of an enameled number plate. The Contractor shall make his own arrangement for power supply required for testing purpose. All necessary tools, equipments and instruments required for carrying out necessary checks, tests and commissioning shall be arranged by the Contractor.

Item: 10(c) Extra for erection of Interlocking Mechanism.

The price shall cover erection of an Interlocking Mechanism on an Isolator to permit working of an Isolator and or earthing blade assembly in a desired sequence. The price shall be extra on items 4,5(a),5(b), 8,9,10(a) and 10(b) and shall be applicable individually for each Isolator, Circuit Breaker and Interrupters.

Item: 11 (a)
Supply & erection of 25 kV Potential Transformers (Type-II)

The price shall cover supply & erection and connecting up of a 25KV Potential Transformer complete with all fittings and accessories including terminal connectors. It shall also include mounting of the transformer in position and supply and erection of the enameled number plate. Bus-bar connectors

provided with jumper connections shall be paid under item 17(c). 25KV Potential Transformers (Type-II) **shall** conform to RDSO specification No. TI/SPC/PSI/PTS/0990(09/99) with A&C slip No.1 to 5 or latest amendments.

Item: 11(b)
Supply & Erection of 25KV Potential Transformers (Type-I)

The price shall cover supply & erection of a 25KV potential transformer type-I complete with all fittings and accessories as per relevant specification including terminal connectors and fixing bolts. The price for supply and erection shall include proper alignment of the transformer in position. The price shall also cover the supply and erection of an enameled number plate and fixing bolts. The price shall not include the cost of any small parts steel work. 25KV Potential Transformers (Type-I) **shall** conform to RDSO specification No. TI/SPC/PSI/PT/0990(09/99) with A&C slip No.1 to 5 or latest amendments.

Item: 12
Supply & Erection of 25 KV Current Transformers (1500-750/5)

The price shall cover supply & erection and connecting up of a 25KV Current Transformer complete with all fittings and accessories including terminal connectors. It shall include mounting of the transformer in position and supply and erection of an enameled number plate. 25KV Current Transformers (1500-750/5) shall conform to RDSO specification No. ETI/ PSI/90(6/95) with A&C slip No.1 to 8 or latest amendments.

Item: 13
Erection of Control & Relay panel (board) for 25 kV TSS as per RDSO Spec.No. TI/ PSI/PROTCT/6071 (Feb'2015):

The price shall cover erection and connecting up of Control Boards with Numerical type relays as per RDSO's Specification No TI/SPC/PSI/PROTCT/6071 (Feb'2015) or latest amendments (Comprising of distance, wrong phase and instantaneous over current protection with PT fuse failure) for OHE protection, transformer protection, OHE protection ,auto reclosing scheme and Shunt capacitor banks manufactured by any RDSO approved firms, for all the 220/132KV and 25KV Circuit Breakers, Interrupters, Isolators and Transformers at the traction substations complete with all wiring, control switches, meters, protective and auxiliary relays etc. including mimic panel. The price for erection shall also include alignment and grouting of the panels in position and all necessary connections to bring the control board to operation. It shall also include the cost of connecting the frame of each control panel to the earth bus inside the control room.

The prices for erection of Control & Relay panel shall include erection and connecting up of Panto flashover protection relay as per RDSO specification No.TI/SPC/PSI/ PROTCT/2983 or latest amendments.

The prices for erection of Control & Relay panel shall include erection and connecting up of Delta-I type fault selective relay (2 Nos.) as per RDSO specification No.TI/SPC/PSI/ PROTCT/1982 (12/2003) with A&C slip.No.-1(11/13) or latest amendments.

Item: 14 Supply & Erection of 25 KV Lightning Arrestors.

The price shall cover supply & erection of a 25KV Lightning Arrestor complete with all fittings and accessories including terminal connector. It shall also include mounting and connecting up of the Lightning Arrestor in position and supply and erection of an enameled number plate. 25KV Lightning Arrestors shall conform to RDSO specification No.TI/SPC/PSI/MOGTLA/0100 (07/2010) or latest amendments.

Item: 15 Erection, testing, commissioning of 25 KV/240 V Auxiliary Supply Transformer (10/25 kVA capacity) Oil type.

The price shall cover erection and connecting up a 10/25 KVA L.T. Supply transformer complete with all fittings and accessories including terminal connectors. The price shall include supply and reaction of 5 SWG copper jumper wire required for connecting also include mounting of the transformer on its supporting structure and supply and erection of an enameled number plate. The price shall also cover oil filtration, testing and commissioning of the transformer. The Contractor shall make his own arrangement for oil filtration plant as well as power supply for the same. 25KV/240V Auxiliary Supply

Transformer (10/ 25 kVA capacity) Oil type shall conform to RDSO specification no.ETI/ PSI/15 (8/2003) or latest amendments.

Item: 16 Supply & erection of 25 KV Drop out fuse switches for 10/25 KVA Auxiliary Supply Transformer.

The price shall cover supply & erection, and connecting up of 25KV drop out fuse switches for 10/ 25 KVA capacity Auxiliary Supply Transformers complete with all mounting accessories including terminal connectors. It shall also include the erection of insulators, operating pole and fuse links. 25KV Drop out fuse switches for 10/25 KVA Auxiliary Supply Transformer shall conform to RDSO specification No. ETI/ PSI/14 (1/86) with A&C Slip 1 or latest amendments

Item: 17 (a)
Supply & Erection of Tubular Aluminum bus-bars 50 mmx39 mm dia.

The price shall cover supply and erection per meter length of 50x39mm dia. Aluminum tube to serve as bus bar or equipment to equipment bus-bar connection in the traction sub-station, wherever required. The price shall include bending, shaping and connecting/ clamping of the Aluminum tube to the equipment terminals/bus-bar supports as required.

Item: 17 (b)
Supply & Erection of `ZEBRA'ACSR Conductor.

The price shall cover supply and erection per meter length of 61/3.18 mm (ZEBRA ACSR) conductor to serve as bus-bar or equipment to equipment/bus-bar connection in the traction sub-station, wherever required. The price shall include straightening, shaping and connecting/clamping of the conductor to the equipment terminals/bus-bar supports as required.

Item: 17 (c)
Supply & Erection of bus-bar junctions & connectors.

The price shall cover supply and erection of a bus-bar junction and connector of the type specified, including bolts, nuts, lock nuts, washers etc. required at the junction of bus-bars. The price shall also include supply and erection of `ALCU' strip if required to be provided at the junction.

NOTE: 1) For purpose of payment for items (a) and(b) fraction of a meter in the total length used at a sub-station shall be rounded off to the nearest meter (0.5m and below being ignored).

2) For purpose of payment, the length of aluminum conductor strung as busbar between gantries shall be taken as horizontal distance between the interfaces of the gantries. The total length used at a sub-station shall be rounded of to the nearest meter (0.5 m and below being ignored).

Item: 17 (d)
Supply & Erection of Aluminum bus-bar of 36 mm x 28 mm:

The price shall cover supply and erection of Aluminum bus-bars 36mm x 28 mm including bending, shaping and clamping on to insulators, connectors or equipment terminals.

NOTE: The price under item 17 (d) does not cover the cost of terminal connectors which will be paid for under item 17, 17 (c) as applicable

Item: 17(e)
Erection of copper jumper.

The price shall cover the erection of the complete jumper assembly including jumper wire. The price shall not, however, be applicable for jumper connections already including under item 10, of standard schedule of rate for OHE works dealing with supply & erection of overhead equipments and extra thereon but shall be applicable for any jumper connection in any combination between feeders, L.T. Transformers drop out switch, lightening arrestors for overhead equipments, isolators for overhead equipment and outgoing bus-bars for switching stations and boosters stations. Continuity jumper at Boom anchor anti-creep will be payable under this item. Anti-theft jumper as per drawing no.ETI/OHE/G/05107 for connecting out-of-run OHE with the in running OHE at insulated/un-insulated over-lap locations and also anti-creep locations at polluted zone wherever considered necessary will be payable under this item. The supply of all components and

fittings (excluding the catenary wire) and the erection of all the components and fittings including the catenary wire for providing double catenary contact wire in place of catenary under overline structures as per DRG. No. ETI/OHE/SK/446 and ETI/OHE/SK-529 respectively will also be payable under this item, treating the double catenary as one jumper irrespective of its length.

Item 17: (f)
Erection of an Aluminum jumper.

The price shall cover on a flat rate basis the erection of an Aluminum jumper complete with all components and fittings required for providing jumper connection, including parallel clamps, bimetallic AL-Cu strips wherever required, and terminal or tee clamps at either end. The price shall be applicable for any aluminum jumper/connections in any combination between feeders, return conductors, overhead equipment, isolators and outgoing bus-bars or switching stations and booster stations. Jumper connections for 25 KV feeders at angle tower traction sub-station or at feeding stations will also be paid under this item.

Item: 17: (g)
Erection of all Aluminum 25 KV feeder/return conductors (single Spider)

The price shall cover erection of a 25 KV feeder/return conductor (along or across tracks) made of a single all aluminum bare, hard drawn conductor 19/3.99 mm (SPIDER). The price shall not include the cost of suspension assembly (which will be paid for under item 18 (e)) and termination (which will be paid for under item 18 (d)) and small part steel work, complete with bolts and nuts etc, if any. The price shall also cover on a flat rate basis, the cost of supply of splices to the extent required. The price shall exclude the cost of 19/3.99 mm (SPIDER) conductor.

Item: 18 (a)
Supply & erection of 132 KV Support Insulators:

The price shall cover supply and erection of 132KV support insulators complete with fixing bolts, nuts and studs. Bus-bar/ jumper clamps for clamping the bus-bar shall be paid under item 17(c).

Item 18: (b)
Supply & Erection of 25 kV Support Insulators:

The price shall cover the supply and erection of a 25kV solid core post insulator to support Aluminum bus-bars. It shall include supply of fixing bolts, nuts, locknuts, washers and studs etc. It shall also cover-erection of all components required for the assembly including post insulator. Bus-bar clamps/jumper clamps for clamping the bus-bars/jumpers shall be paid under item 17(c).

Item: 18 (c) (i)
Supply & Erection of 132 kV Termination with Disc Insulators with adjuster:

The price shall cover supply and erection of all materials for the termination of a single ACSR conductor (61/3.18 mm ZEBRA) strung between gantries/portals, including anchor fittings, single clevis assembly, adjuster, anchor double straps, string ring of 10nos. of 280mm (11") Disc Insulators strain clamps and arcing and other fittings to complete the assembly. The assembly shall be of breaking strength of not less than 11500 kgf.

Item 18: (c) (ii)
Supply & Erection of 132 KV or 110 KV Terminations with Disc Insulators without Adjuster:

The price shall cover supply and erection of all materials for the termination of a single ACSR conductor (61/3.18 mm ZEBRA) strung between gantries/portals, including anchor fittings, single clevis assembly, anchor double straps, string of 10nos. of 280mm (11") Disc Insulators, strain clamps and arcing ring and other fittings to complete the assembly. The assembly shall be of breaking strength of not less than 11500 kgf.

Item: 18 (d)
Erection of materials for termination of All Aluminum 25 KV feeder/return conductor (single SPIDER).

The price shall not cover supply of materials required for the termination of an all aluminum 25 KV feeder/return conductor (SPIDER), including appropriate mast anchor fittings adjuster, strain clamp end

fitting and 3 KV cut-in-insulator and the 9 tone insulator assembly. The price shall cover erection of all materials including the 9-tone insulator assembly and 3 KV cut-in-insulators.

Item 18: (e)
Supply & Erection of solid core suspension Insulators:
The price is applicable to the provision of a 9 tonne suspension insulator assembly for suspension of an all Aluminum 25 kV feeder (Single or Double SPIDER), 130 sq. mm or 65 sq. mm overhead equipment conductor or 19/2.79 mm all Aluminum catenary or any other similar type of suspension. The price shall cover supply of all components required for the suspension assembly including the appropriate suspension clamps and the 9 tonne insulator assembly but excluding small parts steel work with bolts and nuts etc., if any. The price shall cover erection of all components, including the 9 tone insulator assembly but excluding small parts steel work with bolts and nuts etc., if any

The price shall include the cost of provision of a flat armor tape only to be used in connection with suspension of "SPIDER" conductor.
Item: 19
Supply & Erection of 110 V Low Maintenance Lead Acid Batteries:

The price shall cover supply and erection of a 110V, 200Ah low maintenance lead acid battery complete with stand and accessories as mentioned in relevant specification and a tool board. The price for erection shall include installation, connecting up, charging and commissioning of the battery. 110V Low Maintenance Lead Acid Batteries shall conform to RDSO specification no. RDSO/PE/SPEC/TL/0040-2003(Rev-0) with A&C Slip 1(09/2005) or latest amendments.

Item: 20
Supply & Erection of Battery Chargers for 110V Low Maintenance Lead Acid Batteries.

The price shall cover supply and erection, connecting up and commissioning of battery charger for charging 110V, 200Ahr Low Maintenance Lead Acid battery. The price for erection shall include grouting of the charger in position or mounting it on the wall and connecting it to 240V single phase A.C. supply. Battery Chargers for 110V Low Maintenance Lead Acid Batteries shall conform to RDSO specification no. ETI/PSI /24(6/81) or latest amendments.

Item: 21
Supply & Erection of 240 V A.C. L.T. Distribution Boards in the Control Room for 10/25 KVA L.T. Supply Transformer.

The price shall cover supply and erection of a 240V AC distribution board in the Control Room. It shall include the grouting of the framework of the distribution board in position or mounting it on the wall and necessary connections. 240V A.C. L.T. Distribution Boards in the Control Room for 10/25 KVA L.T. Supply Transformer shall conform to RDSO specification as indicated in Annexure 1(c), or latest amendments.

Item: 22
Supply & Erection of 110 V D.C. Distribution Board.

The price shall cover supply and erection of a 110V DC distribution board in the control room. The price shall include the grouting of the frame work of the distribution board in position or mounting it on the wall and necessary connections. 110V D.C. Distribution Board shall conform to RDSO specification as indicated in Annexure 1(c), or latest amendments.

Item: 23
Supply & installation of cables for:

a) Circuit Breakers and Interrupter Control & Indication Circuit.

The price shall cover supply and installation per meter length of a PVC 1100V grade 2.5 sq.mm (copper conductor) 7 core cable from each circuit breaker and Interrupter to the Control and Relay Board.

b) Transformer Alarm/Trip Circuits and Tap Changer Control.

The price shall cover supply and installation per meter length of a PVC 1100V grade 2.5 sq.mm. (copper conductor)10 core cable from the Marshalling Box of each 132/25KV Traction Transformer to the Control and Relay Board.

c) Transformer Bushing C.T. Circuits and 110V DC circuits.

The price shall cover supply and installation per meter length of PVC 1100V grade 4 sq.mm (copper conductor) 4 core cable from each 132/25kV transformer to the Control and Relay Board and from Battery charger and battery to DC distribution board.

d) Current Transformer Circuits, 110 Volts. DC and 240V AC Supply Circuits.

The price shall cover supply and installation per meter length of PVC 1100V grade 4 sq.mm (copper conductor) 2 Core cable from each current transformer to the control and relay board, from 110V DC distribution board to the control and Relay Board and from 240V A.C. LT distribution board to Battery Chargers.

e) Potential Transformer Circuits, 240V AC Supply Circuits.

The price shall cover supply and installation per meter length of PVC 1100V grade 2.5 sq.mm (copper conductor) 2 Core cable from each potential transformer to the control and Relay Board, and from 240V AC LT distribution board to control and relay board.

f) 240V Heater Circuits.

The price shall cover supply and installation per meter length of 1100V Grade PVC insulated heavy duty 2 Core 4 sq.mm aluminum conductor cable for space heater provided in control cabinets of various equipments and control panel.

g) L.T. Power supply to control room:

The price shall cover supply and installation per meter length of an 1100V grade 25/ 150 sq.mm aluminum conductor 2 Core PVC insulated and armored cable from each L.T. supply transformer to the L.T. A.C. distribution boards and from there to 132/25KV Traction Transformer for extending L.T. supply to blower fans.

h) L.T. Power Supply for Oil Filtration Plant.

The price shall cover supply and installation per meter length of PVC insulated and armored 300 sq.mm 2Core Aluminum conductor cable from 10/25 kVA L.T. Supply Transformer to L.T. distribution board in the switch yard.

NOTE:

1) The price for erection of cables shall include cable boxes, metallic glands, identification labels, terminal connectors, copper lugs and leading inducts or pipes as required.

2) The price for erection shall include connecting up of the cable at either end. It shall also include clamping of the cable on steel supports fixed in the trenches, on the structures, on the frame work of the equipment or on the wall of the Control Room as required.

3) For purposes of payment, fraction of a meter in total length of cable of each type used in a sub-station shall be rounded off to the nearest meter (0.5m or below being ignored).

Item: 24
Supply and erection of earth system.

a) Earth Electrode:

The price shall cover supply and erection of an earth electrode, a typical drawing of which is included in Annexure-I. The price shall cover the provision of a protective concrete box with removable

cover as shown in the drawing. The price shall include the testing of earth value and painting the particulars on the box.

NOTE: 1) The price shall be inclusive of concrete box with cover for this item which shall not be included in Item 2.

b) Earth leads 75x8mm mild Steel laid in the ground.

The price shall cover supply and installation per meter length of 75x8mm mild steel flat, buried at a depth of 60cm below ground level. The price shall also cover connections of the steel flats to the earth electrodes to constitute the main earth ring and to the earthed terminals of the 132/25kV transformers etc. as required.

c) Earth leads 50x6 mm mild steel laid in the ground.

The price shall cover supply and installation per meter length of 50x6mm mild steel flat buried at a depth of 60cm below ground level. The price shall also cover connections of the steel flats to the main earth ring and to the steel structures and metallic frame work/terminals of various equipments, as required.

NOTE (For item 24 b and c)

1) The price for item 24(b) and (c) shall cover supply and installation of a buried rail of approx. 13m length.

d) Earth leads 75x8 mm mild steel flat laid exposed.

The price shall cover supply and installation per meter length of 75x8 mm mild steel flat, painted all around with two coats of painting to colour grass green shade-218 of IS:5 passing through cable trench or exposed above ground level. The price shall also cover the connections of the steel flats to the earth electrodes, to constitute the main earth ring and to the earthed terminals of the various equipments as required.

e) Earth leads 50x6 mm mild steel flat laid exposed.

The price shall cover supply and installations per meter length of 50x6 mm mild steel flat painted all around with two coats of painting to colour grass green shade-218 of IS:5 passing through cable trench or exposed above ground level. The price shall also cover the connections of the steel flats to the main earth ring and to the steel structures and metallic frame work/terminals of various outdoor equipments as required.

f) 8 SWG G.I. Wire for Earthing.

The price shall cover supply, shaping and erection of 8 SWG G.I wire per meter used for earthing of control panels, L.T. AC and DC distribution boards, battery chargers, etc. at sub-station control rooms. The requirement of fencing panel earthing to the nearest fencing upright shall also be included and paid for under this item.

g) 32mm dia MS Rod for earth mat.

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

NOTE: For purposes of payment for items (b) to (g) fraction of a meter in the total length of earth lead of each type used at a substation shall be rounded off to the nearest meter (0.5m and below being ignored).

Item 25: (a)
Supply & erection of earth Screen Wire.

The price shall cover supply and stringing per meter length of 25 tone quality 19/2.5mm (70Kg/mm) galvanised steel stranded wire. It shall include the supply and erection of suitable terminations using

strain clamps adjuster (on one side only) etc. It shall also include connecting by means of suitable terminal spades, the end of the earth screen wire to the main members of the columns of portals gantries across which these wires are strung or to 50x6mm M.S. flat earth leads. For purposes of payment the clear span between the structures on which earth wire is run shall be adopted. The clear span will be rounded off to the nearest meter (0.5m and below being ignored).

Item 25: (b)
Supply & erection of earth screen wire of size 7/9 SWG.

Same as item 25(a) above except that the earth screen wire of size 7/9 SWG to be used in place of earth screen wire of size 19/2.5mm.

Item: 26(a)
Supply and erection of fencing panels at sub-stations.

The prices shall include supply and erection of fencing panels as per relevant drawing included in Annexure-1, painted with two coats of red oxide zinc chromate primer as per particulars specified in Para 2.6.12 and finished with two coats of aluminum paint to IS:2339. The prices shall not include supply and erection of fencing uprights, anti-climbing devices but shall include the cost of fasteners and the price shall be for a meter length of the panels, measured in the plan view of the approved drawings.

(b) Supply & erection of fencing uprights.

The price shall cover supply and erection of fabricated fencing uprights painted with two coats of red oxide zinc chromate primer as per particulars specified in para 2.6.12 and finished with two coats of Aluminum paint to IS;2339. The price shall be on the basis of black weight of the steel section of the approved drawing with no deduction for holes and skew cuts or no increase for weld materials. The cost of foundation of uprights will be paid under item 2. Provision of the earth connections connecting each upright with the main earth bus as per approved drawing shall be paid under item 24.

(c) Supply & erection of Gates.

The price shall cover supply and erection of gates including locking device to Drg. No. CORE/ALD/PS/01Mod `C'. The gates will be painted with two coats of red oxide zinc chromate primer to IS:2074 and finished with two coats of aluminum paint as per particulars specified in Para 2.6.12 and IS:2339. The price shall be per meter length of the gate as measured on the plan view of the appropriate approved drawings. The price shall also include providing two bond connections made of multi-stranded flexible steel equivalent to 6 SWG in the form of helical spring for the purpose of continuity of earthing between the gate and the adjacent fencing uprights as per the appropriate approved drawings. Both fixing ends shall be provided with an "eye" and properly crimped.

NOTE: All fasteners, bolts, nuts, locknuts and washers etc. required for assembly and fixing of steel work shall be galvanized.

d) Supply & erection of anti-climbing device at Sub-stations.

The price shall cover supply and erection of an anti-climbing device consisting of steel fixtures and galvanized barbed wire mounted on the fencing panels as per approved drawings. The price shall be per meter length of the panel. The price shall include painting of the fixtures with two coats of red oxide zinc chromate primer and two finishing coats of aluminum paint as per particulars specified in Para 2.6.12 & IS: 2339

NOTE: The prices for item (a) to (d) shall also include supply of all necessary galvanized steel bolts, nuts, lock-nuts and washers etc. required for assembly and fixing of the steel work.

Item: 27
Erection, testing & commissioning of 132/27KV or 110 KV, 21.6/30.24 MVA single phase Power Transformer.

The traction power transformer complete with all accessories including oil (which may be in separate drums/containers) will be handed over by the Purchaser at the sub-station premises. The Contractor shall bring the transformer on to its correct position on the foundation and erect all the accessories,

check up the alignment and make connections of HV and LV terminals to the 132kV and 25kV bus-bars. The Contractor shall carry out oil filtration and pre-commissioning tests as approved by the Purchaser and commission the transformers strictly in accordance with the instructions of the transformer manufacturer or his commissioning Engineer at site to the complete satisfaction of the Purchaser. The Contractor shall be held responsible to ensure that the work is carried out to the highest standards, in accordance with the relevant codes of practice and any special conditions/guidelines/requirements as laid down by the manufacturer of the transformer are properly complied with contractor shall notify the manufacturer regarding likely date of commissioning, one month in advance, so that the manufacturer can depute his representative if so desired by him at his own cost, for warranty obligation purposes. Notwithstanding availability of manufacturer's representative or otherwise, it shall be contractor's responsibility to ensure that the equipment is commissioned as per laid down procedure. However, in case of any extra cost being incurred in this regard, due to delay on the from part of the Contractor the same shall be recovered the Contractor. The Contractor shall make his own arrangements for oil filtration equipment as well as power supply required for the same. All necessary tools, equipment, instruments required for carrying out necessary checks and tests and commissioning of the transformer shall be arranged by the Contractor.

Item: 28
Supply and spreading of Gravel/ Ballast in the Switch Yard.

The price shall be per cu.m. rate and shall cover supply and spreading of uniformly graded gravel/ballast of size 20/25mm, in the outdoor switch yard after completing all the works and leveling the switch yard area, but before commissioning of the sub-station. 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 10cm. over the area indicated by the Purchaser's Engineer.

Item: 29
Supply & erection of Maintenance free type Lead Acid Battery.

The price shall cover supply and erection of pre-charged 110V, 200AH Maintenance free type lead acid battery complete with stand and accessories and tool board as mentioned in relevant specification. The price for erection shall include installation, connecting up, charging at site if required and commissioning of the battery.

Item: 30
Supply & erection of Battery Charger for 110 V, 200AH Maintenance free type Lead Acid Battery.

The price shall cover supply and erection of connecting up and commissioning of battery charger for charging 110V, 200AH Maintenance free Lead acid Battery. The price for erection shall include grouting of the charger in position or mounting it on the wall and connecting it to 240V single phase A.C. supply.

Item: 31
Erection of Copper cross feeder wires (37/2.25 mm HDBC)

The price shall cover erection of 25KV feeder wire across/along the track at the location of SP /SSP/FP/BT/Gantries stations. Feeder wire shall be made of hard drawn bare copper conductor of 37/2.5 mm. The price shall be exclusive of cost of feeder wire (which will be supplied by the purchaser), termination (which will be paid under item 32 and small parts steel work complete with bolts, nuts etc if any.

Item : 32

Supply (other than insulators) and erection of materials (including insulators) for termination of copper cross feeder

The price shall cover the supply of all materials required for termination of copper cross feeder wire (37/2.25 mm HDBC) including appropriate mast anchor fitting (3231), 18 mm Single clevis (5040), 9 Tone adjuster (5020-2), Feeder ending clamp (1130), double clevis (3010) and other components as necessary but excluding 9-Ton insulator assembly. The price shall also cover the erection of all materials including 9-Ton insulator assembly and termination of cross feeder at either ends. Fittings/components required for termination of one cross feeder at both ends constitute one set.

Notes to item 32

(1) Small parts steel work complete with bolts and nuts wherever required, will be paid for under item 3(b) or 3(b) and 3(c) as applicable and shall not be including in this item.

(2) Supply and erection of materials for termination of catenary wire on either side of the portals at anticreep locations, will also be paid for under this item.

Item: 33

Supply and erection of large copper jumper 160 Sq.mm between Aluminum bus and cross feeder.

This jumper shall be provided between 36 mm Aluminum bus and the copper cross feeder at SP/SSP/FP/BT locations. The price shall cover the supply of all components and fittings required for providing a flexible copper jumper (160 Sq.mm) and connection between 36 mm Aluminum bus and cross feeder. including Terminal connector 19mm multiple hole bolted type (1009), parallel clamps (1050-3), Al-Cu bimetallic strips, fasteners, but excluding jumper wire (which will be supplied by the purchaser).The price shall also cover the erection of the complete jumper assembly including jumper wire.

Item : 34

Supply and erection of a large copper jumper 160 Sq.mm between cross feeder and OHE.

This jumper shall be provided between copper cross feeders and OHE. The price shall cover the supply of all components and fittings required for providing a flexible copper jumper (160 Sq.mm) between copper cross feeder and existing OHE, including Parallel clamps (1030-3 & 1050-3) complete with fasteners etc as required but excluding the jumper wire (which will be supplied by the purchaser). The price shall also cover the erection of the complete jumper assembly including jumper wire.

Item: 35
Supply of Insulators for item 32.

The price shall cover only supply of 9 tonne insulator assembly required for termination of OHE covered under item 32.

PARTICULARS OF SOR ITEMS
For TSS
Schedule-1, Section-9

Item: 1 (c)
Design and drawings for Shunt Capacitor Bank

The prices shall cover on a flat rate basis preparation, of all designs and drawings required in connection with supply, erection, testing and commissioning of Shunt Capacitor equipment at the traction sub-stations. The price shall also cover on a flat rate basis cost of survey, investigation of soil bearing pressure and soil resistivity, preparation of cross section drawing, general arrangement drawings, detailed layout of equipments, bus bar connections and insulators, layout of cable trenches out door and inside the control room, layout of the earthing system and earth connection layout, design of supporting structures, detailed drawings for steel work and structural support, suitable concrete pedestals and foundations for equipments components, fittings and materials. The price shall include supply of requisite number of copies of all drawings including completion drawings to the Purchaser. The price shall also include supply of required number of copies of designs, drawings, technical booklets and completion drawings as mentioned in tender specification.

Item: 7 (a)
Supply & Erection of 220kV Lightning Arrestors:

The price shall cover supply & erection and connecting up of a 220KV Lightning arrestor with surge counters complete with all fittings and accessories including terminal connector. It shall also include mounting of the Lightning arrestor in position and supply and erection of and enameled number plate. 220kV Lightning Arrestors shall conform to RDSO specification no. ETI/ PSI/ 137(8/89) with A&C slip No. 7 or latest amendments.

Item: 10 (a)
Supply & Erection of 25kV Single Pole Isolators (1600A).

The price shall cover the supply and erection, alignment and connecting up 25kV Single Pole Isolator complete with mounting base, operating rod, operating mechanism and all accessories required for its smooth and trouble free operation. The price including solid core Post Insulator etc. shall also cover supply and erection of an enameled number plate and a pad lock for each Isolator. Bus bar connector provided for making connection to Isolator terminal pad shall be paid under item 17 (c). 25kV Single Pole Isolators (1600A) shall conform to RDSO specification no. ETI/ OHE/16(1/94) with A&C slip No. 2 or latest amendments.

Item: 10 (b)
Supply and Erection of 25 kV Double Pole Isolators (1600A).

Same as for item 10(a) above except that the price shall cover supply and erection of double pole Isolator instead of single pole Isolator.

Item: 27(a)
Erection, testing & commissioning of 220/27 kV, 21.6/30.24 MVA single phase Power Transformer.

The traction power transformer complete with all accessories including oil (which may be in separate drums/containers) will be handed over by the Purchaser at the sub-station premises. The Contractor shall bring the transformer on to its correct position on the foundation and erect all the accessories, check up the alignment and make connections of HV and LV terminals to the 220kV and 25kV bus-bars. The Contractor shall carry out oil filtration and pre-commissioning tests as approved by the Purchaser and commission the transformers strictly in accordance with the instructions of the transformer manufacturer or his commissioning Engineer at site to the complete satisfaction of the Purchaser. The Contractor shall be held responsible to ensure that the work is carried out to the highest standards, in accordance with the relevant codes of practice and any special conditions/guidelines/requirements as laid down by the manufacturer of the transformer are properly complied with contractor shall notify the manufacturer regarding likely date of commissioning, one month in advance, so that the manufacturer can depute his representative if so desired by him at his own cost, for warranty obligation purposes. Notwithstanding availability of manufacturer's representative or otherwise, it shall be contractor's responsibility to ensure that the equipment is commissioned as per laid down procedure. However, in case of any extra cost being incurred in this

regard, due to delay on the from part of the Contractor the same shall be recovered the Contractor. The Contractor shall make his own arrangements for oil filtration equipment as well as power supply required for the same. All necessary tools, equipment, instruments required for carrying out necessary checks and tests and commissioning of the transformer shall be arranged by the Contractor.

Item 41
Supply, erection, testing and commissioning of 25 kV Shunt Capacitor bank

The lump sum price shall cover supply, erection testing and commissioning of 5500 KVAR at 40 KV (2469 KVRA at 25kV) shunt capacitor bank at Traction sub-stations, complete with capacitor unit, internal fuses, discharge devices, rack insulator assembly, inter-connector between units, insulators, suitable earthing lugs including terminal connectors and other material and hardware required for satisfactory operation of the unit. It shall also include mounting of the capacitor bank on the supporting structures and its connecting upto other equipments. Payment for supporting structure shall be made under item 3.

The contractor shall carryout pre-commissioning tests as approved by the purchaser and commission the shunt capacitor bank strictly in accordance with the instructions of the shunt capacitor bank manufacturer or his commissioning engineer at site to the complete satisfaction of the purchaser. The contractor shall be held responsible to ensure that the work is carried out to the highest standards, in accordance with relevant codes of practice and any special conditions/ guidelines/requirements as laid down by the manufacturer of the shunt capacitor bank are properly complied with. The contractor shall notify the manufacturer regarding likely date of commissioning, one month in advance so that the manufacturer can depute his representative, if so desired by him, at his own cost, for warranty obligation purposes. Notwithstanding availability of manufacturer's representative or otherwise, it shall be contractor’s responsibility to ensure that the equipment is commissioned as per laid down procedure. All necessary tools, equipments, instruments required for carrying out necessary checks and commissioning of the shunt capacitor bank shall be arranged by the contractor. 25kV Shunt Capacitor bank shall conform to RDSO specification No. TI/SPC/PSI/FC & SR/0100(01/10) or latest amendments..

Item: 42
Supply, erection, testing and commissioning of Low Loss Series Reactor suitable for 25 kV Shunt capacitor bank (Losses limited to 5KW +/-10%)

The prices shall cover supply, erection and connecting up of series reactor suitable for 5500 KVAR at 40 KV (2469 KVRA at 25kV) shunt capacitor bank complete with all fittings and accessories including connectors. It shall include mounting of the series reactor in position. 25kV Shunt Capacitor bank equipment shall conform to RDSO specification No. TI/SPC/PSI/FC & SR/0100(01/10) or latest amendments.

Item: 43
Supply and erection of 25 kV Current transformers (200-100/5A)

The prices shall cover supply, erection and connecting up of a 25kV Current transformer with ratio 200-100/5A complete with all fittings and accessories including terminal connectors. Current transformer shall conform to RDSO specification as indicated in Annexure 1(c). The price shall include mounting of the current transformer in position and supply and erection of an enameled number plate.

Item: 44
Supply and erection of 25 kV Neutral Current Transformer

The prices shall cover supply, erection of 25KV neutral current transformer for protection of the capacitor bank. The price shall also cover connecting of the neutral current transformer with capacitor bank and control and relay panel. It shall also cover mounting of the neutral current transformer on the supporting frame.

PARTICULARS OF SOR ITEMS
For 220 KV TSS ITEMS
Schedule – 1, Section-10

Item 4:(a)
Erection, testing & commissioning of 220 KV Double Pole SF-6 Gas Circuit Breakers:

The price shall cover erection of 220 kV double pole SF-6 Gas Circuit Breakers, complete with operating mechanism, all fittings and accessories including terminal connectors. The price shall cover grouting the supporting frame and Mechanism box on foundations block and mounting of other accessories in their respective places. It shall also cover first gas filling (gas required for first filling shall be supplied by the Purchaser), testing and commissioning of the circuit breaker. The price shall also cover the supply and erection of an enameled number plate. The Contractor shall make his own arrangement for filling of the SF-6 gas and power supply required for testing purpose. All necessary tools, equipments, instruments required for carrying out necessary checks, tests and commissioning shall be arranged by the Contractor.

Item: 5 (c)
Supply and Erection of 220 KV Double Pole Isolators (Manually operated).

The price shall cover supply & erection and connecting up of a 220kV single phase double pole Isolator with manually operated mechanism complete with mounting base and all accessories/ required for its operation including terminal connectors. The price shall include supply and erection of an enameled number plate and padlock. The price shall include mounting of the Isolator and the operating rod in position and their alignment for smooth and trouble free operation. The prices shall also include the cost of 220kV solid core post insulator and operating rod. 220KV Double Pole Isolators (Manually operated) shall conform to RDSO specification No. ETI/ PSI/ 122(3/89) with A&C slip No.1 or latest amendments.

Item: 5 (d)
Extra for supply and erection of earthing blade assembly for 220 KV Double Pole Isolators **(Manually operated)**

The price shall cover supply and erection of earthing blade assembly for 220kV Isolators. The price shall be extra on item 5(c) and applicable individually for each Isolator.

Item: 6 (a)
Supply & Erection of 220 KV Current Transformers (400-200/5A).

The price shall cover supply & erection and connecting up of a 220KV Current Transformer complete with all fittings and accessories including terminal connectors. It shall also include mounting of the transformer in position, and supply and erection of an enameled number plate. The 220KV Current Transformers shall conform to RDSO specification no. ETI/ PSI/ 117(7/88) with A&C slip No.1 to 9 or latest amendments.

Item: 18 (a) (i)
Supply & erection of 220 KV Support Insulators:

The price shall cover supply and erection of 220KV support insulators complete with fixing bolts, nuts and studs. Bus-bar/ jumper clamps for clamping the bus-bar shall be paid under item 17(c).

Item: 18 (c) (iii)
Supply & Erection of 220 KV Termination with Disc Insulators with adjuster:

The price shall cover supply and erection of all materials for the termination of a single ACSR conductor (61/3.18 mm ZEBRA) strung between gantries/portals, including anchor fittings, single clevis assembly, adjuster, anchor double straps, string ring of 16nos. of 280mm (11") Disc Insulators strain clamps and arcing and other fittings to complete the assembly. The assembly shall be of breaking strength of not less than 11500 kgf.

Item: 18 (c) (iv)
Supply & Erection of 220 KV Terminations with Disc Insulators without Adjuster:

The price shall cover supply and erection of all materials for the termination of a single ACSR conductor (61/3.18 mm ZEBRA) strung between gantries/portals, including anchor fittings, single clevis assembly, anchor double straps, string of 16nos. of 280mm (11") Disc Insulators, strain clamps and arcing ring and other fittings to complete the assembly. The assembly shall be of breaking strength of not less than 11500 kgf.

PARTICULARS
OF
NON SOR ITEMS
FOR
TSS WORKS
Schedule – 1, Section-11

N.S. Item: 4
Supply of 132 KV Double Pole SF-6 Gas Circuit Breakers:

The price shall cover supply of 132 KV double pole SF-6 Gas Circuit Breakers, complete with operating mechanism, all fittings and accessories including terminal connectors. Erection of item NS-4 is covered under Schedule 1, Section 8, item no SOR 4

N.S. Item: 4 A
Supply of 220 KV Double Pole SF-6 Gas Circuit Breakers:

The price shall cover supply of 220 KV double pole SF-6 Gas Circuit Breakers, complete with operating mechanism, all fittings and accessories including terminal connectors. Erection of item NS-4 A is covered under Schedule 1, Section 10, item no SOR 4 (a).

N.S. Item: 4 B
Supply of 110 KV Double Pole SF-6 Gas Circuit Breakers:

The price shall cover supply of 110 KV double pole SF-6 Gas Circuit Breakers, complete with operating mechanism, all fittings and accessories including terminal connectors. Erection of item NS-4 is covered under Schedule 1, Section 8, item no SOR 4

N.S. Item: 8
Supply of 25 KV Single Pole Vacuum Circuit Breakers

The price shall cover supply of 25 KV single pole Vacuum Circuit Breakers, complete with operating mechanism, all fittings and accessories including terminal connectors. Erection of item NS-8 is covered under Schedule 1, Section 8, item no SOR 8.

N.S. Item: 9
Supply of 25 KV Single Pole Vacuum Interrupter

The price shall cover supply of 25 KV single pole Vacuum Interrupter, complete with operating mechanism, all fittings and accessories including terminal connectors. Erection of item NS-9 is covered under Schedule 1, Section 8, item no SOR 9

NS Item: 13
Supply of Control & Relay panel (board) for 25 KV TSS as per RDSO Spec. No. TI/SPC/PSI/PROTCT/6071 (Feb'2015):

The price shall cover supply of Control Boards with Numerical type relays as per RDSO's Specification No TI/SPC/PSI/PROTCT/6071 (Feb'2015) or latest amendments. (Comprising of distance, wrong phase and instantaneous over current protection with PT fuse failure) for OHE protection, transformer protection, OHE protection, auto reclosing scheme and Shunt capacitor banks manufactured by any RDSO approved firms, for all the 220/132KV and 25KV Circuit Breakers, Interrupters, Isolators and Transformers at the traction substations complete with all wiring, control switches, meters, protective and auxiliary relays etc. including mimic panel.

The prices for supply of item NS 13 shall include supply of Panto flashover protection relay as per RDSO specification no. TI/SPC/PSI/PROTCT/2983 or latest amendments. This relay forms an inherent part of control panel.

The prices for supply of item NS 13 shall also include supply of Delta-I type fault selective relay (2 Nos.) as per RDSO specification No. TI/SPC/PSI/PROTCT/1982 with A&C slip no. 1 or latest amendments. This relay forms an inherent part of control panel.

Erection of item NS 13 is covered under Schedule 1, Section 8, item no SOR 13.

N.S. Item: 15
Supply of 25 KV/240V Auxiliary Supply Transformer (oil type)

The price shall cover supply of 25 KV/240V Auxiliary Supply Transformer (oil type) complete, with all fittings and accessories including terminal connectors. Erection of item NS-15 is covered under Schedule 1, Section 8, item no SOR 15

N.S. Item: 27
Supply of 132/27 KV, 21.6/30.24 MVA single phase Power Transformer.

The price shall cover supply of 132 KV/27KV single phase traction power transformer complete with all accessories including oil as per RDSO Spec. No.ETI/PSI/118 (10/93) with A&C slip no.01 to 10 or latest amendments for 21.6/30.24 MVA, ONAN/ONAF traction power transformer. The price shall cover transportation & unloading charges of power transformer to the sub-station premises. Erection of item NS-27 is covered under Schedule 1, Section 8, item no SOR 27

N.S. Item: 27A
Supply of 220/27 KV, 21.6/30.24 MVA single phase Power Transformer.

The price shall cover supply of 220 KV/27KV single phase traction power transformer complete with all accessories including oil as per RDSO Spec. No.ETI/PSI/118 (10/93) with A&C slip no.01 to 10 or latest amendments for 21.6/30.24 MVA, ONAN/ONAF traction power transformer. The price shall cover transportation & unloading charges of power transformer to the sub-station premises. Erection of item NS-27 A is covered under Schedule 1, Section 9, item no SOR 27(a).

N.S. Item: 27 B
Supply of 110/27 KV, 21.6/30.24 MVA single phase Power Transformer.

The price shall cover supply of 110 KV/27KV single phase traction power transformer complete with all accessories including oil as per RDSO Spec. No.ETI/PSI/118 (10/93) with A&C slip no.01 to 10 or latest amendments for 21.6/30.24 MVA, ONAN/ONAF traction power transformer. The price shall cover transportation & unloading charges of power transformer to the sub-station premises. Erection of item NS-27 is covered under Schedule 1, Section 8, item no SOR 27

N.S. Item: 40
Supply and erection of Control & Relay Panel (Board) for Shunt Capacitor bank as per RDSO Spec. No. TI/SPC/PSI/PROTCT/6071 (Feb'2015):

The prices shall cover supply, erection and connecting up of control board with numerical type protective and auxiliary relays for circuit breakers, instrument transformers, LEDs annunciation labels, alarm cancellations push buttons, local/remote switches and capacitor bank with all wirings, control switching and mimic diagram as per RDSO's Specification No TI/SPC/PSI/PROTCT/6071 (Feb'2015) or latest amendments. It shall also include cost of wiring /terminal blocks required for providing the facility of remote operation. The price for erection shall include alignment and grouting of the panels in positions and all necessary connection to bring the control board to pertain. It shall also include the cost of connection the frame of each control panel to the earth bus inside the control room.

N.S. Item: 41
Supply and erection of ABT (Availability Based Tariff) meter arrangement along with its all associated equipments including CTs/PTs of 0.2S Class.

The prices shall cover supply, erection, testing and commissioning of "ABT (Availability Based Tariff) meter arrangement along with its all associated equipments including CTs/PTs of 0.2S Class" as per **Form-5 (Schedule-1 Section-11, Part-D)** and connecting up of all wirings and fittings as per concern authority.

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PART-I

CHAPTER-IV C

-DELETED-

PART II

CHAPTER I

GENERAL SPECIFICATIONS

PART II
CHAPTER I

GENERAL SPECIFICATIONS

SECTION-1 :GENERAL

SECTION -2 : OVERHEAD EQUIPMENT

Section 3 : Switching Stations, Booster Transformer Stations and L.T. Supply Transformer Stations.

SECTION-4 TRACTION SUB-STATIONS

SECTION-5 SCADA WORKS

-DELETED-

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PART II

CHAPTER I

GENERAL SPECIFICATIONS

SECTION I

GENERAL

INTRODUCTION : 2.1.1

(a) This part of Tender papers is divided into eight Chapters and contains general, technical and other specifications for design and erection of complete 25 kV A.C. 50 Hz single phase traction overhead equipment, switching stations, booster transformer stations, L.T. supply transformer stations complete with foundations, structures, return Conductors and 25 kV feeders, if any. This part also gives reference to technical specifications of materials and components, procedure for submission of designs and drawings of basic arrangements, components and fittings designs and other typical designs relating to overhead equipment, switching stations and booster transformer stations and Traction Sub-stations. A list of the standard drawings is included in Annexure-1, Part-IV.

(b) **SCOPE OF WORK**:

The sections of the Indian Railways to be equipped with traction overhead equipment in accordance with this specification are detailed in part-III where the particular features of the sections to be electrified and their special requirements are indicated .

(c) **Indian Railways Schedule of Dimensions**:

To avoid infringements of various parts of OHE {Structures, Foundation, live parts, equipments etc. included in Para - 2.1.12(d) " INSULATION CLEARANCE", 2.1.17 (a) "CLEARANCE" and 2.6.9 (c) "INFRINGEMENT TO STANDARD DIMENSIONS"} with standard dimensions mentioned in “Indian Railways Schedule of Dimensions 1676 mm Gauge (BG) Revised - 2004 with Addendum & Corrigendum slip Nos. 1 to 16 or its latest revision issued by Railway Board " shall be followed.

CLIMATIC DATA: 2.1.2

The data pertaining to section are given in part-III.

WIND PRESSURE: 2.1.3

For design of layout of overhead equipment maximum span etc. Wind pressure shall be taken as specified in part-III. Structures, and foundations of overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations and Station Sub-stations shall be designed for the wind pressure indicated in part-III.

SYSTEM PARTICULARS: 2.1.4

The nominal voltage of the overhead equipment will be 25 kV A.C. 50 Hz, single phase. The supply voltage may, however, rise upto 27.5 kV. One terminal of the 25 kV system will be solidly earthed at the traction sub-station and also connected to the running rails. The other terminal will be connected to the overhead equipment through switchgear provided at the traction sub-station and at the feeding station.

ROLLING STOCK: 2.1.5

(a) LOCOMOTIVES

The electric locomotives will generally be equipped with DC motors fed through rectifiers installed on the locomotives.

(b) OVERSIZE CONSIGNMENTS

The specific requirement in regard to movement of steam locomotives and over size consignments for each section are indicated in part-III.

POWER SUPPLY : 2.1.6

(a) TRACTION SUB-STATIONS

Electric power will be supplied at 25 kV A.C. 50 Hz. single phase from traction sub-stations to feeding stations spaced 50 to 80 km apart along the track.

(b) SWITCHING STATIONS

Power supply will be controlled to the different sections of traction overhead equipment by switching stations. At these stations the switching will be effected by means of "Interrupters" which are single pole, non-automatic oil circuit breakers capable of repeatedly interrupting normal full load current. There are three types of switching stations :-

(1) Feeding stations;
(2) Sectioning stations, and
(3) Sub-sectioning stations.

(c) FEEDING STATIONS

Supply will be effected to the overhead equipment through switchgear installed at feeding stations. All feeding stations will be located normally near the track.

(d) SECTIONING STATIONS

The sub-stations cannot, as a rule be paralleled and consequently a neutral section of overhead equipment with insulated overlaps on either side will be provided approximately midway between two consecutive feeding stations. Neutral sections may also be provided at feeding stations. Facilities to bridge the neutral section between feeding stations will be provided at sectioning stations.

(e) SUB-SECTIONING STATIONS

In order to facilitate maintenance of overhead equipment and to permit isolation of faulty sections and expeditious restoration of power supply in healthy sections, sub-sectioning stations with insulated overlaps will be provided between the feeding stations and the sectioning stations.

(f) RETURN CONDUCTORS

In order to reduce interference to telecommunication circuits arising from A.C. 50 Hz. single phase traction current in the overhead equipment, a return conductor may be provided for each main running track. These return conductors shall be connected at intervals to booster transformers and to the rails. The sections in which return conductors shall be provided are indicated in part-III.

(g) BOOSTER STATIONS

Booster transformer stations are provided in conjunction with return conductors to reduce inductive interference to telecommunication circuits arising from single phase 25KV AC traction. The Booster stations are located along the track.

(h) Supply and erection of traction sub-stations mentioned in sub-para (a) above do not come within the purview of this specification.

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SECTION 2
OVERHEAD EQUIPMENT

TRACK : 2.1.10

(a) GAUGE AND TRACK CENTERS

The track gauge is 1676 mm (5'-6"). In multiple track zones, the normal distance between track centers varies between 4270 mm (14'.ft) and 4420 mm (14'-6").

(b) SPEED

The overhead equipment which shall be of the simple polygonal type and pre-sag should be designed for a maximum speed of 160 km/h (Approx.100 miles/h) if regulated and for a maximum speed of 80 Km/h (Approx. 50 miles/h) if unregulated, unless otherwise specified in Part-III for any particular section.

Note : (i) The OHE shall be with swiveling type of cantilever having tension in the conductors regulated automatically, with a pre-sag of 50/100 mm.
(ii) Maximum Contact wire gradient shall be 1 mm per meter and maximum difference in contact wire gradient between two adjoining spans shall be 0.5 mm per meter.

(c) CURVES

The minimum radius permissible is 175 m (573 ft.) i.e. a 10^0 curve. Inside station limits, the curvature at a 1 in 8.5 turnout is 8 degree i.e. of radius 219m (716 ft.).

(d) SUPER ELEVATION

The maximum super elevation is 165 mm (6.5"). On curves, the minimum setting of structures shall be decided on the basis of maximum super elevation (see para 2.3.10). For purposes of design and erection of overhead equipment, the actual super elevation as existing at site or as indicated to the contractor shall be adopted.

(e) LOW JOINTS

For low or loosely packed rail joints a difference of 25mm (1") in the level of opposite rails may be taken as the basis for estimating the displacement of the pantograph with respect to its normal position.

(f) FORMATION

Generally sections with more than one track have common formation. In certain lengths, however the formation for different tracks may be separate (See relevant drawing listed in Annexure-1, Part-IV).

(g) DISPLACEMENT

The general design of overhead equipment shall permit a displacement of ± 100 mm of tracks without difficulty and any adjustment of the overhead equipment on this account shall be of such a nature as could be done conveniently without changing any component of the overhead equipment.

SECTIONING: 2.1.11

(a) INSULATED OVERLAPS

Insulated overlaps are provided for facility of isolation. Some of the overlaps may be provided with manually operated isolators switches. In addition for connecting the overhead equipment to booster transformers, insulated overlaps are indicated in the sectioning diagrams (see part-III).

(b) YARD SUPPLY

The sectioning diagram/s also indicate the tracks in stations yards and siding whose equipments is electrically independent from those of other tracks.

The overhead equipment in yards and sidings may be fed through isolator switch or interrupter in accordance with arrangement indicated in the sectioning diagram/s.

(c) SECTION INSULATORS

Section insulators shall be provided as indicated in the sectioning diagrams, or cross-over between main tracks and to isolate sections of overhead equipment in yards and sidings. Section insulators may also be used to form neutral sections at special locations as indicated in the approved drawings.

(d) Deleted

(e) FEEDERS & RETURN FEEDERS 25 KV ALONG TRACK FEEDERS

25 kV along track feeders may connect sections of overhead equipment to a switching station or an isolator switch or gantry. Such feeders will be run usually on traction structures and sometimes on independent masts. A single 'SPIDER' conductor shall be used for such feeders.

(f) RETURN CONDUCTOR

Return conductor may, be run on traction structures or masts. A single 'SPIDER' conductor shall be used for such return conductors.

(g) SCHEMATIC ARRANGEMENTS

The different arrangements of feeders, return feeders, 25 kV along track feeders and return conductors are shown in the drawing listed in Annexure-1 (Part-IV).

(h) SECTIONING DIAGRAM

The provisional sectioning diagram/s of the sections to be electrified is/are included in part-III.

PANTOGRAPHS : 2.1.12

(a) The outline of the pantograph, its dimensions and its current collecting area are shown in a drawing listed in Annexure-I (Part-IV).

(b) NUMBER AND PRESSURE

Each locomotive will be equipped with two pantographs, but only one pantograph generally the trailing one will be in use at a time. The working pressure of the pantograph on the contact wire may vary between 5 and 15 kg.

(c) SPACING IN MULTIPLE HEADED TRAINS

The distance between adjacent running pantographs in the case of multiple heading would normally be 20 metre. This distance may, however, be reduced to 7.9 metre between two pantographs in very exceptional cases.

(d) INSULATION CLEARANCE

The electrical clearances for the pantograph on tangent tracks and on curves for design and erection of overhead equipment shall be based on the schedule of Dimensions mentioned in Para - 2.1.1(c) "Indian Railways Schedule of Dimensions".

OVERHEAD EQUIPMENT: 2.1.13

(a) BRIEF DESCRIPTION

Essentially the traction overhead equipment shall consist of a standard catenary wire from which a grooved contact wire is suitably suspended by means of droppers. In order to cater for a speed of 160 kmph the contact wire is given a pre-sag of about 50/100mm for 72 m span and reduced suitably for other spans.

(b) CATENARY

The catenary wire shall be either of cadmium copper 19/2.10mm, 65mm$^{2.}$

(c) CONTACT WIRE

The contact wire shall be grooved and made of hard drawn copper having 107 sq.mm cross section.

(d) DROPPERS

Droppers shall be made of hard drawn round copper wire; approximately 5 mm dia. Droppers shall be spaced not more than 9 m apart (see Annexure-1 (Part-IV)).

(e) ENCUMBRANCE

As a general rule, the nominal "encumbrance" i.e. the center distance between the catenary and the contact wire at the support shall be 1.40 m. Deviation from this figure will be permitted in special cases (e.g. spans near over-bridges, structures with more than one cantilever etc.).

(f) JUMPERS

All jumpers connected to OHE conductors shall be of copper only. The in-span jumpers potential equaliser jumpers at insulated overlaps and neutral section, shall be of 50 mm sq. nominal, 19/1.8mm size. Flexible jumpers of nominal section 105mmsq, 19/7/1.06 mm size shall be used at overlaps, turnouts, crossings etc.

(g) BRIDDLE WIRE

Briddle wire for supporting contact wire for regulated tramway equipment shall be of Cadmium copper 7/2.10 mm in size.

(h) ANTI THEFT JUMPER

Anti theft jumper of 50 mm sq. nominal, 19/1.8 mm in size shall be used in out of run wire of conventional OHE and copper cadmium anticreep wire as an anti-theft measure.

The jumper connecting the AL. Conductors to any other conductors terminal or clamp shall be made with the aid of suitable bi-metallic clamps. All Aluminum jumpers of size 19/7/1.4 mm bare 3/4 hard shall be used to connect other Aluminum conductors such as return conductor. The tail ends of feeder wires from the strain clamps at the termination of a feeder, return feeder or return conductor may be connected directly to a terminal or clamp where feasible to avoid the use of a separate jumper wire.

TYPE OF EQUIPMENT: 2.1.14

The overhead equipment used shall normally be either of the regulated or unregulated type. Unregulated tramway type equipment (contact wire only) may be adopted where specially indicated by the purchaser.

(a) REGULATED

In the regulated type of overhead equipment, the tension of both the catenary and the contact wires shall be maintained at a constant value at all temperatures by means of automatic tensioning devices desired to take up the variation in the length of overhead equipment due to temperature variation.

An anti creep shall be provided at a point approximately midway between two tensioning devices and not more than 750 meters from any one of them. The general arrangement of an anti-creep is shown in a drawing listed in Annexure-1.The arrangement shall generally consist of the galvanised steel wire anchored on the masts adjacent to the anti-creep central mast in accordance with the relevant drawing listed in Annexure-1.Part IV. Alternatively, the arrangement may consist of anchoring the catenary on either side of the boom of a portal with the contact wire running through and providing a jumper connection as per general arrangement shown in typical drawing listed in Annexure-1, Part IV. The Purchaser shall indicate the type of anti-creeps to be adopted in the pegging plans.

(b) UNREGULATED

The unregulated type of overhead equipment has no provision for automatic regulation of tension of either the catenary or the contact wire.

(c) TRAMWAY TYPE EQUIPMENT REGULATED CONTACT WIRE ONLY

In tramway type equipment regulated, only a contact wire is provided without a continuous catenary or droppers. The tension in the contact wire is regulated. At support, briddle wire is used for supporting the contact wire.

(d) The section in which different types of equipment should be provided are indicated in part-III.

PLANE OF CONTACT: 2.1.15

(a) REGULATED

The regulated overhead equipment shall be so erected that the contact wire has the designed sag.

(b) UNREGULATED

In the case of unregulated equipment the contact wire shall have no sag at an ambient temperature of 35ºC.

(c) TRAMWAY TYPE

In tramway type equipment, the contact wire will have its own natural sag when erected.

(d) DROPPER

Dropper charts to be used for standard span of regulated and unregulated overhead equipment would be supplied by the Purchaser. Dropper for non-standard spans, span with section insulators and special locations shall be calculated by the Contractor in accordance with the method indicated by the Purchaser and submitted to the Purchaser for approval.

TENSIONS: 2.1.16

(a) REGULATED

(i) In regulated equipment the tension is the catenary and in the contact wire shall be 1,000 kgf in each conductor.

(ii) Deleted

(b) UNREGULATED

In unregulated equipment the tension in the catenary and in the contact wire at 35 degree C without wind shall be, 1,000 kgf in each conductor.

(c) TRAMWAY TYPE

In regulated type tramway equipment, the tension shall be 1,250 kgf.

CLEARANCE: 2.1.17

(a) GENERAL

The distance between live parts and parts at earth potential (for parts likely to be earthed) shall be as large as possible. In all cases, the clearances must not infringe the values given in schedule of Dimensions mentioned in Para - 2.1.1 (c) “Indian Railways Schedule of Dimensions".

(b) OVER BRIDGES & TUNNELS

The clearances which are to be made available at over bridges, signal, gantries and other over line structures shall be based on the above rules.

(c) PLATFORM SHEDS AND OTHER STRUCTURES

In the course of checking the overhead equipment pegging plans, the Contractor shall prepare a list of platform sheds and other structures in the vicinity of track to be wired. The clearances to these structures shall be in accordance with those shown in the relevant drawings listed in Annexure-1, Part. IV. If these clearances are not available, the Contractor shall advise the Purchaser in time to enable the later to take up necessary modifications.

HEIGHT OF CONTACT WIRE: 2.1.18

(a) Normally, the minimum height of contact wire above rail level shall be 5.50 m at mid span under the worst temperature conditions. This height may be reduced under bridges and in tunnels to the extent permitted by the purchaser. The minimum height shall be 4.80 m. In electric locomotive sheds and over electric locomotive inspection pits, the minimum height shall be 5.80 m. At level, crossings the minimum height shall be 5.50 m. Any infringement restricting minimum height at level crossings will be removed by the Purchaser.

(b) GRADIENT OF CONTACT WIRE

Any change in the height of the contact wire shall be made gradually and the maximum slope shall not normally exceed 1 mm per metre on main lines and 10 mm per metre on sidings. The end span of any section with a gradient of contact wire shall have a slope not greater than half the main slope. Contact wire gradient should be 1 mm per meter and difference in contact wire gradient between two adjoining spans shall be 0.5 mm per meter.

STAGGER: 2.1.19

To ensure uniform wear of contact strips of pantographs, the contact wire shall normally be staggered in a manner which will be indicated by the Purchaser.

TERMINATION : 2.1.20

(a) **GENERAL**

Traction overhead lines shall be terminated using components specified to Chapter 2.4.The termination may be carried forward by one or two spans if anchoring facilities so require.

(b) Terminating wires shall be electrically connected to the conductors with which they are likely to approach closely or come into contact under normal conditions.

(c) SUPPLEMENTARY INSULATION

If a terminating wire passes a live conductor to which it should not be connected, i.e. in a different elementary section, the portion of the terminating wire close to the live conductor shall be separated by means of insulators. The insulators swept shall be located in such a manner as to clear the zone of the pantograph under the worst conditions and as far away as is possible from live conductors.

TYPES OF STRUCTURES : 2.1.21

(a) The overhead equipment of main tracks in case of multiple tracks section shall be electrically and mechanically independent of the one another by provision of independent cantilever masts to the maximum extent possible (see Annexure-1 for general arrangement drawings).

(b) HEADSPANS Deleted

(c) PORTALS

In cases where the tracks in a multiple track section do not permit location of independent masts and where automatic tensioning of overhead equipment is required, rigid portals may be used. Also in the vicinity of points and crossings, portals may be used, provided it is not possible to have prescribed setting with independent cantilever masts. These structures shall be equipped with standard bracket assemblies for supporting individual equipment of different tracks. The use of such structures is to be avoided as far as possible and for this purpose, the Purchaser will arrange to slew

the tracks, if practicable. A single portal shall normally not cover more than five tracks (See also 2.3.7). Portal structures shall also be employed at anticreep central locations and such portals will have necessary guy arrangement.

(d) FOUNDATIONS

Foundations for all structures shall be designed in an economical manner by following the methods of design indicated by the Purchaser and observing the schedule furnished by him (See part -II, Chapter-II)

CANTILEVER ASSEMBLY : 2.1.22

The bracket assembly carrying overhead equipment shall be of the swiveling type. The assembly shall be such that the tubes adopted will permit easy adjustment of the whole equipment after erection to cater for displacement of the track during maintenance upto the extent of 100 mm on either side except as otherwise relaxed by the Purchaser (see Para 2.1.10 g).In special locations, pull-off arrangements may be used with the approval of the Purchaser (See Annexure-1 for drawings of the bracket assembly and components).

OVERLAPS : 2.1.23

Overlaps shall be provided at suitable intervals such that neither the tension length exceeds 1,500 m nor the fixed anchor to balance weight anchor exceeds 750 metres.

(a) GENERAL

The two contact wires at the overlapping zone shall be parallel to each other in a plane parallel to the track and run separated from each other (see Annexure-1 for general arrangement drawings).

(b) INSULATED

In the case of insulated overlaps, the separation between the two contact and the two catenary wires shall be 0.5m (See Annexure-1 for general, arrangement drawings).

POINTS & CROSSINGS : 2.1.24

Arrangements of overhead equipment of different types e.g. regulated, unregulated or tramway at points and crossings shall be in accordance with the standard drawings listed in Annexure -1.

SECTION INSULATORS : 2.1.25 (See also Para 2.1.11(c))

(a) BRIEF DESCRIPTION

The section insulators shall provide effective electrical isolation of two elementary electrical sections of overhead equipment and permit smooth passage of the pantograph in either direction at all speeds upto 70 KM/H. The outline of a section insulator is shown in a drawing listed in Annexure-1. The section insulators shall be of the single wire type.

(b) SIZE AND WEIGHT

The section insulator assembly shall be such that it should be possible to install the insulator in the overhead equipment provided the axial distance between the catenary and the contact wire with section insulator in position is not less than 450 mm. The weight of the complete assembly shall not be more than 45 kg for single wire type excluding the weight of the catenary insulator and the catenary ending clamps.

ISOLATORS : 2.1.26

Manually operated isolators single or double pole type, with or without earth contact assembly may be required to bridge certain section insulators or insulated overlaps (See para 2.1.11.). In certain large yards, isolators controlling different lines may be grouped together on a gantry (See Annexure-1).

RETURN CONDUCTORS : 2.1.27

At all Booster stations, the return conductor shall be provided with cut-in-insulators. At point mid way between two booster stations, the return conductor shall be connected to the rail through suitable terminal lugs which will provide a means of isolation, when required. The drawings showing the general arrangement of connections to the return conductor are listed in Annexure-I. The connection from the isolating arrangement to the rail shall be by means of 2 M.S. flats, each of minimum size 40 mm x 6 mm and at feeding stations 4 M.S. flats each of minimum size 40 mm x 6 mm .The flats shall be given two coats of red oxide zinc chromate primer to IS:2074:1992 CNSL based and finished with two coats of Bitumen 85/25 blown grade. Return conductors may be taken under ground in special locations such as under overline structures with the approval of the Purchaser. The return conductor shall also be connected with buried rail on either side of the overlap before the feeding post and cut-in-insulator should be provided on the return conductor before the feeding post within the overlap limits and two independent rail connection links from the mast on either side on the cut-in-insulator. The same practice is to be adopted on all the sub-sectioning posts and sectioning posts for the return conductor.

BRIDGES AND TUNNELS : 2.1.28

(a) OVERBRIDGES

The complete overhead equipment (i.e. both the catenary and the contact wires) shall normally pass under over-line structures. Additional intermediate suspension points shall be provided, if necessary, to ensure the specified minimum height of contact wire being maintained. In special cases catenary may be anchored on either side of the overline structure and the contact wire carried underneath.

(b) TUNNELS AND CUTTINGS

The arrangements proposed for the equipment in tunnels and cuttings shall take into account the special features of each location and shall be in accordance with general design specified in part -II.

(c) SAFETY SCREENS

On over-bridges, metallic protective screens shall be provided in order to prevent any person from coming into contact with the live overhead equipment. Such screens shall be properly earthed.

(d) **HEIGHT GAUGES AT LEVEL CROSSINGS**

Height gauges will be provided at all level crossings in accordance with the general arrangement drawings listed in Annexure-1.

BONDING AND EARTHING : 2.1.29

(a) Bonding and earthing shall be done in accordance with the code for bonding and earthing.

(b) **LONGITUDINAL AND TRANSVERSE BONDING**

Longitudinal and transverse bonding of tracks, bonding of structures including traction structures to rails and associated earths shall be provided in accordance with the above code.

(c) **TRACTION STRUCTURE BONDING**

Every traction mast or structure shall be bonded to a non-track circuited rail unless it is provided with a continuous earth wire or it is individually earthed by means of an earthing station. For general arrangement drawings, see Annexure-1.

(d) **DOUBLE RAIL TRACK CIRCUIT**

Where track circuits are provided on both rails, traction masts/structures shall not be bonded to rails but shall be provided with an earth wire made of steel reinforced aluminum conductor consisting of 6 strands of aluminum and one strand of steel each of 4.09 mm dia.(RACCOON) [conforming to IS:398 Pt II (latest revision as indicated in Annexure-1)]. The earth wire shall be run on traction masts or structures. They shall be divided into different electrical sections not exceeding 1,000 m. long. The earth wire in each such section shall be connected at two traction structures, situated at a

distance not exceeding 250 m on either side of the mid-point of the section to two 10 Ohm, earth stations which will be provided by the Contractor. Sections on which earth wire is required to be provided are indicated in Part-III.

L.T. SUPPLY TRANSFORMER STATIONS: 2.1.30 (See para 2.1.40(c))

LIGHTNING ARRESTORS: 2.1.31

No lightning Arrestors will be provided on the traction over head equipment.

CERAMIC BEADED GLASS FIBER TYPE SHORT NEUTRAL SECTION ASSEMBLY: 2.1.32

Ceramic beaded glass fiber type section insulator assembly shall consist of resin bonded fiber glass(or equivalent)insulators covered with either teflon (or equivalent) or ceramic beaded with PTFE spacers (or similar) adequately dimensioned and rated for the application. The insulators shall have suitable end fitting for connections to the contact wire through end fitting. For smooth passage of pantograph without any shock from contact wire to insulator and vice-versa, suitable runners preferably of stainless steel shall be provided. The central position of the assembly along with arc trap shall be solidly earthed as the later with earthing clamp is provided to trap any arc current caused by break of contact between pantograph and live contact wire when it passes from contact wire to insulator. The distance between arc trap and nearest line position shall be adjustable upto a maximum of 320 mm Suitable means of suspension of the components of the assembly from the catenary conductor shall be provided. The complete assembly shall be as light as possible and so constructed that adjustments of components can easily be made during erection of maintenance and also for ensuring smooth passage of pantograph.
In the catenary conductor, resin bonded fiber glass insulators with suitable covering shall be provided. The insulators shall have suitable end fittings for connections to catenary wire through end fittings. The central portion shall be solidly earthed.

The neutral section assembly shall be suitable for erection symmetrically on either side of the cantilever bracket support with regulated or unregulated conventional/ composite OHE where one point each for suspension of catenary conductor and contact wire is available as also shown in GA drawing under Annexure-I.

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SECTION-3

SWITCHING STATIONS, BOOSTER TRANSFORMER STATIONS AND L.T.SUPPLY TRANSFORMER STATIONS.

DESCRIPTION : 2.1.40

(a) Switching Stations

Every switching station has a gantry with two or more main masts (Up-right). The interrupters are located behind the gantry. Isolators, Potential Transformers, station class lightning Arrestors and pedestal Insulators are mounted on a gantry. From the gantry, connections are made to various sections of overhead equipment by cross feeders and jumper connections. Switching stations are unattended and remote controlled from a remote control centre (see part-III). A small masonry cubicle, called the control cubicle, shall be constructed at each switching station to house control equipment, batteries, battery charger, S.&T. terminal equipment, a terminal board for terminating cables from the switching station equipment, a telephone and telephone equipment and A.C. 240V distribution board. In the case of the Feeding stations that are located within the Traction sub-stations premises, all the above equipment will be provided inside the sub-station control room. The switching station and its control cubicle shall be enclosed by fencing except at feeding stations that are located within the Traction sub-stations premises.

(b) Booster Transformer

Booster stations are provided for each track at the insulated overlap spans. The primary terminals are connected directly in series with the traction overhead equipment and the secondary terminals directly in series with the return conductors by means of flexible jumpers. Normally each booster station will be provided with one booster transformer which will be mounted on a gantry structure with two masts as indicated in a drawing listed in Annexure-1.

Single booster station will be located on either side of the track in a double track section. In multi-track sections where space does not permit location of a booster station may be provided with cross feeders for connections to the overhead equipment and return conductors as indicated in the relevant general arrangement drawing listed in Annexure-1. Two 7.5 kV lightning arrestors for each booster transformer are also erected on the gantry and connected to the L.T. terminals of the booster transformer.

(c) L.T. supply transformer stations

The low tension supply required at switching stations will be obtained through L.T. supply transformers included as part of switching stations, mounted on steel structures and connected to the 25 kV side through rigid bus-bars of aluminum. In special cases where the length of connection is small, 50 sq.mm copper wire may be used for connection, with the approval of the Purchaser. At locations other than at switching stations, wherever low tension supply is required, L.T. supply transformer stations included as a part of OHE may be provided along side the track at isolated location.
L.T. supply transformer stations shall essentially comprise of a mast mounted transformer connected to the traction overhead equipment through dropout fuse switches. The 240 V side shall be connected to a distribution board located at the remote control cubicle by means of 2 core 25 sq. mm aluminum cable (see 2.4.23(a)). The general arrangement drawing for L.T. supply transformer stations for single double and multi-track sections is included in Annexure-1.

SCOPE OF WORK : 2.1.41

(a) Switching stations

The switching stations shall be complete in all respects in accordance with specifications. The work shall include:-

(i) Filling up and leveling of the ground to the extend necessary.

(ii) Provision of control cubicles for installation of remote control equipment for switching stations.

(iii) Provision of 240 V A.C. distribution board.

(iv) Provision of lights, plug points inside the cubicles.

(v) Trench work inside the cubicles.

The work shall not include :

(i) S & T Terminal equipment, telephone and telephone equipment.

(ii) Provision of bus-bars from the traction sub-station to the feeding station in the case of these feeding stations which are located within the traction substation premises. However, the provision of a tee connector in the feeding station bus-bars would form part of the switching station work (see the relevant drawing in Annexure-1).

(iii) Provision of 110 V battery and battery chargers and terminal boards in the feeding stations.

(iii) Supply of equipments listed in Annexure-4.

Note : *Supply and spreading of gravel at all Switching stations is included in the scope of work of the Contractor. It shall however be noted that no extra cost for this shall be payable to the contractor.*

(b) Booster Transformer Stations

The booster transformer stations will be complete in all respects, in accordance with the specifications. The work, however, shall include :-

(i) Filling up and leveling of the ground to the extent necessary, but exclude the supply of booster transformers and other equipments indicated in Annexure-4.

(ii) L.T. supply transformer station shall be complete in all respects in accordance with the specifications. The work shall, however, not include (i) cable and cable connections in L.T. side except at switching stations, where this is included as a part of switching station work (ii) supply of L.T. supply transformer and other equipment as listed in Annexure-4.

CLEARANCES : 2.1.42

No part of the installations which is live at 25 kV shall be erected at a height less than 3 m from the datum level. Clearance between any part live at 25 kV and any part at earth potential (or part likely to be earthed) shall not normally be less than 500mm.This clearance may be reduced under special circumstances but in no case static clearance shall be less than 320 mm and any dynamic vertical and horizontal clearances 270 mm and 220 mm respectively. The clearance between any part live at 3 kV and any part at earth potential (or part likely to be earthed) shall be not less than 150 mm under static condition and 70 mm under dynamic conditions.

SETTING OF GANTRIES : 2.1.43

The gantries are normally aligned parallel to the track. The minimum distance of the face of the gantry from the center line of the nearest track is referred to as the 'setting' of the gantry. The setting shall normally be 3.5m. Setting of the individual gantries of different stations will be furnished by the Purchaser.

DATUM LEVEL : 2.1.44

The datum level will be the finished level of the gantry mast foundation. All vertical dimensions shall be stated with respect to this datum level. Datum levels of individual stations will be indicated on the location and connection diagrams.

MOUNTING OF EQUIPMENT AND BUSBAR ARRANGEMENT : 2.1.45

(a) The interrupters and isolators shall be mounted in such a way that these can be manually operated conveniently by a person standing on the ground. The indicators showing the 'OPEN' or 'CLOSED' position of the equipment shall be so arranged as to be visible from out-side the fencing enclosure on the side of the main gantry.

(b) The bus-bar arrangement for typical switching stations is schematically indicated in a drawing included in Annexure-1.

FENCING & ANTICLIMBING DEVICES : 2.1.46

Every switching station, together with its associated control cubicle shall be enclosed by fencing except at feeding stations that are located within the traction sub-station premises. The fencing shall have an anti-climbing device also at top.

At booster transformer and L.T. supply transformer stations, suitable anti-climbing devices consisting of galvanised steel clamp fixtures shall be mounted on each mast. The device shall be fitted below the transformer supporting beam or steel work. The general arrangement drawings indicating the fencing and anti-climbing devices, are indicated in Annexure-1.

NUMBERING : 2.1.47

Each booster transformer, interrupter, potential transformer, L.T. supply transformer and isolator shall carry an enameled number plate of approved design (see Annexure-1). The Purchaser will furnish the actual numbers to be allocated to the various equipments as per specification No. ETI/OHE/53 (Latest version as indicated in Anexure-1).

INTERLOCKING ARRANGEMENTS : 2.1.48

An interlock shall be provided between each interrupter and its associated double pole isolator, to prevent operation of the isolator from the open to the closed position or vice-versa, unless the interrupter is locked in the open position and to prevent operation of interrupter either manually or by remote control unless the isolator is lock in the open or closed position. The interlocking device shall consist of a lock combined with an electrical contact to make or break the remote control circuit on the operating mechanism of the interrupter and a lock for the isolator operating mechanism and interlock key for the two locks.

EARTHING ARRANGEMENTS : 2.1.49

(a) Earthing of switching stations, booster transformer stations and L.T. supply transformer stations shall generally comply with the code of practice for earthing IS: 3043 (Latest version as indicated in Anexure-1) except where otherwise specified below:

(b) Earthing system
(i) Switching stations

At each switching station, two separate and independent earth circuits shall be provided, one for earthing the HT equipment and the other for earthing the L.T. equipment. The general arrangement of earthing connections at a typical switching station is shown in the relevant drawing included in Annexure-1.

(ii) Earth Circuits

Each earth circuit shall take the form of a closed ring and shall be provided with a minimum of two earth electrodes. Each earth electrode shall consist of galvanised iron pipe, 40 mm nominal bore at least 3.1 m long provided with a spike at one end and welded lug suitable for taking minimum size of 50x6 mm mild steel flat, directly at the other. The pipe shall be embedded into the ground. The earth electrodes of the HT and the LT earth circuits shall be located as far apart as it is possible. The drawing of typical earth electrode is included in Annexure-1.

(iii) HT earth circuit

The resistance to earth of the HT earth circuit shall be less than 2 ohms. If this value cannot be achieved with a maximum of four separate but inter connected earth electrodes then the additional earth electrodes shall have the surrounding earth treated with charcoal and salt filling. All masts, structures, fencing uprights and equipment pedestals shall be connected by the two separate and distinct connections to the closed loop of the earth bus. Earth bus and connections to it shall be of M.S. flats of a minimum size 50 mm x 6 mm. Potential transformers and lightning arrestors shall be bonded to masts/structures by 25 mm x 3 mm copper strips.

(iv) LT earth circuits

The LT earth circuit shall also comprise of a minimum of two inter-connected earth electrodes as described in para (iii) above and the total resistance to earth of the earth circuit shall be less than 2 ohms. This circuit will not form a part of this contract at those feeding stations that are located within the traction sub-station premises. All low tension equipment control boards, one terminal of the secondaries of the potential and LT supply transformers, metal casing of battery chargers, each connections of 8 SWG galvanised iron wire to the LT earth bus. The section of the LT earth bus shall be the same as that of the HT earth circuit.

(v) Earth strips

The earth bus and connections of HT earth circuit shall be painted with two coats of red oxide zinc chromate primer to IS 2074 (Latest version as indicated in Anexure-1) with a minimum thickness of 1.5 mils (40 microns) and with two finishing coats of bitumen 85/25 (blown grade to IS:702(Latest version as indicated in Anexure-1) with 20% mica to a thickness of about 15 mils (375 microns) either by hot application or by brushing a solution of it with suitable viscosity to obtain the thickness in minimum number of coats and buried at a depth of 300 mm below the ground level.

The earth bus of the LT earth circuit shall run along the wall fixed on wooden gutties at a height of 300 mm from the floor. The connections to equipment will run from the bus along the wall and in recesses in the floor. All recesses will be covered with cement plaster after finishing the work. The connection of earth strips to each other shall be made by 10 mm dia. steel rivets or by welding. The connections to the various items of equipment and structures or fencing posts shall be made with G.I. bolts. The earth connection to the structural members shall be made at a height of about 150 mm above the foundation.

(vi) Inter connection

The HT and LT earthing systems shall be interconnected. In Addition, at all switching stations, the HT earth shall be connected by the two independent mild steel flats each of minimum size 50 mm x 6 mm painted with two coats of red oxide zinc chromate primer to IS:2074 (Latest version as indicated in Anexure-1) and finished with two coats of bitumen 85/25 blown grade as described above, to the non-track circuited rail in a single-railtrack-circuited section and to the neutral point of an impedance bond provided by the purchaser where double-rail-track circuiting is employed so as to limit high potential gradients developing in the vicinity of switching stations in the event of fault.

(c) Booster Transformer stations

(i) Earthing system

The earthing system shall comprise of a minimum of two inter-connected earth electrodes. The general arrangement of earthing connections at a typical Booster Transformer stations is shown in the relevant drawing included in Annexure-1. Each earth electrode shall consist of one galvanised iron pipe 40 mm nominal bore at least 3.1 m long provided with a spike at one end and welded lug suitable for taking a minimum size of 50 mm x 6 mm mild steel flat directly at the other end. The pipe shall be embedded into the ground. The earth bus inter-connecting the two earth electrodes shall consist of a minimum size of 50 mm x 6 mm mild steel strip. Each mast of the gantry shall be connected at the bottom to this earth bus by a minimum size of 50 mm x 6mm M.S FLAT. The resistance to earth of the earth circuit shall be less than 2 ohms as described in para (b)(iii) above. The transformers and the lightning arrestors shall be bonded to the gantry mast by means of copper strips of size 25 mm x 3 mm. In addition the earth circuit shall be connected to the non-track circuited rail in the case of single rail track circuit or to the mid point of impedance bond in case of double rail track circuit section.

(ii) Earth strips

The earth strips shall be painted with two coats of red oxide zinc chromate primer to IS:2074 (Latest version as indicated in Anexure-1) with a minimum thickness of 1.5 mils (40 microns) and with two finishing coats of bitumen 85/25 (blown grade to IS:702: (Latest version as indicated in Anexure-1) with 20% mica to a thickness of about 15 mils (375 microns) either by hot application or by brushing a solution of it with suitable viscosity to obtain the thickness in minimum number of coats and buries at a depth of 300 mm below the ground level. The connection of earth strips to each other shall be made by 10 mm dia. steel rivets or by welding. The earth connections to the structural members shall be made at a height of about 150mm above the foundation.

(d) L.T. supply Transformer Stations.

The earthing arrangement of a pole mounted LT supply transformer station shall comprise interconnected earth electrode/electrodes having a resistance not exceeding 10 ohms. If this value can not be achieved with two electrodes, additional electrodes shall have surrounding earth treated with charcoal and salt filling. The transformer and lightning arrestor shall be connected to the supporting steel structure by means of 2 independent connections at the top by means of 25 mm x 3 mm copper strip. At the bottom, the steel structures shall be connected to the inter-connected earth electrodes and to the nearest traction rail by means of two independent connections of mild steel flats having a minimum size of 50 mm x 6 mm. In addition, the earth electrode should be connected to the traction rail by means of a minimum size of 75 mm x 6 mm mild steel flat. The mild steel flat shall be painted with two coats of red oxide zinc chromate primer to IS:2074 (Latest version as indicated in Anexure-1) with a minimum thickness of 1.5 mils (40 microns) and with two finishing coats of bitumen 85/25 (blown grade to IS :702 (Latest version as indicated in Anexure-1) with 20% mica to a thickness of about 15 mils (375 microns) either by hot application or by brushing a solution of it with suitable viscosity to obtain the thickness in minimum number of coats.

CABLE CONNECTION : 2.1.50

(a) All PVC cables provided out-door shall be either laid in the trenches or neatly clamped to the structures as approved by the Purchaser.

(b) Termination of cables

The cable shall be terminated neatly and all the cores arranged and dressed properly. Suitable indexed terminal strips or ferrules shall be provided at all terminals to facilitate maintenance.

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SECTION-4
TRACTION SUB-STATIONS

2.1.51 INTRODUCTION

This part deals with general information and criteria for design, manufacture, supply, erection and testing of equipment at 220 or 132 or 110/25kV traction sub- stations, feeding stations and 25kV Shunt Capacitor Bank. These 220 or 132 or 110/25kV traction sub-stations are also referred to as "SUB-STATIONS" in the Tender Papers.

2.1.52 DEFINITION

The following definitions shall apply for the purpose of this specification, in addition to definitions applicable to standard equipments.

a) "Grid Sub-station" means the sub-station of a power supply authority which is connected to the grid network in the area and from which 220kV or 132kV or 110kV power is supplied to the Railway for electric traction.

b) "Interrupter" means a single pole single phase non-automatic circuit breaker capable of interrupting normal full load current.

c) "Return Feeder" means the conductor of the feeder line from a traction sub-station to the corresponding feeding station which is connected to the earth terminal of the 220 kV or 132 kV or 110kV /25kV traction transformer secondary winding.

d) "Traction overhead equipment" means the overhead conductors and other associated equipment and structures erected over the track to supply power to the electric locomotives.

e) "Traction sub-station" means a 220 or 132 or 110/25kV sub-station for supply of power to traction overhead equipment (installed by the Purchaser), in accordance with this specification.

f) "25 kV Feeder" means the conductor or feeder line from the traction sub-station to the corresponding feeding station and which is connected to the unearthed terminal of the 220 or 132 or 110/25 kV traction transformer secondary winding.

g) "Feeding station" means the 25 kV interrupters and other associated equipment as also structures erected near the track, within or outside the sub- station boundary, for feeding different sections of the traction overhead equipment.

h) "Shunt Capacitor Bank" means shunt capacitor equipment, along with control gear, protective relays, series reactor and accessories erected on 25 kV side of a traction sub-station for the purpose of improvement of power factor and reduction of maximum demand.

2.1.53 FUNCTIONS

The traction sub-stations covered by this specification will be installed to supply power for electric traction at 25 kV A.C. 50 cycles single phase through the traction overhead equipment.

2.1.54 LOCATIONS

The locations of the traction sub-stations are given in Part-III.

2.1.55 SYSTEM PARTICULARS

a) Power will be received at 220 or 132 or 110/25 kV single phase, 50 cycles at the traction sub-stations as indicated in Part-III and stepped down to 25kV by means of single phase traction transformer. On the primary side the traction transformers will be connected across two phases of the 220 kV or 132 kV or 110 kV, 3 phase system. On the secondary side one terminal of the transformer will be solidly earthed and also connected to the traction rails, the other terminal will be connected to the traction overhead equipment through 25kV switchgear.

b) Adjacent sub-stations will normally be connected across different phases to reduce the unbalance on the three phase power supply system. In order to keep the supply from two adjacent sub- stations separate, a neutral section is provided on the traction overhead equipment approximately midway between them. The neutral section is normally kept dead. Electric locomotives coast through the neutral section with power off.

c) The traction sub-stations, will normally be unattended and all switching operations will be carried out by remote control from a Remote Control Center.

d) The capacitor bank shall be of outdoor type, mounted on steel racks for connection to the 25kV bus through single pole isolator and circuit breaker. The capacitor bank shall consist of groups of individual capacitor units, connected in series parallel combination to deliver the rated output, at normal rated system voltage, rated frequency and other rated system conditions.

e) **Series reactor (Harmonic suppression reactor)**

A series reactor shall be provided to limit the inrush current and surge voltage at the time of switching in the capacitor bank. The switching surge voltage shall not exceed 70kVP. The series reactor which is also meant to filter a part of the harmonics generated by the traction loads shall have inductive reactance (X_L) equal to or greater than 13% of capacitive reactance (X_C) of the capacitor bank. The series reactor shall be natural air cooled, air Cored, dry insulated and outdoor type. The reactor shall be rated for maximum current including harmonic current that would flow through the capacitor bank under operating condition.

2.1.56 DESCRIPTION

A) TRACTION SUB SATION

a) At the traction sub stations, normally one transformer will be in service to supply power to the overhead equipment while the other will be kept as standby. However, with the development of load at these traction substations, two transformers either existing or by installation of another where necessary may be connected and worked in parallel. The control and protection circuits shall be designed suitably to permit any change over or parallel working of transformers. The transformers are designed to take 50% overload for 15 minutes and 100% overload for 5 minutes.

b) The incoming 220 kV or 132 kV or 110 kV transmission line will be terminated by the supply authorities on gantries erected inside the traction substation. The supply to the transformers will be controlled through single phase double pole circuit breakers. On the secondary side the transformers will be connected to the 25 KV bus through single phase single pole circuit breakers and associated isolators. From the busbars 25 KV supply will be extended to feeding station through circuit breakers called feeder circuit breakers. The feeder circuit breakers will form a part of the substation and will be covered by the specification.

c) At the feeding station, the 25 kV supply will be fed to different sections of the traction over head equipments by means of interrupters. All interrupters will be remote controlled.

d) Normally, the traction substation will be located along side the Railway track. The feeding stations will be located within the substation boundary and connected to the traction substation by extension of the 25 kV busbars. Where the traction substation is located some distance away from the track, the 26 kV supply will be extended to the feeding station by means of two overhead feeders carried on tower/masts. Each feeder line will comprise two conductors one called the 25 kV feeder and the other return feeder.

e) A small masonry building called the control room will be provided at each substation to house the control and instrument panels, remote control equipment, batteries, battery chargers, telecommunication terminal equipment, telephones and AC and DC LT distribution boards.

f) Fire protection baffle wall will be provided in between the two bays of the power transformer.

g) The entire traction substation and the control room will be protected by a fenced enclosure. A Railway siding from the nearest Railway station will be terminated inside each substation, where feasible, to enable unloading of heavy equipment at site. Road access will also be provided wherever possible.

B) FEEDING SATION

Every feeding station has a gantry with two or more main masts (Up-right). The interrupters are located behind the gantry. Isolators, Potential Transformers, station class lightning Arrestors and pedestal Insulators are mounted on a gantry. From the gantry, connections are made to various sections of overhead equipment by cross feeders and jumper connections. Feeding stations are unattended and remote controlled from a remote control center (see part-III). Feeding stations will be located within the traction sub-station premises. Control equipment, S&T terminal equipments, arrangement for termination of cables from feeding station equipments will be provided inside the sub-station control room.

C) SHUNT CAPACITOR BANK

Capacitor Bank, alongwith associated equipments, will be located inside traction sub-station premises. Capacitor Bank and series reactor shall be mounted on steel racks for connection to 25kV bus through single pole isolator and circuit breaker. The control panel for the capacitor bank shall be installed inside the control room of the traction sub-station.

2.1.57 AUXILIARY SUPPLIES

a) The following auxiliary supplies shall be provided at each traction sub-station

i) 110 V, 200 Ah battery for operation of switchgear
ii) Single phase 240 V AC supply

2.1.58 SCOPE OF WORK

a) The traction sub-stations, feeding stations and 25 kV shunt capacitor banks when erected shall be in accordance with the specification and functionally complete in all respects. All works required in this connection shall be deemed to be a part of the contract, whether specifically stated or not in this Specification. The following works, however, are excluded from the contract.

1) Supply of items of equipment listed in Annexure-4.

2) 220 kV or 132 kV or 110 kV incoming lines and their termination on the gantries within the sub-station. The connections from the transmission line to the sub-station equipment shall, however, be made by the Contractor.

3) Filling and leveling of the ground to the extent necessary.

4) Provision of Railway siding where necessary and road access.

5) Control Room building.

6) Lights, fans and plug points inside the control room and yard lighting.

7) Telecommunication terminal equipment and telephones.

8) The works covered by item 2 to 8 will be arranged by the Purchaser or his agent at the cost of the Purchaser.

b) The supply and erection of feeding station will come within the purview of this Contract. However, the gantry erection at feeding stations outside the premises of traction sub-stations will be done by the OHE contractor. Stringing of cross feeders and jumper wires at feeding stations shall, however, be done either by OHE contractor or TSS contractor whosoever does the work later or as decided by the purchaser depending upon the ground situation during the course of progress of OHE/TSS work. Necessary materials (other than Railway supply items) for the above stringing works will, however, be required to be arranged by OHE contractor in any case.

(C) Supply and erection of 25kV shunt capacitor bank alongwith series reactor and other accessories will come within purview of the contract.

2.1.59 CLEARANCES

a) No part of the installation which is ordinarily live shall be erected at a height less than:

i) 4.6 m on the 220 KV or 132 KV or 110 KV side.
ii) 3 m on the 25 KV side.

from the datum level. The equipment will be so mounted that the bottom most portion of any insulator or bushing in service is not less than 2.5 metres above ground level.

b) Clearances between any live part and parts at earth potential (or parts likely to be earthed) shall not be less than 1800 mm and 500mm for 220 KV or 132 KV or 110 KV and 25 KV respectively.

c) On the 220 kV or 132 KV or 110 KV side clearance between phases shall not be less than 4 m. The centre distance of 220 KV or 132 KV or 110 KV bays shall not be less than 14 m.

d) The layout of the sub-station shall be such as to provide suitable clearances to permit work on the equipment in one bay safely with the adjacent bay alive.

2.1.60 EQUIPMENT AND BUSBAR LAYOUT

The layout of equipment and busbar arrangement for typical sub-stations is shown schematically in drawing incorporated in Annexure-1.

2.1.61 NUMBERING

Each circuit breaker, potential transformer, current transformer, Traction Power Transformer, L.T. Supply Transformer, Isolator and Lightning Arrestor shall carry a vitreous enameled steel number plate of approved design (See Annexure-1). The Purchaser will furnish the actual numbers to be allotted to the various switchgear installed at the sub-station.

2.1.62 BUSBARS

All equipment to equipment connections on the 220 KV or 132 KV or 110 KV side as well as busbars strung between gantries/ portals to which the HV terminals of the transformers shall be connected, shall comprise ACSR conductors and aluminum alloy tubes. The busbars and busbar connections on the 25 kV side shall consist of aluminum alloy tubes supported on pedestal insulators wherever necessary at intervals of not more than 4.5m.

2.1.63 EARTHING

a) Earthing of traction substation shall generally comply with the code of practice for earthing IS: 3043-1987 and RDSO's code of practice No.ETI/PSI/120 (2/91) with A&C Slip No.1 except where otherwise specified. The earthing system shall also conform to Indian Electricity Rules 1956 with latest amendments.

b) **Earthing System**

At each substation, two separate earth circuit will be provided, one for earthing the HT Equipment and the other for earthing the LT Equipment inside the control room.

c) **HT earthing grid**.

A combined resistance of earthing system, in any sub-station shall not be more than 0.5 Ohms. To ensure this, the HT earthing grid shall be formed by means of bare mild steel rods of appropriate size as indicated in Clause (d) below buried at a depth of about 600 mm below the ground level and connected to earth electrodes by means of two separate and distinct connections made with 75 mm x 8 mm MS flats. The connection between the MS flat and MS rod shall be made by welding, while that between, the earth electrodes and the MS flats through MS links by bolted joints. As far as possible the earthing grid conductor shall not pass through the foundation block of the equipments. All crossings between longitudinal conductors and transverse conductors shall be jointed by welding. The transverse and longitudinal conductors of the earthing grid shall be suitably spaced so as to keep the step and touch potentials within acceptable limits. The overall length of the earthing grid

conductor shall not be less than the calculated length as per the code of practice. The earth electrodes shall be provided at the outer periphery of the grid as indicated in the sketch enclosed in Specification No. ETI/PSI/120 (2/91) with A&C Slip No.1 or latest. The earth electrodes shall be embedded as far away as possible from each other. Mutual separation between them shall usually be not less than 6m. The contractor shall submit detailed design calculation for the earthing system and obtain approval of the design/drawings.

d) **Earthing Grid Conductor**.

The size of the earthing grid conductor shall be decided based on the incoming system voltage and fault level. The size of the grid conductor for fault level upto 12000 MVA will be 32mm dia and above 12000 upto 160000 MVA 36mm dia and above 16000 upto 20000 MVA, 40 dia MS rod respectively.

e) **Earth Electrodes**.

The earth electrodes shall normally be of mild steel galvanised perforated pipe of not less than 40mm nominal bore of about 3m length provided with a spike at one end and welded lug suitable for taking directly MS flat of required size at other end. The pipe shall be embedded vertically into the ground as far as possible except in case of hard rock, it may be buried inclined, the inclination being limited to 30 degree from the vertical. The connection of MS flats to each electrode shall be made through MS links by bolted joints. A typical drawing of one earth electrode installation is indicated in Annexure-1. If the value of earth resistance specified may not be achieved with a reasonable number of electrodes connected in parallel such as in rocky soil or soil of high resistivity, the earth surrounding the electrodes shall be chemically treated by alternative layers of finely divided coke, crushed coal or charcoal and salt at least 150mm all around. However, coke treatment shall be used only where absolutely necessary and such electrodes shall not be situated within 6 m of other metal work. In high embankments, use of electrodes longer than 3 m shall be considered so as to reach the parent soil to achieve earth resistance as specified.

f) **Buried Rail.**

A steel rail of section 52 Kg/m and length about 13 m shall be buried near the track at the traction sub-station at a depth of about 1 m to form part of the earthing system. Two separate and distinct connections shall be made by means of 75 mm x 8 mm MS flats between the earthing grid and the buried rail. The buried rail shall also be connected by means of two separate and distinct connections made with 75 mm x 8 mm MS flats to the non-track circuited rail in a single rail track - circuited section and to the neutral point(s) of impedance bond(s) in a double- rail track circuited section . In case where the feeding post is located separately away from the traction substation, the burried rail shall be provided at the feeding post (where one terminal of the secondary winding of the traction power transformer is grounded).

g) **System earthing** .

One terminal of the secondary winding of each traction transformer shall be earthed directly by connecting it to the earthing grid by means of a 75mm x 8mm MS flat and to the burried rail by means of another 75 mm x 8 mm MS flat. One designated terminal of the secondary of each potential, current and LT supply transformer shall also be connected to the earthing grid by means of two separate distinct earth connections made with 50 mm x 6mm MS flat.

h) **Equipment earthing**.

The metallic frame work of all outdoor equipments such as transformers, circuit breakers, Interrupters & Isolators. As well as steel structures shall be connected to the earthing grid by means of two separate and distinct connections made with MS flat of size 50 mmx 6 mm upto 10000 MVA and by 75 mm x 8 mm MS flats above 10000 MVA upto 20000 MVA. Equipments on the secondary side of the traction power transformer and steel structures shall be connected to the earthing grid by means of two separate and distinct connections made with MS flats of size 50 mm x 6 mm. One connection shall be made with the nearest longitudinal conductor while the other shall be connected with the transverse conductor.

i) **Earthing inside the control room**.

An LT earth circuit shall be provided inside the Control Room by means of 50 mm x 6 mm mild steel flat and connected to the main earth ring by two independent connections made with 50 mm x 6

mm mild steel flat. The metallic frame work of control panels, L.T., AC and DC distribution boards, battery chargers, remote control equipment, cabinets, etc. shall be connected to the earth ring by means of 8 SWG galvanised steel wire.

j) **Earthing of lighting arrestors.**

In addition to the earth electrodes provided for the main earthing grid, an independent earth electrode shall be provided for each lightning arrestor. The earth electrode shall be connected to the ground terminal of the lightning arrestor as well as the main earthing grid by means of two separate and distinct connections made with 50 mm x 6 mm MS flat for 25kV side lightning arrestor, and with 75mm x 8 mm MS flat for the primary side lightning arrestor. The earth electrode shall be provided as close as possible to the lightning arrestor and the connection shall be as short and straight as possible avoiding unnecessary bends. For lightning arrestors provided for the traction transformers, there shall also be a connection as direct as possible from the ground terminal of the lightning arrestor to the frame of the transformer being protected by means of two separate and distinct connections made with 50mm x 6 mm MS flat for 25kV side arrestor and with 75mm x 8mm MS flat for primary side arrestor.

k) **Earthing of fencing uprights and panels**.

Each metallic fencing uprights shall be connected to the main earthing grid by means of two separate and distinct connection made with 50 mm x 6 mm MS flat. In addition, all the metallic fencing panels shall be connected to the uprights by means of two separate and distinct connections made with 6 SWG GI wire. All the metallic door panels shall also be connected to the supporting uprights by means of two separate and distinct connections made with 6 SWG GI wire.

l) **Method of jointing**

All the joints between the MS flats, MS rods or between MS flat and MS rods shall be made by welding only. No soldering shall be permitted. For protection against corrosion, all the welded joints shall be treated with red lead and afterwards thickly coated with bitumen compound.

m) **Painting of MS Flats**.

For protection against corrosion, all the exposed surfaces of earthing connections (MS flats) above ground level shall be given all around two coats of painting to colour grass green, shade-218 of IS:5.

2.1.64 EARTH SCREEN.

The area covered by outdoor sub-station equipment shall be shielded against direct strokes of lightning by an overhead earth screen comprising 45 tone quantity 7/9 SWG, 19/2.5mm galvanised steel stranded wire strung across pinnacles of the metallic structures as indicated in the drawings included in Annexure-1. The earth screen wires shall be fixed not less than 2.5 Mt above the live conductors so as to provide an angle of protection, not exceeding 30 degree to the equipment/busbar below and shall be solidly connected to the sub-station earth circuit by means of 50 mm x 6 mm MS flats.

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PART - II

SECTION-5

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PART-II

CHAPTER -II

FOUNDATIONS

PART-II

CHAPTER -II

FOUNDATIONS

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PART-II

CHAPTER-II

FOUNDATIONS

SCOPE : 2.2.1

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

(b) While casting a foundation, care shall be taken to ensure that no part of it and mast erected therein do not infringe the dimensions given in Schedule of Dimensions as mentioned in Para - 2.1.1 (c) “Indian Railways Schedule of Dimensions".

DESIGN OF FOUNDATION: 2.2.2

(a) SOIL PRESSURE

For design of foundations for traction structures carrying overhead equipment, the Contractor shall determine the type and allowable bearing pressure of soil at suitable intervals and adopt the type and size of foundations, suitable for particular locations with the help of the approved employment schedules. In cases of particularly weak soil, the bearing pressure may have to be determined for each location where so advised by the Purchaser. Soil bearing pressure, using SPT (falling weight equipment) should be determined generally for every 5 kilometer interval or less wherever change of soil is encountered. In general IS code of practice (IS 6403:1981) 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 foundation for masts and gantries at switching stations and booster stations, the Contractor shall determine the type and allowable bearing pressure of soil at the locations of such stations and shall prepare designs for the foundations suitable for each location to suit the bearing pressure of the soil in consultation with the Purchaser.

(b) STRUCTURES CARRYING OVER-HEAD EQUIPMENT

Foundations for traction structures carrying overhead equipment shall be either of the side bearing side gravity or new pure gravity type according to their location, formation of the sub-grade and bearing pressure of the soil. In new filled up soil or cinder formation, pure gravity sand-filled core foundations, or foundations with cast-in-site reinforced concrete piles, or cantilever types foundation with counter-weights or guyed foundations may be adopted.

(c) ON BRIDGE PIERS

Complete design of foundations for traction structure on bridges to suit different locations and local conditions will be furnished by the Purchaser.

(d) MASTS & FABRICATED STRUCTURES AT SWITCHING STATIONS/TSS

Foundations for the masts of gantries at switching stations and TSS shall be of the pure gravity type, the base of which shall rest on consolidated soil.

(e) FENCING POSTS

Foundation for fencing posts shall rest on consolidated soil if the depth of unconsolidated soil is less than 1.5 m below the datum level and shall be rectangular parallel piped in shape. If the depth of unconsolidated soil is more than 1.5 m the foundation block shall rest on reinforced concrete piles cast-in-site or reinforced concrete foundation may be adopted as desired by the Purchaser.

(f) TYPICAL DESIGN

Typical design and drawings of side bearing and new pure gravity and side gravity type foundations are included in the drawings listed in Annexure-1. Employment schedules for standard foundations for

traction structures for various locations and types are also included in the drawings listed in Annexure-1, Part IV.

(g) SPECIAL FOUNDATIONS

(i) 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 especially pile foundations of under reamed type as per RDSO'S standard designs (Reference RDSO'S Drawings No.ETI/C/0062 MOD-B or latest) 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.

(ii) **Foundation in Contact/Buried under Non-aggressive Soil/Ground Water :**

The Foundation Concrete shall be of M-15 Grade. The Core concrete shall be M-20 Grade. It shall be adopted in the areas where concrete is in contact/buried under Non-aggressive soil/Ground water as per IS: 456-2000.

(iii) **Foundation in Coastal Areas:**

The Foundation Concrete shall be of M-20 Grade. The Core concrete shall also be M-20 Grade.
It shall be followed in the areas where concrete is exposed to Coastal Environment as per IS: 456-2000.

(iv) For casting the OHE foundation in Soft Rock and Hard Rock, RDSO drawings mentioned at Sl. No. - 123 of LIST OF STANDARD DRAWINGS AND SPECIFICATIONS (ANNEXURE - 1 of Part-IV) of tender Document.

The decision of the Purchaser with regard to feasibility and suitability of adoption of the alternative design for each type of foundation will be final.

(h) EQUIPMENT PEDESTALS

Pedestals for interrupters and L.T. supply transformers where required, shall be of mass concrete with the base resting on consolidated soil. Pedestal for Power transformers shall be made of mass concrete with base resting on consolidated soil. Foundation for circuit breakers supported on steel structures and for other items of equipments such as isolator, instruments transformers, bus bar support insulators etc. shall be of the pure gravity type, the base of which shall rest on consolidated soil, and shall be left with core holes into which the legs of the supporting structures shall be suitably fixed by grouting.

(j) CABLE TRENCHES

The cable trench shall rest on original ground if the depth of unconsolidated soil is less than 0.5 m. If the depth of the unconsolidated soil is more than 0.5 m., the cable trench shall be made of reinforced cement concrete of approved design supported at suitable intervals on concrete pillars.

BEARING PRESSURE: 2.2.3

(a) GUIDING INFORMATION

Subject to Para 2.2.2 (a) above, the following allowable bearing pressures may generally be expected for various kinds of soil. The information is given for general guidance only.

(i) Average good soil in banks and cutting ... 11,000 kg/sq.m.

(ii) Moorum soil in cutting ... 22,000 kg/sq.m

(iii) New banks & bad soils in banks and cutting ... 5,500 kg/sq.m.

(iv) Black cotton soil-pure gravity foundation shall normally be adopted. However, under reamed pile foundations may be adopted at the option of the Purchaser in limited locations for trial purpose.

In the case of dry black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 16,500 kg/sq.m. the depth of the foundation block being not less than 2.8m. In the case of wet black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 8,000 kg/sq.m.

In the case of hard rock, a hole should be blasted in the rock, or by means of any other drilling and pneumatic method and the mast sealed into it with concrete.

CONCRETE: 2.2.4

Concrete for foundations shall be nominal mix / Ready mix of grade M 10 (or M 15) obtained by mixing cement, coarse aggregate, fine aggregate and water in accordance with proportions given vide Table 3 of IS:456 (Latest version as indicated in Annexure-1) reproduced below. For grouting, muffing, embedding of structures in foundations and for cable trenches at switching stations, nominal mix concrete M 15 (or M 20) obtained by mixing materials in proportions as indicated in Table-3 of IS:456 (Latest version as indicated in Annexure-1) shall be used. Volume batching may be adopted vide clause 9.2.2. of IS:456 (Latest version as indicated in Annexure-1) reproduced below :-
IS: 456-2000 (latest version)

TABLE - 3: PROPORTIONS FOR NOMINAL MIX / READY MIX CONCRETE

(Clause 9.3 and 9.3.1)

Grade of concrete	Total quantity of dry aggregate by mass per 50 kg of cement, to be taken as the sum of the individual masses of the fine and coarse aggregates kg max.	Proportion of fine aggregate of coarse aggregate (by mass)	Quantity of water per 50 kg of cement (max. Liters)
1	2	3	4
M 5	800	Generally 1:2 but subject	60
M 7.5	625	to an upper limitof 1 : 1.5	45
M 10	480	and a lower limit of 1 : 2.5	34
M 15	350		32
M 20	250		30

NOTE: *(i) The proportions of the fine to coarse aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate shall be used.*
(ii) Minimum grade of concrete shall be not less than M - 20 in reinforced concrete work.

Example:

For an average grading of the fine aggregate (that is zone II of Table 4 of IS : 383 (Latest version as indicated in Annexure-1) the proportions shall be 1:1.5, and 1:2 and 1:2.5 for maximum size of aggregate 10 mm, 20 mm and 40 mm respectively.

* Specification for coarse and fine aggregates from natural sources for concrete (second revision).

"Volume batching may be allowed only where weigh-batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have earlier been established. Allowance for bulking shall be made in accordance with IS: 2386 (Part-3) (Latest version as indicated in Annexure-1). The mass volume relationship should be checked as frequently as necessary, the frequency of the given job being determined by Engineer – In charge to ensure that the specified grading is maintained."

In judging the acceptability of the materials, quality of concrete and the method of work, the Purchaser will generally observe the provisions of the "Indian Standard code of Practice for Plain and Reinforced Concrete, IS:456 (Latest version as indicated in Annexure-1). The crushing strength of concrete shall not be less than the limits given below:-

Specified characteristic Compressive strength of 15 cm cubes at 28 days.

Grade of Concrete	At 28 days age
(a) M. 10	10 N/mm^2
(b) M. 15	15 N/mm^2
(c) M 20	20 N/mm^2

NOTE: *(a) Test specimen of works tests shall be taken at the site of work from mixture of concrete ready for pouring into the foundation hole. All tests shall be carried out in accordance with IS: 516* (Latest version as indicated in Annexure-1) *. The sample of concrete from which test specimens are made shall be representative of the entire batch.*

(b) Age is reckoned from the day of casting.

SIZE AND GRADING OF AGGREGATES : 2.2.5

The graded coarse aggregate 40 mm nominal size (table 2 of IS: 383 (Latest version as indicated in Annexure-1)) 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 (Latest version as indicated in Annexure-1) (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 : 2.2.6

After erection of masts in sand-cored foundations, the core hole of the foundation blocks shall be filled with dried sand and covered with a layer of bitumen of 80 mm thickness below 30 mm from top level of the block. . A hemispherical shaped muff shall be provided on such foundations in lieu of standard type.

SINKING OF CONCRETE SHELLS: 2.2.7

Where the water-table is high, one or more sections of reinforced concrete shells may have to be sunk before casting concrete. The size of each of shell shall be 1,200 mm outside dia x 50 mm thick x 600mm high reinforced with 6 mm (1/4") dia rods spaced 150 mm apart, both longitudinally and circumferentially, the concrete shall be of grade M.20 as per provisions of para 2.2.4.

TYPE OF FOUNDATION IN BLACK COTTON SOIL : 2.2.8

The foundations in dry black cotton soil should be of type BC or NBC or any other type as approved by the Purchaser.

CEMENT: 2.2.9

The cement to be used in the construction of PCC / RCC structures should be of Ordinary Portland Cement to IS:269 (Latest version as indicated in Anexure-1) or Portland Pozzolana cement (fly ash based) as per IS: 1489 Pt-I (Latest version as indicated in Anexure-1).

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PART - II

CHAPTER - III

STRUCTURES

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CHAPTER - III

STRUCTURES

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PART - II

CHAPTER - III

STRUCTURES

SCOPE : 2.3.1

(a) This chapter deals with the design of steel structures and steel work for overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations and the specification for steel and prestressed concrete trial mast.
(b) This Chapter deals with the design of all structural steel work including gantry structures, supporting structures and small parts steel work including chairs, brackets and other fabricated steel-work for mounting various equipments, busbars, cables etc. at Traction sub-stations, feeding stations and shunt capacitor banks

TYPES : 2.3.2

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

(i) Broad flange beams.
(ii) Rolled steel joists (I section).
(iii) Fabricated steel Structures (welded/bolted).

Structure/uprights shall generally be embedded in concrete foundation blocks in special cases Structures may be secured by means of holding down bolts. Limited quantity (approx. 700 nos.) of circular spun prestressed concrete masts may also be used at the sole discretion of the Purchaser.

DESIGN : 2.3.3

FOR OHE : 2.3.3.1

(a) STEEL STRUCTURES

Designs for steel Structures shall, except where otherwise Provided, comply with the Indian standard code of practice for use of structural steel in General Building Construction- IS: 800 (Latest version as indicated in Anexure-1). The thickness of smallest steel sections used shall be 5 mm for galvanised members.

(b) All the steel Structures and small part steel for carrying overhead equipment are to be fully galvanised after drilling and fabrication as per specification **ETI/OHE/13 (4/84)** (Latest version as indicated in Anexure-1) and no painted structures are to be used.

FOR TSS : 2.3.3.2

(a) GENERAL

The steel structures may be of riveted, bolted or welded construction as convenient for installation. The thickness of smallest steel section used shall not be less than 6 mm (or 1/4"). Legs of gantry structures/portals and supporting steel work and uprights or busbar supports shall generally be embedded in concrete foundation blocks and for equipment and in special cases secured by means of holding down bolts.

(b) DESIGN

a) All the steel structures like gantries/portals, other supporting members, small part steel work etc. shall be galvanised after fabrication with a minimum value of average mass of zinc coating being not less than 610 g/m^2 as per RDSO's specification No.ETI/OHE/13 (4/84) with Amendment No.1,2 & 3.

b) All designs for special steel work shall be furnished by the Contractor, for approval of the Purchaser. Designs for steel structures shall except where otherwise provided, comply with the "Indian Standard Code of Practice for use of Structural steel in General Building Construction" - IS : 800 - 1984, other relevant IS Specifications and statutory regulations.

c) For purposes of design, all possible loads which may occur in the worst combination shall be considered.

d) **Steel Structures**

For calculation of wind load on structures, conductors and equipment, the basic wind pressure shall be taken as 112.5 Kg/sq.m.

e) For purposes of design of gantries, the tension in the 220 kV incoming/outgoing lines shall be taken as 200 kg. at 4 degree C (without wind) in each conductor and 150 kg. at 4 ^{o}C (without wind) in the earthwire. The tension in the 66 kV strung busbars and earth screen wire at 66/25 kV sub-stations shall not exceed 200 kg. at 4 ^{o}C (without wind).

f) **Uprights and fencing posts**.

Uprights carrying equipment such as potential transformers, current transformers, lightning arrestors, busbar support insulators, shall be made from standard metric steel sections viz. channels, angles or small joists, either single or fabricated.

g) Notwithstanding the provisions contained in I.S. and other regulations referred to in Para 2.3.3.2(b) above regarding permissible deflection, the following should apply.

The deflection at the top of the mast or structure shall be limited to one eightieth (1/80) of its height above foundation.

h) The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

CANTILEVER MASTS: 2.3.4

(a) LOAD

For purposes of design the worst possible combination of all loads that may occur shall be considered.

The load shall include the following (weights to be assumed for design of Structures are shown against important items).

(i) Weight of overhead equipment (1.60 kg/metre for each conventional and 1.32 kg/metre for each composite OHE).

(ii) Weight of bracket supporting the overhead equipment (60 kg/normal bracket)

(iii) Weight of a man (60 kg)

(iv) Weight of an earth wire (0.32 kg/metre).

(v) Weight of feeder, return conductor or other special equipment wherever they occur.

(vi) The effect of eccentricity of vertical and horizontal loads on the bracket due to variation in temperature.

(vii) Wind loads perpendicular and parallel to the track. The wind pressure adopted shall be taken as that indicated in part-III.

(viii) Radial forces on the mast, due to stagger, curvature, anchorage etc.

(ix) Weight of the mast itself.

(x) Any other load or loads that may occur due to special location of the Structures.

(b) DEFLECTION

Notwithstanding the provisions contained in IS:800 (Latest version as indicated in Anexure-1) referred to in para 2.3.3 above regarding permissible deflection, the following shall apply.

(i) The deflection at the top of the mast due to permanent loads shall not exceed 8 cm and the mast shall be so erected that it becomes reasonably vertical after application of permanent loads.

(ii) The additional deflection under maximum wind pressure shall not exceed 8 cm at the level of the contact wire.

(c) TORSION

The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

(d) TYPICAL DESIGN

The typical design of a traction mast is included in the set of standard drawings listed in Annexure-1, part-IV. Employment schedules for standard masts for various locations and types are included in the standard drawings listed in Annexure-1, part IV, to enable selection of suitable type for different locations and local conditions.

ANCHOR MASTS: 2.3.5

(a) Masts at which overhead equipment will be anchored shall also normally be of the same type as those in other locations. Anchor masts shall normally be provided with suitable guys but struts may be permitted in special cases.

(b) DWARF MASTS

At certain locations where due to local conditions it is not feasible to anchor the guy rod on a foundation block in the ground, a dwarf mast shall be used in accordance with approved designs.

HEAD SPANS : 2.3.6 (See paras 2.1.21 and 2.4.19)

(a) **LOAD**

The loads to be considered shall be as detailed in para 2.3.4 (a) as far as applicable and at their worst combination.

(b) **SAG FOR HEAD SPAN WIRE**

The sag of the head span wire shall be approx. one-tenth (1/10) of the span.

(c) **MINIMUM TENSION IN CROSS SPAN & STEADY SPAN WIRES** -

For purpose of design, a minimum tension of 200 kg, shall be ensured in the span wires for worst combination of temperature and wind load.

(d) **DEFLECTION OF MAST**

Deflection at the top of the mast or Structure shall be limited to one-eightieth (1/80th) of its height above foundation.

(e) TYPICAL DESIGN

Typical design for head span mast carrying overhead equipment for 4 tracks will be furnished to the contractor.

PORTALS : 2.3.7 (See 2.1.21)

(a) GENERAL

Portals shall be of fabricated steel of standard types of purchaser's designs. The most important designs are covered by Drawings listed in Annexure-1, part-IV.

(b) LOAD

The load shall be as detailed in para 2.3.4 (a) as applicable.

STRUCTURES ON BRIDGES: 2.3.8

(a) The structure may be either cantilever masts or portals (hinged or fixed at base) depending on the type and condition of bridge pier capping. As far as possible cantilever masts grouted in foundations

blocks on pier will be used. Where this is not possible cantilever masts with holding down bolts or suitable portals (hinged or fixed at the base) may be adopted.

(b) Designs of structures on bridges to suit different locations and local conditions will be furnished to the contractor by the Purchaser.

SPECIAL STRUCTURES : 2.3.9

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: 2.3.10

(a) The setting is the distance from the Central line of the track, on straight or curve to the face of the mast/structure of fitting located on the mast.

(b) On straight and outside of curve, the standard setting shall be as per the relevant drawing included in Annexure-1, Part IV. Minimum setting of structures shall be 2.8 M plus curve allowance as required. Whenever this distance can not be provided, specific approval of Purchaser shall be obtained before erection. Setting of portal upright overlap/ turn-out structures, anchoring structures and other masts carrying more than one OHE will be 3.0 m wherever possible.

(c) EXTRA CLEARANCE ON CURVES

The minimum setting of structures on curves shall be determined by adding to the above minimum figures an extra clearance indicated in the table included in the set of standard drawings listed in Annexure-1, Part-IV.

(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.

(e) STRUCTURES ON PLATFORM

The setting of structures on platform shall be not less than 4.75 m.

(f) STRUCTURES NEAR SIGNALS

In the vicinity of signals, structures shall be located in a manner which shall ensure good visibility where necessary, the setting shall be increased as per the relevant drawing included in Annexure- 1, Part-IV.

(g) SETTING OF STRUCTURES

The value of setting of masts/structures shall be painted on each mast/ structure. The figure shall be 25 mm in size in white on a red background. In addition, the track level shall also be marked on the mast/structure by a horizontal red painted stroke.

NUMBERING OF STRUCTURES CARRYING OVERHEAD EQUIPMENT : 2.3.11

All structures shall be numbered in accordance with the numbering given in the approved overhead equipment layout plans. Enameled/Retro-Reflective number plate shall be provided on each mast or structure as per approved designs (See Annexure-1, Part-IV).

STEEL WORK FOR SWITCHING STATIONS AND GANTRIES: 2.3.12

(a) HORIZONTAL MEMBERS OF GANTRY

Horizontal member of main as well as auxiliary gantry carrying isolator switches, insulators, potential transformers etc. shall be made from steel sections viz. channels, angles and small joists, single or fabricated. They shall preferably be attached to masts by means of clamps to avoid drilling of masts sections.

(b) For purpose of design, all possible loads which may occur in the worst combination shall be considered. The loads shall include the followings:-

(i) Weight of insulators, instrument transformers, isolator switches, busbars, 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 structures 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 that indicated in part-III.

(vi) Weight of men working on the structures.

(vii) Weight of structure itself.

(viii) Erection loads.

(ix) 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) Deleted.

(ii) Maximum tension in the cross feeders at switching stations under worst conditions:-

(1) For spans less than 18 m ... 100 kgf.

(2) For spans more than 18 m ... 200 kgf.

(iii) Maximum tension in longitudinal feeders running parallel to the track at the switching stations under worst conditions.1500 kgf.

(iv) Tension in anchored overhead equipment in case of sectioning and paralleling stations 2,000 kgf.

(d) DEFLECTION OF GANTRY MASTS

Deflection under the permanent loads (at an average temperature of 35°C without wind) at the top of the fabricated structures of mast shall be limited to one eightieth (1/80) of its height above foundation.

(e) Masts of the gantry at which feeder or overhead equipment will be anchored at the switching stations shall normally be provided with suitable guys, but struts shall not be permitted.

(f) CHAIRS AND BRACKETS

Chairs, brackets and supporting steel work carrying potential transformers, lighting arrestors, insulators, etc, shall be made of fabricated steel and be mounted on the main auxiliary gantry preferably by means of clamps to avoid drilling of mast sections.

(g) UPRIGHTS AND FENCING

Uprights carrying operating handles of isolators and fencing posts shall be made from steel sections, viz. channels, angles or small joists, either single or fabricated.

STEEL: 2.3.13

Steel conforming to IS: 2062 (Latest version as indicated in Anexure-1) shall be used for all fabricated steel work.

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