

# HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED



## TENDER DOCUMENT

FOR

**Tender No:** HRIDC/GGN/ELECT/MSIL/2022/01

**Name of Work:** “Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments for (i) Electrification of Maruti Suzuki Railway Yard” and “General Electrical works of Proposed Station Building in Maruti Yard in connection with Railway Siding for Maruti Suzuki India Ltd. MANESAR” and (ii) OHE Modification of PATLI YARD area including Provision of double line Sectioning Post (SP) with CB arrangement & SCADA Equipment at PATLI STATION and electrification of PATLI-MANESAR Single line connectivity in connection with HORC project, in the state of Haryana.

**JUNE -2022**

Estimate Cost of Work: **1821 Lacs**  
Date of Opening of Tender: **14.07.2022**  
Completion Period: **15 Months**

**HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED**

Corporate Office: SCO 17-19, 3<sup>rd</sup> Floor, Sector 17, Chandigarh.

Website: [www.hridc.co.in](http://www.hridc.co.in)  
<https://etendershry.nic.in>

**TABLE OF CONTENTS**

PART	CHAPTER NO	SUBJECT	REF No.	PAGE No.
		PREAMBLE		P-1
PART-I	CHAPTER-I	INSTRUCTIONS TO TENDERERS AND CONDITIONS OF TENDERING	1.1	1101
	CHAPTER-IIA	SPECIAL CONDITIONS OF CONTRACT FOR OHE & SCADA WORK	1.2	A1201
	CHAPTER-IIB	SPECIAL CONDITIONS OF CONTRACT FOR GENERAL SERVICES		B1201
	CHAPTER-III A	PRICES AND PAYMENT FOR OHE	1.3	A1301
	CHAPTER-III B	PRICES AND PAYMENT FOR TSS		B1301
	CHAPTER-III C	PRICES AND PAYMENT FOR SCADA		C1301
	CHAPTER-IV A	EXPLANATORY NOTES OF SCHEDULE OF PRICES FOR OHE	1.4	A1401
	CHAPTER-IV B	EXPLANATORY NOTES OF SCHEDULE OF PRICES FOR TSS		B1401
	CHAPTER-IV C	EXPLANATORY NOTES OF SCHEDULE OF PRICES FOR SCADA		C1401
	CHAPTER-IV D	EXPLANATORY NOTES OF SCHEDULE OF PRICES FOR GENERAL SERVICES		D1401
PART-II	CHAPTER-I	GENERAL SPECIFICATIONS	2.1	2101
	CHAPTER-II	FOUNDATIONS	2.2	2201
	CHAPTER-III	STRUCTURES	2.3	2301
	CHAPTER-IV	EQUIPMENTS, COMPONENTS & MATERIALS	2.4	2401
	CHAPTER-V	DESIGNS & DRAWINGS	2.5	2501
	CHAPTER-VI	ERECTION & INSTALLATION OF EQUIPMENTS	2.6	2601
	CHAPTER-VII	INSPECTION & TESTING	2.7	2701
	CHAPTER-VIII	SWITCHING STATION BUILDING	2.8	2801
PART-III	-	PARTICULAR SPECIFICATIONS	3.0	3001
PART-IV	-	BOQ's FOR OHE, SCADA , GS AND ANNEXURES	-	4001
PART-V	-	FORMS OF TENDERS ETC.	-	5001

## PREAMBLE

### 1. SCOPE OF WORKS:

The tender document consisting of works related to “Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments for (i) Electrification of Maruti Suzuki Railway Yard” and “General Electrical works of Proposed Station Building in Maruti Yard in connection with Railway Siding for Maruti Suzuki India Ltd. MANESAR” and (ii) OHE Modification of PATLI YARD area including Provision of double line Sectioning Post (SP) with CB arrangement & SCADA Equipments at PATLI STATION and electrification of PATLI-MANESAR Single line connectivity in connection with HORC project, in the state of Haryana.

**(A) OHE Works (High Rise OHE): -**

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

**(B) SCADA Works:**

Design, supply, erection, testing and commissioning of Supervisory Control and Data Acquisition (SCADA) equipment's for control of Switching Stations for 25 kV A.C. Single phase, 50 Hz supply.

**(C) Electrification of Station Building and Yard:**

Electrification of Proposed Station Building/Yard including Provision of HIGH MAST TOWER with complete Power supply arrangement at MSIL YARD, MANESAR in the state of Haryana.

**Estimated cost of the tender work is ₹ 18, 21, 11,818.00**

**Breakup is as under: -**

(A)	OHE Works (High Rise)	“Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments, Provision of double line Sectioning Post (SP) with CB arrangement & SCADA Equipments at PATLI STATION and Electrification of PATLI-MANESAR Single line Connectivity including modification of PATLI YARD area.	<b>₹ 153779279.00</b>
(B)	SCADA Work	Design, supply, erection, testing and commissioning of Supervisory Control and Data Acquisition (SCADA) equipment's for control of Switching Stations for 25 kV A.C. Single phase, 50 Hz supply.	<b>₹ 1946160.00</b>
(C)	Electrification of Proposed station Building and Yard	Electrification of Proposed Station Building/Yard including Provision of HIGH MAST TOWER with complete power supply Arrangement at MSIL YARD, MANESAR.	<b>₹ 26386379.00</b>
<b>Total</b>			<b>₹ 182111818.00</b>

**(TOP SHEET)****1.1 Details to be filled by HRIDC:**

Mode of Tender	<b>E-tender (Two Packet System)</b>
Tender Notice No.	<b>HRIDC/GGN/ELECT/MSIL/2022/01</b>
Full name of work	“Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments for (i) Electrification of Maruti Suzuki Railway Yard” and “General Electrical works of Proposed Station Building in Maruti Yard in connection with Railway Siding for Maruti Suzuki India Ltd. MANESAR” and (ii) OHE Modification of PATLI YARD area including Provision of double line Sectioning Post (SP) with CB arrangement & SCADA Equipments at PATLI STATION and electrification of PATLI-MANESAR Single line connectivity in connection with HORC project, in the state of Haryana.
Approx. Cost	<b>INR 18,21,11,818.00 /- (Rupees Eighteen Crore Twenty One Lakhs Eleven Thousand Eight Hundred Eighteen only)</b>
Completion period	<b>15 (Fifteen) Months</b>
Earnest money amount	<b>INR 10,60,600 /- (Rupees Ten Lakhs Sixty Thousand Six Hundred only)</b>
Issue of Tender Notice	Issue of Tender Notice on HRIDC website ( <a href="http://www.hridc.co.in">www.hridc.co.in</a> )
Sale/availability of tender document on e-procurement portal of Haryana Govt.	Tender documents will be available on e-procurement portal Government of Haryana i.e. <a href="https://etenders.hry.nic.in">https://etenders.hry.nic.in</a> and HRIDC website i.e. <a href="http://www.hridc.co.in">www.hridc.co.in</a> on <b>22.06.2022 at 05:00 PM to 14.07.2022 up to 03:00 PM.</b>
Site visit and other related details	The prospective tenderers may contact the following for further details: General Manager/Projects/HRIDC (Email: <a href="mailto:gphridc@gmail.com">gphridc@gmail.com</a> )
Start date for submission of offer on the e-procurement portal of Haryana Govt. i.e. <a href="https://etenders.hry.nic.in">https://etenders.hry.nic.in</a>	<b>07.07.2022 at 05:00 PM</b>
Last date/Time of uploading of tenders	<b>14.07.2022 up to 03:00 PM.</b>
Date/Time of Opening of Tender	Technical Bids will be opened after closing of uploading of tender i.e. <b>14.07.2022 at 03:30 PM.</b> Financial bids of the eligible tenderers would be opened subsequently on

	the date & time to be notified later on.
--	------------------------------------------

**1.2 PRECAUTIONS TO BE TAKEN FOR PREPARING LEGAL DOCUMENTS  
(For guidance to Tenderer):**

**(a) Non-Judicial Stamp Paper**

- i) Should have been purchased in the name of the Company/firm/executants.
- ii) Should be purchased from the Place/State where the document is being executed.
- iii) Values of the non-judicial stamp paper (NJSP) should be as mentioned in Tender conditions, where value of NJSP is not mentioned in the tender conditions, value of NJSP should as per the law of the state in which the document is being executed.
- iv) Date of purchase of Non-Judicial stamp paper should be prior from the date of execution of document.

**(b) Signature on the document**

- i) The document should be signed on each page and also at the appropriate place meant for signature of executants/deponent.
- ii) Signatory/executants should ensure that on the date of signing the document he/she has valid authority/attorney in his/her favor for signing.
- iii) In affidavit declaration clause as well as verification clause both should be signed by deponent/executants.
- iv) Where the document requires witnessing, it should be duly signed by witnesses along with their names and addresses.
- v) On Power of Attorney, signatures of the Attorney holder should also be got done and attested by executants.

**(c) Format of the document**

- i) Where the format has been prescribed by HRIDC, the document should be executed in that format.
- ii) Date and place of execution should always be mentioned on the document.

**(d) Notarization of document**

- i) The document should be duly attested (signed and stamped) by notary public on each page.
- ii) The seal of the notary public should contain his name, area of practice and Registration number.
- iii) Notaries stamps of appropriate value wherever required should be affixed on the document.

**TENDER NOTICE**

**2.0** The Chief Project Manager/HRIDC, , for and on behalf of **Haryana Rail Infrastructure Development Corporation** invites open e-tender under **Two-Packet System** for the following work:

<b>S. No.</b>	<b>Name of work</b>	<b>Approx. Cost/ Earnest Money</b>	<b>Similar nature of work/ Period of completion</b>	<b>Cost of tender document/ E-service Fee</b>
1	<p><b>Name of Work:</b> "Design, Supply, Erection, Testing &amp; Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments for (i) Electrification of Maruti Suzuki Railway Yard" and "General Electrical works of Proposed Station Building in Maruti Yard in connection with Railway Siding for Maruti Suzuki India Ltd. MANESAR" and (ii) OHE Modification of PATLI YARD area including Provision of double line Sectioning Post (SP) with CB arrangement &amp; SCADA Equipments at PATLI STATION and electrification of PATLI-MANESAR Single line connectivity in connection with HORC project, in the state of Haryana.</p>	<p><b>Approx. Cost:</b>  <b>INR 18,21,11,818.00/- (Rupees Eighteen Crore Twenty-One Lakhs Eleven Thousand Eight Hundred Eighteen only)</b></p> <p><b>Earnest Money/Bid Security:</b>  <b>INR 10,60,600 /- (Rupees Ten Lakhs Sixty Thousand Six Hundred only)</b></p>	<p><b>(1) Following works will be treated as of similar nature:"</b></p> <p>Design, Supply, Erection, Testing &amp; Commissioning of 25 kV, 50 Hz, AC, Single phase, Traction Overhead equipment, Switching Stations, Booster Transformer Stations and LT Supply Transformer Stations including foundations, structures and all Ancillary Equipment.</p> <p><b>Completion Period:</b>  <b>15 ( Fifteen) Months</b></p>	<p><b>Cost of tender document:</b>  <b>INR 20,000/- only (including GST @18%)</b></p> <p><b>E-service Fee:</b>  <b>INR 1,000/- (Rupees One thousand + 18% GST)</b></p>

**NOTE: TENDER/OFFER WITHOUT EARNEST MONEY WILL BE SUMMARILY REJECTED.**

## 2.1 Critical Dates

Code	Activity	Date
D	Issue of Tender Notice on HRIDC Website (i.e. <a href="http://www.hridc.co.in">www.hridc.co.in</a> )	18.06.2022
D1= D + 4 days	Availability of tender documents on e-procurement portal of Government of Haryana (i.e. <a href="http://www.etenders.hry.nic.in">www.etenders.hry.nic.in</a> ) and HRIDC website (i.e. <a href="http://www.hridc.co.in">www.hridc.co.in</a> )	22.06.2022
D2=D+12 days	Date of pre- tender meeting	30.06.2022
D3 = D +19 days	Start of submission of offer on e-procurement portal i.e. <a href="https://etenders.hry.nic.in">https://etenders.hry.nic.in</a>	07.07.2022
D4 = D +26 days	<ul style="list-style-type: none"> <li>End of availability of tender documents at <a href="https://etenders.hry.nic.in">https://etenders.hry.nic.in</a></li> <li>Opening of tender/ offer</li> </ul> <p><b>Note:</b> This is also the last date of uploading of completed offers by the bidders</p>	14.07.2022
The reference time for all the above activities is indicated in Top Sheet above.		
<b>NOTE:</b> In case the intended date for opening of tenders is declared a holiday, the tenders will be opened on the next working day at the same time.		

**2.2 Validity of Offer:** 120 days from the date of opening of Technical Bid (D4).

## 2.3 Tender Documents to be submitted by Tenderer(s) and information regarding Tender:

- (i) The tenders are to be uploaded up to date D4 along with scanned copy of all the requisite documents mentioned in **Annexure-A of this chapter**. By all Tenderer(s) failing which the offer will be considered incomplete and action shall be taken as given in **Annexure-A of this chapter**.
- (ii) Technical Bids will be opened on Date D4 immediately after closing of uploading of tenders.
- (iii) Financial bids of the eligible tenderers would be opened subsequently on the date and time to be notified later on.
- (iv) Requisite Earnest Money Cost of tender document and E-service fee shall be deposited by all the tenderer(s) via **ONLINE MODE** failing which the offer will be **summarily rejected**.
- v) Tenderer(s) to please note that after opening of tender, any document/credential pertaining to technical, financial eligibility, constitution of firm etc. shall neither be asked nor be entertained/considered under any circumstances and no claim or representation whatsoever from

the tenderer in this regard shall be entertained. **Scanned copy of the documents, uploaded by the Tenderer, shall be clear & readable.** However, HRIDC reserves the right to ask for any clarification on the documents/credentials already submitted by the tenderer along with the offer.

(vi) Tenderer may have to submit the original documents in physical form at short notice whenever asked by HRIDC at any stage of tender evaluation process or even after finalization of tender.

(vii) The tenderers are requested to carefully peruse the Tender Documents and upload all requisite documents/credentials along with the offer. **Documents submitted/uploaded previously or along with another tender currently under consideration shall not be considered while evaluating the present tender.**

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

(ix) In E-tender, all submissions of documents are to be uploaded on the e-procurement portal as indicated in the tender document. There may be last minute hic-cups and delay in uploading the Earnest Money and documents etc. Tenderer(s)/Prospective bidders are advised to upload their offer well in time. HRIDC will not be responsible for any delay/non submission of offer due to any reason whatsoever.

(x) The tenderer (s) shall visit the site of work and acquaint himself/themselves with the conditions of work viz. approach roads and accessibility, nature of soil/rock, availability of materials, electric power, water for work and drinking purposes, site for labour camps, stores, Godowns, extent of lead/lift in work, availability of skilled and unskilled labour etc. that may be encountered in the course of execution of work. In short, he/they should familiarize himself/themselves fully with the conditions of the site and furnish a certificate to this effect, in the Proforma appended as **FORM-43**.

**(xi) Two Packet System.**

The tender uploaded by the tenderer(s) will consist of TWO Packets/Files i.e. Packet-I/File-I and Packet-II/File-II.

1. **“Packet-I/File-I” – Technical Bid** will be opened after closing of uploading of tender (D4) i.e. **14.07.2022 at 03:30 PM**. The Bid shall contain (a) Tender form (First sheet), (b) All requisite documents mentioned in **Annexure-A of this chapter**. (c) Complete Tender document along with Corrigendum/Addendum if any issued time to time. Tenderers are requested to ensure that all such documents and Forms/ Annexure duly filled and signed by legally authorized signatory are uploaded, completed in all respects with their Packet-I/File-I failing which his/their offer is likely to be rejected/summarily rejected, as applicable.

2. **Packet II/File II-FINANCIAL BID (SECOND PACKET)** shall contain the Financial Bid only and will be uploaded along with File-I/Packet-I on or before the tender opening date D4. Financial Bid of only those tenderer(s) will be opened whose Packet-I/File-I (Technical Bid) is found eligible as per Tender Conditions. The time, date and venue of opening of Packet-II/File-II (Financial Bids) shall be notified to the successful tenderer(s) after evaluation of Packet-I/File-I (Technical Bids). The same shall be opened on due date in the presence of tenderers/their representatives as may wish to attend the same.



**Further, offered rates should be filled up in the BoQ at specified space i.e. Financial Bid Sheet (Packet-II/File-II). Rates offered in any other Performa/Form shall be summarily rejected.**

(xii) Tenderer should keep the validity of their offer for **120 days**. Any deviation will not be accepted under any circumstances.

(xiii) **Tenderer(s) participating in this tender are deemed to have accepted all the conditions given in Tender document.**

(xiv) The tenderer(s) may note that the HRIDC reserves its right to either accept or reject any Bid/s without assigning any reasons whatsoever and tenderer(s) shall have no claim(s) on this account.

(xv) Prospective tenderer(s) may contact CHIEF PROJECT MANAGER, **Haryana Rail Infrastructure Development Corporation 5<sup>th</sup> Floor, RailTel Tower, Plot No. 143, Sector 44, Gurugram, Haryana, 122003** for obtaining further clarifications, if required, **during the working hours.**

**(xvi) Instructions regarding GST**

- Works contracts shall be treated as supply of services as per Schedule–II GST Act.
- GST Act and Rules issued from time to time by the Government/ concerned authorities shall be applicable
- Contractor/ suppliers/ service providers/ parties shall register their firms State wise under GSTIN (GST Identification Number) and submit at the time of opening of tender or before the signing the agreement and shall mention place of business, registered office address and email id.

(xvii) The cost of the Tender Documents is non-refundable and Tender Document is not transferable.

(xviii) The detailed e-tender notice is available on e-procurement portal of Government of Haryana i.e. <https://etenders.hry.nic.in>.

(xix) As the work indicated in this tender document is to be executed in close vicinity to the running railway track, the Tenderers are expected to meet the required safety guidelines (also mentioned in this document) and keep a constant vigil on safety related aspects. Tenderers are also advised to visit the site before submission of their tenders to understand the need for adopting safety related precautions at the work site.

(xx) Provisions of Make in India Policy 2017 issued by Govt. of India, as amended from time

To time, shall be followed for consideration of tenders.

(xxi) The tenderers who desire to participate against e-tenders, are advised to electronically register themselves on website <https://etenders.hry.nic.in> for which they would require to obtain Class III digital certificate (if already not obtained) issued by CCA under IT Act-2000. The detailed process for the same is explained in the **FORM-44** (Instructions regarding electronic tendering system)

(xxii) All other terms and conditions in respect of above tender are given in the tender document.

(xxiii) Only e-tenders will be accepted, and tenders submitted in any other form will be summarily rejected.

**(xxiv) The tenderer(s) shall abide by the Indian Railways Standard General Conditions of Contract (April 2022) with all corrections slips issued time to time, wherever applicable, in addition to the conditions mentioned in this tender document.**

Chief Project Manager/HRIDC  
Plot No. 143, 5th Floor RailTel Tower,  
Sector-44, Gurugram, Haryana 122003

### 3. FOREIGN EXCHANGE:

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

### 4. EARNEST MONEY (EMD) / BID SECURITY:

(1)(a) The tenderer shall be required to submit the EMD/ Bid Security 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 Bid Security shall be as under:

Value of the Work	EMD/Bid Security
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 Bid Security shall be rounded off to the nearest ₹100. This Bid Security 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 Bid Security detailed above.
- (iii) Labour Cooperative Societies shall submit only 50% of above Bid Security detailed above.

(b) 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.

(c) If his tender is accepted, this Bid Security mentioned in sub para (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 Bid Security of other Tenderers shall, save as herein before provided, be returned to them, but the Railway shall not be responsible for any loss or depreciation that may happen thereto while in their possession, nor be liable to pay interest thereon.

- (2) The Bid Security shall be submitted as Bank Guarantee bond from a scheduled commercial bank of India or as mentioned in tender documents. The Bank Guarantee bond shall be as per FORM-54 and shall be valid for a period of 90days beyond the bid validity period.
- (3) **In case, submission of Bid Security in the form of Bank Guarantee, following shall be ensured:**
- i. A scanned copy of the Bank Guarantee shall be uploaded on e-Procurement Portal while applying to the tender.
  - ii. The original Bank Guarantee should be delivered in person to the official nominated as indicated in the tender document within 5 working days of deadline of submission of bids.
  - iii. Non submission of scanned copy of Bank Guarantee with the bid on e-tendering portal and/or non submission of original Bank Guarantee within the specified period shall lead to summary rejection of bid.
  - iv. The Tender Security shall remain valid for a period of 90 days beyond the validity period for the Tender.
  - v. The details of the BG, physically submitted should match with the details available in the scanned copy and the data entered during bid submission time, failing which the bid will be rejected
  - vi. The Bank Guarantee shall be placed in an envelope, which shall be sealed. The envelope shall clearly bear the identification "**Bid for the \*\*\*\*\* Project**" and shall clearly indicate the name and address of the Bidder. In addition, the Bid Due Date should be indicated on the right hand top corner of the envelope.
  - vii. The envelope shall be addressed to the officer and address as mentioned in the tender document.
  - viii. If the envelope is not sealed and marked as instructed above, the Authority assumes no responsibility for the misplacement or premature opening of the contents of the Bid submitted and consequent losses, if any, suffered by the Bidder.

#### **5.1 SECURITY DEPOSIT: -**

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

Balance of Security Deposit may be deposited by the Contractor in cash or Term Deposit Receipt issued from Scheduled commercial bank of India or irrevocable Bank Guarantee bond issued from Scheduled commercial bank of India, or may be recovered at the rate of 6% of the bill amount till the full Security Deposit is recovered. Provided also that in case of defaulting Contractor, the HRIDC may retain any amount due for payment to the Contractor on the pending "on account bills" so that the amounts so retained

(including amount guaranteed through Performance Guarantee) may not exceed 10% of the total value of the contract.

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

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

**5.2 (i) Refund of Security Deposit:** Security Deposit mentioned in sub clause (5) above shall be returned to the Contractor along with or after, the following:

- (a) Final Payment of the Contract as per clause 51. (1)
- (b) Execution of Final Supplementary Agreement or Certification by Engineer that HRIDC has No Claim on Contractor and
- (c) Maintenance Certificate issued, on expiry of the maintenance period (Guarantee/warranty period) as per clause 50. (1), in case applicable.
- (d) The warranty period of all types of LED light fittings in general services work is 60 months. SD amount (5% of total LED fitting cost) will be released after completion of that warranty period.

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

**5.2(iii)** No interest shall be payable upon the Bid Security and Security Deposit or amounts payable to the Contractor under the Contract, but Government Securities deposited in terms of Sub-Clause 22(b) of this clause will be payable with interest accrued thereon.

**5.1 DELETED**

**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 mobilization advance, or any modification in respect of mobilization advance, on account/ progress payment, recovery rate, insurance warranty, extension in completion period, facilities to be provided by the Engineer or any reimbursement of taxes etc. are liable to be rejected without assigning any reason thereto and the decision of the HRIDC 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 ENGINEER:**

All materials required for completion of the work shall be supplied by contractor.

**7. BOOSTER TRANSFORMERS**

-DELETED-

**8. DESIGN SPEED**

The traction overhead equipment for main line is made suitable for maximum speed of 140 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 (HIGH RISE) all copper OHE with 65 sqmm Cadmium-Copper Catenary and 107 sqmm grooved HDDB Contact wire.

**10.1 PERIOD OF COMPLETION**

The entire work including commissioning of OHE, SCADA and General Services works shall be completed within **15 (Fifteen) Months** from the date of issue of the 'Letter of Acceptance' to the tenderer.

**10.2 VALIDITY OF OFFER:** - 120 days from the date of opening of tender.

**11. TENDER BID**

This is a 'Two packet e-tendering **without e-reverse auction**. The Tender bid shall be uploaded on <https://etenders.hry.nic.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 2.3 (XI) of this chapter.

**12.0 ELIGIBILITY CRITERIA**

Only such tenderer(s) who satisfy the following eligibility criteria shall be considered: -

**The Contractor should have valid Electrical Contractor License for HT/EHT voltage equal to or more than 25 kV issue by Government and submit along with tender document, if valid Electrical Contractor License is not submitted along with tender documents then offer will be summarily rejected.**

**12.1 Technical Eligibility Criteria:**

The tenderer must have successfully completed during last 07 (Seven) years, ending last day of month previous to the one in which tender is invited:

**For All type of work: -**

- **Three similar works of OHE erection**, each costing not less than the amount equal to **30%** of advertised value of the tender.

**Or**

- **Two similar works of OHE erection**, each costing not less than the amount equal to **40%** of advertised value of the tender.

**Or**

- **One similar work of OHE erection**, costing not less than the amount equal to **60%** of advertised value of the tender.

Note: - The work of OHE in a contract shall be considered as completed, if Provisional Acceptance /Final Acceptance Certificate is issued for all the sections of a contract.

**Definition of SIMILAR Work: -**

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

**12.2 Financial Eligibility Criteria**

The tenderer must have minimum average annual contractual turnover of 1.5 V/N crores; where V= Advertised value of the tender in crores of Rupees N= Number of years prescribed for completion of work for which bids have been invited. The average annual contractual turnover shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover. The tenderers shall submit requisite information as per Annexure-VIB, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet.

12.3 Bid Capacity: **These criteria shall not be applicable for this tender.**

12.4 ---- Deleted -----

**13. Tenderer's Credentials: -**

- 13(a) Documents testifying tenderer previous experience and financial status should be produced along with 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 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 are/is qualifying the Qualifying Criteria mentioned in the Tender Document.

(v) The HRIDC 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 HRIDC, 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 HRIDC shall not relieve the bidder of its obligations or liabilities hereunder nor will it affect any rights of the HRIDC there under.

(vi) (a) In case of any information submitted by tenderer is found to be false forged or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the tender Earnest Money Deposit besides banning of business for a period of up to 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. Bid security/ Earnest Money Deposit (EMD), Performance Guarantee and Security Deposit available with the HRIDC 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 up to 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 who such works is 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 Organization:** - The tenderers should have adequate engineering organizations required for the execution of the work. List of Personnel Organization 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

#### **14.0 JOINT VENTURE (JV) IN WORKS TENDERS**

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 Participation of Joint Venture (JV) in Works Tender: This Para shall be applicable for works tenders wherein tender documents provide for the same.

14.1.1 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 up to 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. The tender form can however be submitted by JV or any of its constituent member or any person authorized by JV through Power of Attorney to submit tender.

14.5 Bid Security shall be submitted by JV or authorized person of JV either as:

- (i) Cash through e-payment gateway or as mentioned in tender document, or
- (ii) Bank Guarantee bond either in the name of JV, or in the name of all members of JV as per MOU irrespective of their share in the JV if the JV has not been constituted legally till the date of submission of tender.

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 along with 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.

14.7 Once the tender is submitted, the MoU shall not normally be modified / altered / terminated during the validity of the tender. In case the tenderer fails to observe/comply with this stipulation, the full Bid Security 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 normally be allowed to be modified after submission of the bid by the JV, except when modification becomes inevitable due to succession laws etc., provided further that there is no change in qualification of minimum eligibility criteria by JV after change of composition. 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 normally 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 JV entity to whom the work has been awarded, with the same shareholding pattern as was declared in the MOU/JV Agreement submitted along with the tender, shall be got registered before the Registrar of the Companies under 'The Companies Act -2013' (in case JV entity is to be registered as Company) or before the Registrar/Sub-Registrar under the 'The Indian Partnership Act, 1932' (in case JV entity is to be registered as Partnership Firm) or under 'The LLP Act 2008' (in case JV entity is to be registered as 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 Bid Security and other dues payable to the Contractor under this contract. The entity so registered, in the registered documents, shall have, inter-alia, following Clauses:

14.11.1 Joint and Several Liability - Members of the entity 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 members of the entity 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 Registered Entity - 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 Registered Entity 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 Lead member 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 along with 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:

- (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
- (ii) 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,
- (iii) A notarized or registered copy of Power of Attorney in favors of the individual to sign the MOU/JV Agreement on behalf of the partnership firm and create liability against the firm.
- (iv) 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 from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.

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

- (i) A copy of notarized affidavit on Stamp Paper declaring that his Concern is a proprietary Concern and he is sole proprietor of the Concern OR he who is signing the affidavit on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.

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

- (i) A copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement,
- (ii) The copies of MOA (Memorandum of Association) / AOA (Articles of Association) of the company
- (iii) A copy of Certificate of Incorporation
- (iv) A copy of Authorization/copy of Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favors 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 In case one or more members of the JV is/are LLP firm/s, the following documents shall be submitted:

- (i) A copy of LLP Agreement
- (ii) A copy of Certificate of Incorporation of LLP
- (iii) A copy of resolution passed by partners of LLP firm, permitting the Firm to enter into a JV agreement
- (iv) A copy of Authorization /copy of Power of Attorney issued by the LLP firm (backed by resolution passed by the Partners) in favors of the individual, to sign the tender and/or sign the MOU/ JV agreement on behalf of the LLP and create liability against the LLP.
- (v) An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry / Department of the Govt. of India from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.

14.14.5 In case one or more members of the JV is/are Society/s or Trust/s, the following documents shall be submitted:

- (i) A copy of Certificate of Registration
- (ii) A copy of Memorandum of Association of Society/Trust Deed
- (iii) A copy of Rules & Regulations of the Society
- (iv) A copy of Power of Attorney, in favors of the individual to sign the tender documents and create liability against the Society/Trust.

14.14.6 All other documents in terms of Para 12.0 &12.1 above.

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 (non-lead) member(s) of JV, who is/ are not satisfying the technical eligibility for the work

as per para 12.1 above, shall have technical capacity of minimum 25% of the cost of work i.e., each non-lead member of JV member must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum of 25% of advertised value of the tender.

(b) For works with composite components

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 component(s) 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 (non-lead) member(s) of JV, who is/ are not satisfying the technical eligibility for any component of the work as per para 12.1 above, shall have technical capacity of minimum 25% of the cost of any component of work mentioned in technical eligibility criteria. i.e., each other (non-lead) member of must have satisfactorily completed or substantially completed during the last 07 (seven) years, ending last day of month previous to the one in which tender is invited, one similar single work for a minimum of 25% of cost of any component of work mentioned in technical eligibility criteria.

Note for Para 14.15.1:

1. 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.

2. 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 member of JV shall not be less than 51% 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 as per the Indian Partnership Act, prior to submission of tender.

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 normally 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 submission 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 Bid Security shall be forfeited.

If any Partner/s withdraws from the firm after submission of the tender and before the award of the contract, the offer shall be rejected and Bid Security of the tenderer will be forfeited. If any new partner joins the firm after submission 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 the Standard 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 Bid Security shall be submitted by partnership firm. The Bid Security submitted in the name of any individual partner or in the name of authorized partner (s) shall not be considered.

15.7 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.

15.8 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.

15.9 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 Standard 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.

15.10 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:

- (i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.
- (ii) A notarized or registered copy of Power of Attorney in favors of the individual to tender for the work, sign the agreement etc. and create liability against the firm.
- (iii) 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 from participation in tenders / contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were / are partners/members. Any Concealment / wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.
- (iv) All other documents in terms of Para 12 above.

15.11 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 Para 12 of the above.

## 16.

16.1 (a) **PREBID MEETING:** A Pre-Tender meeting will be held on **30.06.2022 at 11:00 AM** through online video Conferencing as well as offline in the Conference room of HRIDC office, Plot No 143, 5th Floor, Railtel Tower, Sector-44, Gurugram, Haryana-122003.

(b) **Pre-bid Queries:** Tenderers shall review the tender documents in a detailed manner, conduct site inspections at their own cost and carry out a detailed review of drawings for the works mentioned in this tender document. Further, in case of queries/ clarifications, if any, Tenderers shall send their pre-bid queries to HRIDC through mail on the email id **horc.etendering@gmail.com** clearly mentioning their name as well as the name of the tender document at least 3 days before the scheduled date for the Pre-bid meeting. Additionally, Tenderers can also send their pre-bid queries through registered post to the office of Chief Project Manager, Haryana Rail Infrastructure Development Corporation, 5 th Floor, Railtel Tower, Plot No. 143, Sector 44, Gurugram, Haryana, 122003 at least 2 days before the scheduled date for the Pre-bid meeting

Note: A maximum of two representatives of each Tenderer shall be allowed to participate on production of an authority letter from the Tenderer.

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

Tender is invited on e- procurement portal of Government of Haryana i.e. <https://etenders.hry.nic.in> and HRIDC website [www.hridc.co.in](http://www.hridc.co.in). All the details are available on the website. Tender submitted in any other mode other than through <https://etenders.hry.nic.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: - 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 Project Manager  
HRIDC,  
Gurugram -122003

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

(b) After award of contract:

The Chief Project Manager  
HRIDC,  
Gurugram -122003

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

(ii) For Security Deposit:

The Chief Project Manager  
HRIDC,  
Gurugram -122003

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

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

The DGM/Electrical  
HRIDC,  
Gurugram- 122003

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

(iv) For matters relating to basic design and drawings for fittings, components equipment's and prototype tests: -

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

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

The DGM/Electrical  
HRIDC,  
Gurugram- 122003

Or officers nominated by him.

**18.0 QUANTITIES APPROXIMATE**

Quantities given in various Schedule-1, Section-1 to Section-12 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, categorized 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. 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 rate at which payment are to made shall be arrived at by loading SOR rate uniformly for each item with escalation of estimate (% above SOR) and loading of percentages quoted by the tenderer over advertised value of the section.** 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 & 12)**

The rates given in Schedule-1, Section-6 & 7 & 12 are 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 & 12 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 shall liable to be rejected.

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

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) .....Deleted.....**

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) -DELETED-

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

The rates given in Schedule-2 section -1 are the rates for Non SOR items for general services work. The tenderer are advised to quote only single percentage, below/at par/above against 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-2 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 shall liable to be rejected.

20. **INDIAN RAILWAYS STANDARD GENERAL CONDITIONS OF CONTRACT:**

'Indian Railways Standard General Conditions of Contract- **April-2022** 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 or HRIDC office.

**In case of any difference between provisions of GCC April-2022 and any condition contained in this tender document, the provisions of GCC- April-2022 will prevail, unless stated otherwise.**

21. **COST OF TENDER DOCUMENT:**

Tender Documents will be available on the e-procurement portal <https://etenders.hry.nic.in> from **22.06.2022 at 05:00 PM to 14.07.2022 up to 03:00 PM** (D4). The cost of Tender Document will have to be deposited ONLINE. The cost of tender document is Rs. 20,000/- (including GST @ 18%). This should be paid separately and not included in the Earnest Money of tender.

22. **PERFORMANCE GUARANTEE:**

The procedure for obtaining Performance Guarantee is outlined below:

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 up to 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 22<sup>nd</sup> day after the date of issue of LOA. Further, if the 60thday happens to be a declared holiday in the concerned office of the Railway, submission of PG can be accepted on the next working day.

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

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

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

(i) Irrevocable Bank Guarantee;



- (ii) Government Securities including State Loan Bonds at 5% below the market value;
  - (iii) Pay Orders and Demand Drafts tendered by any Scheduled Commercial Bank of India;
  - (iv) Guarantee Bonds executed or Deposits Receipts tendered by any Scheduled Commercial Bank of India;
  - (v) Deposit in the Post Office Saving Bank;
  - (vi) Deposit in the National Savings Certificates;
  - (vii) Twelve years National Defense Certificates;
  - (viii) Ten years Defense Deposits;
  - (ix) National Defense Bonds and
  - (x) Unit Trust Certificates at 5% below market value or at the face value whichever is less. Also, FDR in favor 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 up to 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 is based on original contract value and shall not change due to subsequent variation(s) in the original contract value.
- (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.
- (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 these conditions.

**23. e-Payment**

Tenderers are required to submit their bank details in the Performa 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 HRIDC which either HRIDC has supplied to him or for which he has taken any payment (including ONA) from HRIDC.

**25.** Bank Guarantees against Security Deposit, Performance Guarantee, Mobilization 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).

**Annexure- A****Scanned copy of the Documents to be uploaded along with offer**

S.No.	Document	Required in the form	If Not submitted along with the tender, then
1.	Cost of Tender Document (in terms of Clause 21.0 of this chapter)	ONLINE MODE (No documentary proof required)	<b>Summarily Rejected</b>
2.	Earnest Money Deposit (in terms of Clause 4.0 of this chapter)	ONLINE MODE (No documentary proof required)	<b>Summarily Rejected</b>
3.	E-Service Fee	ONLINE MODE (No documentary proof required)	<b>Summarily Rejected</b>
4.	Constitution of Firm documents		<b>Summarily Rejected</b>
(A)	In case of Sole Proprietorship Firm	(i) A copy of notarized Affidavit certifying the Sole Proprietorship of the firm. <b>(Standard Affidavit as per Form-30)</b>  (ii) An undertaking that he/Sole Proprietorship Firm is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract <b>(April-2022)</b> .	
(B)	In case of HUF	i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the	

		<p>authority, power and consent given by other members to act on behalf of HUF.</p> <p>ii) An undertaking that the HUF is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which HUF was / is a partner/member. Concealment /wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract <b>(April-2022)</b></p>	
(C)	In case of a "Partnership Firm/Concern"	<p>(i) Notary certified copy of the Partnership Deed.</p> <p>(ii) Document(s) in support of Registration of firm with Registrar of firms viz. Registration certificate/ Form- A &amp; Form-B/ Form C (as applicable) etc. issued by Registrar of firms.</p> <p>(iii) Power of Attorney (duly notarized/registered) in favors of the individual signing the tender documents, agreement and create liability against the Firm. <b>(Standard Performa as per Form-31)</b></p> <p>iii) An undertaking by all the partners of the Partnership Firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which HUF was / is a partner/member. Concealment /wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract <b>(April-2022)</b></p>	
(D)	In case of a "JV Firm"	<p>(i) A copy of MOU/JV Agreement duly notarized in accordance with the <b>Form-23</b> to "General Tender Conditions and Instructions to Tenderers" of Tender Document, duly signed by the Power of Attorney (POA) holders/authorized signatories of all the constituents/members of the JV.</p> <p>(ii) Power of Attorney/ authorization duly Notarized by all JV constituents, in favors of the individual signing the tender document on behalf of the JV. <b>(Standard Performa as per Annexure 32)</b></p> <p>(iii) An undertaking that the JV is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other</p>	

		<p>Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which HUF was / is a partner/member. Concealment/wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract <b>(April-2022)</b></p>
(D) (i)	<p>In case one or more of the members of the JV Firm is/ are Partnership Firm(s), following documents shall be submitted:</p>	<p>(i) Notary certified copy of the Partnership Deed and document(s) in support of registration of firm with registrar of firms viz. Registration certificate/ Form-A &amp; Form-B/Form C (as applicable) etc. issued by registrar of firms;</p> <p>(ii) 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 of appropriate value <b>(Standard Performa as per FORM-33)</b></p> <p>(iii) Power of Attorney (duly notarized/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. <b>(Standard Performa as per FORM-34)</b></p> <p>iv) An undertaking by all the partners of the Partnership Firm that they are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which HUF was / is a partner/member. Concealment /wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract <b>(April-2022)</b></p>
(D) (ii)	<p>In case one or more of the members of the JV Firm is/ are Proprietary Firm or HUF, following documents shall be submitted:</p>	<p>(i) A copy of notarized affidavit on Stamp Paper confirming 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. <b>(Standard Affidavit as per FORM-35)</b></p> <p>(ii) An undertaking that he/Sole Proprietary firm/HUF is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General</p>

		Conditions of Contract ( <b>April-2022</b> ).
(D) (iii)	In case one or more members of JV is/ are Limited companies, the following documents shall be submitted:	<p>(i) A notary certified copy resolutions of the Directors of the Company, permitting the company to enter into a JV agreement, authorizing MD or one of the Directors or Managers of the Company to sign JV MOU/Agreement and such other documents required to be signed on behalf of the Company and enter into liability against the Company and/or do any other act on behalf of the Company. <b>(Standard Performa as per FORM-36)</b></p> <p>(ii) Notarized Copy of <b>Memorandum and Articles of Association</b> of the Company duly registered as per prevailing law;</p> <p>(iii) A copy of Certificate of Incorporation</p> <p>(iv) 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 creates liability against the company. <b>(Standard Performa as per FORM-37)</b></p> <p>(v) An undertaking that the Company is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract (<b>April-2022</b>).</p>
(D) (iv)	In case one or more members of JV is/are LLP firm, the following documents shall be submitted/:	<p>(i) A notarized copy of certificate of incorporation and LLP agreement;</p> <p>(ii) A notarized copy of resolution of the partners of LLP, permitting the LLP to enter into a JV agreement, authorizing one of the partners of LLP to sign JV MOU/agreement and such other documents required to be signed on behalf of the LLP and to create liability against the LLP and/or to do any other act on behalf of LLP. <b>(Standard Performa as per Annexure FORM-38)</b></p> <p>(iii) A notarized/ registered copy of authorization/copy of power of attorney issued by the LLP (backed by resolution of partners) in favors of individual to sign the tender, sign MOU/JV agreement on behalf of the LLP and creates liability against the LLP. <b>(Standard Performa as per FORM-39)</b></p>

		<p>(iv) An undertaking that LLP firm is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract (<b>April-2022</b>).</p>
(E)	In case of a "Company" registered under Companies Act-2013	<p>(i) Copy of the MOA (Memorandum of Association)/AOA (Articles of Association) of the Company;</p> <p>(ii) A copy of Certificate of Incorporation</p> <p>(iii) A copy of notarized/registered Power of Attorney (<b>Standard Performa as per FORM-40</b>) by the Company (backed by the resolution of Board of Directors) (<b>Standard Performa as per FORM-41</b>) in favors of the individual signing the tender on behalf of the Company and create liability against the company.</p> <p>(iv) An undertaking that the Company is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract (<b>April-2022</b>).</p>
(F)	In case of a "LLP (Limited Liability Partnership)"	<p>(i) Notarized copy of the LLP Agreement;</p> <p>(ii) A Copy of Certificate of Incorporation; and</p> <p>(iii) A copy of notarized/registered Power of Attorney/authorization issued by the LLP in favors of the individual to sign the tender on behalf of the LLP and create liability against the LLP. (<b>Standard Performa as per FORM-42</b>)</p> <p>(iv) An undertaking that the LLP is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make</p>

		the contract liable for determination under Clause 62 of the General Conditions of Contract (April-2022).	
(G)	In case of a Registered Society/ Registered Trust	(i)A notarized copy of the Certificate of Registration; (ii)Notarized copy of Deed of Formation; and (iii)A notarized/registered copy of Power of Attorney in favors of the individual to sign the tender documents and create liability against the Society/Trust. (iv)An undertaking that Registered Society/ Registered Trust is not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India or any other Ministry / Department of Govt. of Haryana from participation in tender on the date of opening of bids, either in individual capacity or as a member of the partnership firm or JV in which he was / is a partner/member. Concealment / wrong information in regard to above shall make the contract liable for determination under Clause 62 of the General Conditions of Contract (April-2022).	
5.	Valid Electrical Contractor License for HT/EHT voltage equal to or more than 25 kV	Copy	Summarily Rejected
6.	<b>Technical Eligibility Criteria –</b> As per Clause 12.1 of this chapter	Copy	Summarily Rejected
7.	<b>Financial Eligibility Criteria–</b> As per Clause 12.2 of this chapter. the tenderers shall submit requisite information as per Form -54 along with copies of audited balance sheets duly certified by the chartered Accountant/Certificate from chartered accounted duly supported by Audited Balance sheet.	Copy	Summarily Rejected
8.	<b>Tender Form (First Sheet)- Form -1A</b>	Copy	Liable to be rejected
9.	<b>FORM-43</b> Declaration form regarding site etc.	Copy	Liable to be rejected

10.	<b>FORM-45</b> Declaration regarding constitution of firm	Copy	Liabile to be rejected
11.	<b>FORM-46</b> (Plant and Machinery)	Copy	Liabile to be rejected
12.	<b>FORM-47</b> (Engineers/ Personnel)	Copy	Liabile to be rejected
13.	<b>FORM-48</b> (Works executed during last seven years ending last day of the month previous to the one in which tender is opened)	Copy	Liabile to be rejected
14.	<b>FORM-49</b> Work in Hand - in support of Credentials.	Copy	Liabile to be rejected
15.	<b>FORM-50</b> (Detail of Contractual Payment received in previous three financial years and the current financial year)	Copy	Liabile to be rejected
16.	<b>FORM-51</b> (Bank Detail/ RTGS)	Copy	Liabile to be rejected
17.	Completion Certificate*	Copy	Summarily Rejected
18.	<b>FORM-28</b> Mandatory Affidavit to be submitted by tenderer along with the tender documents	Copy	Summarily Rejected
19.	<b>FORM-53</b> Mandatory undertaking Regarding Employment/ Partnership of Retired Government of India/ Haryana Employees.	Copy	Summarily Rejected

\* Tenderer should make all efforts to submit the Completion certificate as per FORM-52

XXXXXXXX

□□□□□□



# **PART-I**

# **CHAPTER-I**

**INSTRUCTIONS TO TENDERERS**

**And**

**CONDITIONS OF TENDERING**

**FOR OHE, SCADA AND GENERAL SERVICES WORK**

1. **PART-I**

1.1 **CHAPTER-I**

INSTRUCTIONS TO TENDERERS & CONDITIONS OF TENDERING  
FOR OHE, SCADA AND GENERAL SERVICES WORK

<b>Para No.</b>	<b>Subject</b>
1.1.1	Tender papers.
1.1.2	Interpretations.
1.1.3	General.
1.1.4	Clarifications.
1.1.5	Earnest Money.
1.1.6	Income Tax Clearance Certificate.
1.1.7	Forms of Tender.
1.1.8	Prices.
1.1.9	Deleted.
1.1.10	Specifications and Drawings.
1.1.11	Schedule of Work.
1.1.12	Signing of Tenders.
1.1.13	Tenderer's Address.
1.1.14	Erasure or alteration.
1.1.15	Result of Tender.
1.1.16	Engineer not bound to accept any Tender.
1.1.17	Tender an Agreement.
1.1.18	Tenders Confidential.
1.1.19	Canvassing and Bribery.
1.1.20	Indian Labour and Material.
1.1.21	Tenderer's credentials.
1.1.22	Submission of Tender.
1.1.23	Opening of Tender.
1.1.24	Miscellaneous.
1.1.25	Omissions & Discrepancies.
1.1.26	Care In Submission of Tenders.
1.1.27	Right of Railway to deal with Tenders
1.1.28	Site office for HRIDC officers

## 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 April,2022) of Indian Railways as amended/corrected up to 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 Engineer 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 HRIDC and shall include their executors, administrators, successors and permitted assigns.

##### **"CONTRACTOR'S AGENT"**

Shall mean the person or persons authorized 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 authorized under duly executed power of Attorney to receive materials issued by the Engineer 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 Engineers and carry out the same.

##### **"ENGINEER"**

Shall mean the Divisional /District Engineer/Electrical Engineer/ Manager or the Executive Engineer in executive charge of the HRIDC Electrification works and shall include the superior officers of the HRIDC 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 Engineers for the satisfactory operation, as a whole, of the Installations, including structures, foundations etc.

**"MANAGING DIRECTOR/ GENERAL MANAGER"**

Means the officer in Administrative charge of this Project 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 equipment's 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 MD/General Manager, In-charge of this HRIDC Project (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.

**"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 Engineer 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 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 Engineers may have authorized 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 annexure 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 Engineer during the progress of the contracted work.

**"WRITING"**

Includes all matters written, type written 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.hridc.co.in](http://www.hridc.co.in) and e-procurement portal i.e. <https://etenders.hry.nic.in>
- (b) --- DELETED --
- (c) **METRIC**  
Dimensions, weights etc. SHALL BE QUOTED IN METRIC system. The term "ton"=1,000 kg. Shall be used to indicate a metric ton (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 Project Manager, HRIDC, GURUGRAM or his successor/nominee (whose address will be intimated in due course).

**EARNEST MONEY/BID SECURITY: 1.1.5**

- (a) The tender must be accompanied by a sum of **INR 10,60,600 /- (Rupees Ten Lakhs Sixty Thousand Six Hundred only)** 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 CPM/ HRIDC, GURUGRAM 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 HRIDC.
- (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 HRIDC 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 HRIDC administration 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 HRIDC shall return the Earnest Money so retained to the Contractor.

**Minimum Eligibility Criteria: 1.1.6**

**As per Para 12.0 and 12.1 of preamble chapter.**

**FORM OF TENDER: 1.1.7**

The Tender Bid shall be submitted online on to [www.hridc.co.in](http://www.hridc.co.in) and e-procurement portal i.e. <https://etenders.hry.nic.in> along with the entire mandatory documents required as per **ANNEXURE-A of preamble part of this tender documents.**

**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-III A, for OHE and clause no 3.2 of special condition of contract for general services work.

**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. 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.

**Note: -**

- **Notwithstanding anything given anywhere else all work execution shall be as per latest design and drawing of RDSO/CORE and latest guideline issue by Railway Board.**
- **The contractor should follow all the clearances as per latest CEA regulation.**

**(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 In charge shall be final subject to appeal (within seven days of decision being intimated to the Contractor) to the CPM/HRIDC 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”:

	1 <sup>st</sup> stage of completion	2 <sup>nd</sup> stage of completion	3 <sup>rd</sup> stage of completion	4 <sup>th</sup> 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 Engineer 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:				
$(\text{Total contract value as per LOA for OHE portion of work} / \text{Total TKM of the section}) \times \text{No. of TKM in particular stage of completion}$				
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:				
$(\text{Total contract value as per LOA for TSS portion of work}) / (\text{Total TSS in the tender})$				
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 para 1.2.46 II. Work of the section shall be completed to the extent that same is ready for the CRS inspection to the satisfaction of Engineer 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 authorized 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 Engineer 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 Engineer. 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 Engineer.

**ENGINEER NOT BOUND TO ACCEPT ANY TENDER: 1.1.16**

The Engineer 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 Engineer 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 Engineer of a Tender shall be deemed to constitute an Agreement between the Tenderer and the Engineer whereby such Tender shall remain open for acceptance either in part or in full, or as may be modified by negotiation, by the Engineer 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 Engineer 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 Engineer either in whole or in part, he shall be bound by the terms of agreement constituted by Engineer until a formal Contract has been executed between him and the Engineer 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 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 Engineer 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 Engineer or any person on his or their behalf, in relation to the obtaining of this or any other contract with the Engineer, 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 Engineer, 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:**

(a) Should a tenderer

i) 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

ii) being partnership firm / joint venture (JV) / registered society / registered trust etc. have as one of its partners a retired Engineer of the gazetted rank or any other gazetted officer working before his retirement,

OR

iii) being an incorporated company have any such retired Engineer of the gazetted rank or any other gazetted officer working before his retirement as one of its directors

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

THEN

the tenderer will give full information as to the date of retirement of such Engineer or gazetted officer from the said service and as to whether permission for taking such contract, or if the Contractor be a partnership firm or an incorporated company, to become a partner or director as the case may be, has been obtained by the tenderer or the Engineer or officer, as the case may be from the President of India or any officer, duly authorized by him in this behalf, shall be clearly stated in writing at the time of submitting the tender.

b) In case, upon successful award of contract, should a tenderer depute for execution of the works under or to deal matters related with this contract, any retired Engineer of gazette rank or retired gazetted officer working before his retirement in the Engineering or any other department of any of the railways owned and administered by the President of India for the time being, and now in his employment, then the tenderer will ensure that retired Engineer or retired gazetted officer had retired from government service at least 1 year prior to the date of his employment with tenderer and in case he had retired from service within a year then he possesses the requisite permission from the President of India or any officer, duly authorized by him in this behalf, to get associated with the tenderer.

c) Should a tenderer or Contractor being an individual, have member(s) of his family or in the case of partnership firm/ company / joint venture (JV) / registered society / registered trust etc. one or more of his partner(s)/shareholder(s) or member(s) of the family of partner(s)/shareholder(s) having share of more than 1% in the tendering entity employed in gazetted capacity in the Engineering or any other department of the railway, then the tenderer at the time of submission of tender, will inform the authority inviting tenders the details of such persons.

Note:-If information as required as per 1.1.19(c). a), b), c) above has not been furnished, contract is liable to be dealt in accordance with provision of clause 62 of Standard General Condition of contract.

**INDIAN LABOUR AND MATERIALS: 1.1.20**

(a) The Tenderer shall utilize 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 and 12.1 of the preamble of this tender for all type of work (**see ANNEXURE –A of preamble part**)

**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. [www.hridc.co.in](http://www.hridc.co.in) and e-procurement portal i.e. <https://etenders.hry.nic.in>. The necessary changes if required would be posted on this web site during advertisement period and may be seen on web site. 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.hridc.co.in](http://www.hridc.co.in) and e-procurement portal i.e. <https://etenders.hry.nic.in> and in the office of the CPM/HRIDC or his successor/nominee (whose address will be intimated in due course).

After the opening of the tender bids, it shall be scrutinized and analyzed. If found necessary by the Engineer, the tenderer shall be asked to furnish the clarifications and the Engineer 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 ----- DELETED**

**1.1.27**

(a) **Right of HRIDC to deal with Tenders:** The HRIDC reserves the right of not to invite tenders for any of HRIDC 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 HRIDC 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 HRIDC reserves the right to reject such tender at any stage.

**1.1.28: - Site Office for HRIDC officials:** - The Contractor should construct the temporary site offices right at the outset of work comprising of 03 well-furnished office rooms with attached toilets (total approximate 30 sqm area) for DGM/HRIDC, AM/HRIDC and Executive/Other staff. The contractor should arrange allied staff along with a small pantry for the proper working of HRIDC officials at required location as per the approval of the site Engineer. The Contractor shall provide all necessary furniture, Almira, clock, display boards, phones, 4 Nos. Mobile sets/ Walkie-talkie, curtains, 02 Nos computers of latest configurations with printers (all in one) HP make or any other approved brand with internet facilities, electricity along with standby arrangement if required, fans, AC etc. for the use of HRIDC staff. Failure to provide site office within 03 months shall attract a penalty of Rs 1.00 lacks per month, for the period till he constructs the office subject to maximum of completion period of the contract, recoverable from running bill. No payment for providing above facilities will be made by HRIDC. Contractor may please note this and take into account while quoting their rates. If available, HRIDC will arrange railway land inside the railway boundary free of cost to the Contractor for construction of temporary site office for the use of HRIDC officials., However, HRIDC shall not be under obligation to provide land for the above temporary site office until and unless conveniently possible.

XXXXXXXXXX

# **PART-I**

# **CHAPTER -IIA**

**SPECIAL CONDITIONS OF CONTRACT**

**FOR OHE AND SCADA WORKS**

**PART-I**  
**CHAPTER –II A**  
**SPECIAL CONDITIONS OF CONTRACT**  
**FOR OHE AND SCADA WORKS**

<b>PARA No.</b>	<b>SUBJECT</b>
1.2.1	Scope.
1.2.2	Conditions of Contract.
1.2.3	Engineer's Representative.
1.2.4	Contractor's Representative.
1.2.5	Contractor's Office & Address.
1.2.6	Engineer's Address.
1.2.7	Deleted.
1.2.8	Taxes.
1.2.9	Illegal Gratification.
1.2.10	Railway Pass.
1.2.11	Laws of India.
1.2.12	Force Majure.
1.2.13	Notice under local laws.
1.2.14	Determination of Contract.
1.2.15	Loss in transit.
1.2.16	Agreement.
1.2.17	Security Deposit.
1.2.18	Scheme of work.
1.2.19	Procurement of materials.
1.2.20	Specified Railway Stores.
1.2.21	Other Railway Stores.
1.2.22	Contractor's Organization.
1.2.23	Contractor's drawings etc.
1.2.24	Sub-Contractors.
1.2.25	Quality Assurance.
1.2.26	Cranes.
1.2.27	Work Trains.

- 1.2.28 Traffic blocks.
- 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 Engineer'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 equipment's to be changed.
- 1.2.48 Use of rejected equipment.

<b>Para No.</b>	<b>Subject</b>
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

---\*\*\*---\*\*\*\*---

**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-III A, IIIB & IIIC.
- (v) Explanatory notes of Schedule 1, Schedule of prices, Part-I, Chapter-IV A, 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.

**Note:** -

- **Notwithstanding anything given anywhere else all work execution shall be as per latest design and drawing of RDSO and latest guideline issue by Railway Board.**
- **The contractor should follow all the clearances as per latest CEA regulation.**
- **Contractor will have to make all the Design, Drawing and clearness according to parameters of HIGH RISE OHE.**

**ENGINEER 'S REPRESENTATIVE/ PURCHASER'S REPRESENTATIVE: 1.2.3**

(i) **ENGINEER 'S /PURCHASER'S REPRESENTATIVE:** Subject as otherwise provided in this contract, all notices to be given on behalf of the Engineer 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 CPM/HRIDC 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 authorized 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 Part-1, chapter-1..

**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 (Decided by contractor) for progressing designs and drawings and field works, expeditiously at his own cost. He shall intimate the Engineer 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.

**ENGINEER'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 Engineer 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 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.). The cess shall be deducted from contractor's bill as per provision of the act.

**1.2.9** ----- DELETED -----

**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 (hereinafter 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 Engineer 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 Engineer will at the time of such termination take over from the Contractor, at prices as provided for in the contract, all erected equipment or equipment under erection as also all or any portion of unused, undamaged and acceptable equipment, 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 Engineer 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 Engineer 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 Engineer 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:-

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 Clause 18.11 of Tender Form available in the Regulations for Tenders and Contracts,  
or  
(x) 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  
(xi) 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 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 HRIDC or to any person on his or on their behalf in relation to the execution of this or any other contract with this HRIDC.

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

- (a) The contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any commitments or made any advances on account of or with a view to the execution of the works or the performance of the contract and contractor shall not be entitled to recover or be paid any sum for any work 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 thereof and the Contractor shall only be entitled to be paid the value so certified.
- (b) In the contract which has been rescinded as a whole, the Security Deposit already with HRIDC under the contract shall be encashed/ forfeited and the Performance Guarantee already submitted for the contract shall be encashed. The balance work shall be got done independently without risk & cost of the failed Contractor. The failed Contractor shall be debarred from participating in the tender for executing the balance work. If the failed Contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV /partnership firm.  
Further the authorized representative of failed Contractor cannot be accepted as authorized representative in new contract.
- (c) In the contract rescinded in part or parts,
  - (i) The full Performance Guarantee 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 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 THE CPM/ HRIDC 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 ENGINEER that the Contract Agreement is ready. The Contract Agreement shall be entered into by ENGINEER 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 ENGINEER may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and the ENGINEER 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) Deleted.
- (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 ENGINEER 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 ENGINEER 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**

**Same as Clause No 5.1 and 5.2 of preamble chapter**

**SCHEME OF WORK : 1.2.18**

- (a) Within a period of 45 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 / Drawing and submission of various documents enumerated in Part-II Chapter-V :- The comprehensive schedule shall be planned in a manner such that the entire basic designs and drawings( all the design and drawing required for work shall be furnished by contractor itself at his own cost) for the group/s is/are accepted by the Engineer 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 Engineer who reserves for this purpose 30 days for verifying the designs and drawings.

**(b) WORKS TO BE DONE AS APPROVED**

The planning shall be finalized in consultation with the Engineer 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 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 finalization 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 along with the total quantum of designs and drawings, materials and equipment's and the works required for the contract.

**(d)** For finalizing 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 Engineer 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. Thereafter 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 which supply is arranged should have long experience of design and manufacture of equipment's 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 equipment's 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 Engineer. Only tested quality steel shall be used.

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

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

**SPECIFIED STORES : 1.2.20**

**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 at his own cost. HRIDC will not provide any land/ Space for store purpose.**

**FOR ALL WORKS : 1.2.20.1**

(a) All the material required for execution of work shall be supply by Contractor as per different schedule and scope of work. However, HRIDC also supply any item from its own resources to the contractor for erection which may or not provided in the contract. Erection rate shall be mutually finalized as Non Schedule item, if Schedule of Rate for the same is not available in the contract. HRIDC 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.

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

**1.2.21 Deleted**

**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 at his own cost.** If he and the Engineer deem it necessary, sub-depots may be set up to ease operation of work and distribution of materials. The location of Contractor's depot and sub-depots will be decided by Contractor.

(b) 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. 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 Engineer.

(c) 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 Engineer. The cost of providing connections and of energy consumed shall be paid by the Contractor to the Engineer in accordance with relevant rules and prevailing rates of the HRIDC.

(d) At places where piped water supply is available the Engineer 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 Engineer. The Contractor shall be charged for consumption by the HRIDC rate. The Contractor shall arrange water at the work site at his own cost. However, in exceptional cases where the Engineer 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 Engineer in regard to supply of water through work trains shall be final and binding on the Contractor.

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

(f) Contractor shall arrange and make available at their depot the following measuring equipment's duly calibrated for inspection at site by the representative of the Engineer as and when required:

- (i) Weighing Machine of capacity 2 MT
- (ii) Alco meter
- (iii) Vernier Calliper
- (iv) Micrometre
- (v) Radius Gauge
- (vi) Thread Gauge
- (vii) Steel Measuring Tapes 3m & 30 m length each
- (viii) Angle Protractor

#### **FOR TSS & SCADA WORKS AND GENERAL SERVICES WORK: 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, if considered necessary by the Contractor at his own cost.** If he and the Engineer 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 decided by Contractor.

b) 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. 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 Engineer.

c) 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 Engineer. The cost of providing connection sand of energy consumed shall be paid by the Contractor to the Engineer in accordance with relevant rules and prevailing rates of the HRIDC.

d) At places where piped water supply is available, the Engineer 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 Engineer.

e) 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.

#### **CONTRACTOR'S DRAWINGS ETC.: 1.2.23**



**Any drawing, designs, diagram required to Start/complete this work shall be furnished by contractor itself.** Any calculations, schedules, information, data, progress charts etc. required by the Engineer in connection with the contract shall be furnished by the Contractor at his own expenses. In case of new developments in designs, comments on Research Designs and Standards Organization (hereinafter called RDSO's) and decision of Engineer to implement the same basic drawings /designs/employment schedules will be submitted by the contractor to the Engineer.

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 Engineer. The Engineer 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 Engineer shall be final and conclusive.

#### **SUB- CONTRACTORS: 1.2.24**

The Contractor shall not assign or sublet the contract or any part thereof or allow any person to become interested therein in any manner whatsoever without the special permission in writing of the ENGINEER, save as provided below. Any breach of this condition shall entitle the ENGINEER to rescind the contract under Clause 62 of these Conditions and also render the Contractor liable for payment to the ENGINEER in respect of any loss or damage arising or ensuing from such cancellation; provided always that execution of the details of the work by petty Contractor under the direct and personal supervision of the Contractor or his agent shall not be deemed to be sub-letting under this clause.

In case Contractor intends to subcontract part of work, he shall submit a proposal in writing seeking permission of ENGINEER for the same. While submitting the proposal to ENGINEER contractor shall ensure the following: -

- (a) (i) Total value of work to be assigned to sub-contractor(s) shall not be more than 50% of total contract value.
- (ii) The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract in last 5 years, ending date of submission of proposal by Contractor to ENGINEER, costing not less than 35% value of work to be subletted, through a works contract. For fulfillment of above, Work Experience Certificate issued by a Govt. Department/Organization shall be considered. Further, Work Experience Certificate issued by a Public listed company shall be considered provided the company is having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, registered at least 5 years back from the date of submission of proposal by Contractor to ENGINEER and work experience certificate issued by a person authorized by the Public Listed Company to issue such certificates.

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

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

- (i) There is no banning of business with the sub-contractor in force over IR.
- (b) The Contractor shall provide to the Engineer a copy of the agreement to be entered into by Contractor with subcontractor. No subcontractor shall be permitted without a formal agreement

- between Contractor and subcontractor. This agreement shall clearly define the scope of work to be carried out by subcontractor and the terms of payment in clear & unambiguous manner.
- (c) On receipt of approval from HRIDC, Contractor shall enter into a formal agreement legally enforceable in Court of Law with subcontractor and submit a copy of the same to the Engineer.
  - (d) The Contractor shall intimate to the Engineer not less than 7 days in advance, the intended date of commencement of subcontractor's work.
  - (e) Once having entered into above arrangement, Contractor shall discontinue such arrangement, if he intends to do so at his own or on the instructions of ENGINEER with prior intimation to Engineer.
  - (f) The Contractor shall indemnify ENGINEER against any claim of subcontractor.
  - (g) The Contractor shall release payment to the Sub-contractor(s) promptly and shall endeavor to resolve all issues amicably and speedily with the Sub-contractor(s), so that the execution of work is not affected in any manner whatsoever.
  - (h) In addition to issuance of work experience certificate to Contractor, the Engineer, when, based on documents, is satisfied that subcontracted work has been carried out by subcontractor, shall issue work experience certificate to the subcontractor also for the portion of work subcontracted and successfully completed by the sub-contractor.  
Note: Work Experience Certificate to the subcontractor shall be issued only when the contractor's work is complete and contractor is entitled for the issuance of Work Experience Certificate. However, in the same contract, when the ENGINEER, based on documents, is satisfied that the subcontractor has successfully carried out subletted work; without issuance of work experience certificate to subcontractor at this stage, the ENGINEER can, only once, consider the successfully completed subletted work for the fulfillment of eligibility for further subletting of work to the subcontractor in the same contract. When the contractor's work is complete and contractor is entitled for the issuance of work experience certificate, the subcontractor shall be issued one Work Experience Certificate for the total scope of work executed by the subcontractor in the contract.
  - (i) The responsibility of successful completion of work by subcontractor shall lie with Contractor. Subcontracting will in no way relieve the Contractor to execute the work as per terms of the Contract.
  - (j) Further, in case Engineer is of the view that subcontractor's performance is not satisfactory, he may instruct the Contractor to remove the subcontractor from the work and Contractor has to comply with the above instructions with due promptness. Contractor shall intimate the actual date of discontinuation of subcontract to Engineer. No claim of Contractor whatsoever on this account shall be entertained by the ENGINEER and this shall be deemed as 'excepted matter' (matter not arbitrable).
  - (k) The permitted subcontracting of work by the Contractor shall not establish any contractual relationship between the sub-contractor and the Railway and shall not relieve the Contractor of any responsibility under the Contract.

#### **QUALITY ASSURANCE MATERIALS: 1.2.25**

- (a) All the equipment's, materials, fittings and components will be subject to quality control program of the manufacturer, being part of the quality Assurance program of the Contractor. The materials may also be inspected by the Engineer or his representative/RITES either at the manufacturer works or at the Contractor's depot. The Engineer or his representative/RITES 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 program so as to satisfy himself that the materials are in accordance with specifications, approved drawings and designs and Engineer's prescribed quality Assurance Standards.

**(b) ERECTION**

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

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

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

(d) The decision of the ENGINEER or his successor shall be final in respect of acceptability or otherwise of any material, fittings, components or equipment's required for the work.

**(e) QUALITY ASSURANCE PROGRAMME**

For proper control of quality and to ensure that the materials, equipment's 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 Engineer's Prescribed Quality Assurance Standards. This programme of the Contractor shall generally cover the following: -

1. The organization 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) and GS portion 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 Engineer's representative if any.

**CRANES : 1.2.26**

**(a) FOR ALL WORKS**

Crane of adequate capacity with a jib of requisite length will be arranged by the Contractor at his own cost. Road crane for handling heavy materials at the contractor's depot for loading and unloading of material 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.

**WORK TRAINS : 1.2.27**

**The contractor shall arrange work train (If required) at his own cost.**

**(a) 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 Engineer to obtain approval from the competent authorities for the use of such trolleys on tracks, if required.

**(b)** In order to minimize 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 Engineer for such special methods of saving of blocks that could be obtained along with reduction/redundancy of the facilities being provided by the HRIDC in terms of Clauses 1.2.26, 1.2.27 and 1.2.28.

**TRAFFIC BLOCKS: 1.2.28**

**(a)** The Engineer 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 Engineer.

**(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 organize 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 Engineer submit a weekly block programmed for works or for work trains 7 days in advance of the week for which the programmed 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 ENGINEER. All formalities of exchanging private numbers etc. with the traffic control will be carried out by the Engineer's staff and for this purpose the Engineer 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 Engineer'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 Engineer 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 Government Doctor. Such medical examination from government Doctors shall be arranged by contractor itself. 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 Engineer 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 energization (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 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 Engineer shall be at liberty to give seven days' 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 Engineer 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 Engineer 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 Engineer without prejudice to the other rights and remedies of the Engineer, and the reimbursement in full or in part as the case may be, shall be met, at the option of the Engineer from out of all or any of the following sources, viz:

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

- (d) (i) and/or (ii) above-mentioned the Engineer 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 Engineer 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 Engineers and the discrepancy set right before execution.

(c)

**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 Engineer's approval will be based on these considerations, notwithstanding the approval communicated by the Engineer, 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 only.**

(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 Engineer or not.

**ADDITIONS AND ALTERATIONS TO ERECTED EQUIPMENT: 1.2.33**

The Engineer 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 energized 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 Engineer and the contractor, based on proper rate analysis and with reference to the current prevalent market rates or the rates available with the ENGINEER in that or nearby area/s. In case additional installations or modifications or replacements are required to be carried out under this para, the Engineer 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 up to 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 up to 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 up to 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;  
Quantities operated in excess of 140% but up to 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;  
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 up to 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 up to 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) FOR TSS WORKS:** .... Deleted.....

The contractor shall supply standby spares and spares components and materials for maintenance as specified in Schedule The supply of spares should be completed before the planned date of energization of sub-station.

**(c) FOR SCADA WORKS:** -

The contractor shall supply standby spares and spares components and materials for maintenance as specified in schedule.

**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 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

Deployment OF TECHNICAL STAFF:			
The Contractor(s) shall employ following Qualified Engineers during the execution of the allotted work as per table below:			
SN	Personnel	Qualification	Total Experience for each person (in years)
1	Electrical Engineer (1 No Required)	Graduate Degree in Electrical Engineering	Must have 05 years of working experience on any OHE project .
2	Supervisor (Electrical) (2 Nos Required)	Diploma in Electrical Engineering	3 years' experience of working in OHE project and electrical general power supply arrangement.

(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 HRIDC ENGINEER for reasons to be recorded in writing.

**TRAINING OF ENGINEER'S STAFF: 1.2.36**

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

**WORK BY OTHER AGENCIES: 1.2.37**

**a)** Any other works undertaken at the same time by the ENGINEER 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 Engineer 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 Engineer in order to permit simultaneous execution of his own works and those undertaken by other Contractors or the ENGINEER 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 HRIDC/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 Engineer 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 Engineer 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) 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 Engineer in time. The contractor 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 Engineer 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 to ENGINEER staff for purpose of maintenance.

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

(c) The 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 laborer 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 Engineer or his 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 Engineer 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 trademarks, except where these are specified by the Engineer 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 Engineer of any proprietary rights that may exist on such processes, drawings or patterns which he may use of his own accord.

In the event of infringement of any patent rights due to above action of the Engineer, 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 Engineer 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 Engineer of such equipment, machine, plant, work or thing, the Contractor shall indemnify the Engineer 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 Engineer 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 Engineer if required but at the Contractor's expense, to conduct all negotiations for the settlement of the same or any litigations that may arise there from and PROVIDED THAT no such equipment, machine, plant, work or thing, shall be used by the Engineer 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 Engineer 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 recognized risks to their offices and depots. Such insurance shall in all respects be to the approval of the Engineer 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 Engineer. 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.

---

**Note:** It may be noted that the beneficiary of the insurance policy should be HRIDC or the policies should be pledged in favor of HRIDC. The contractor shall keep the policy/policies current till the installations are provisionally handed over to the Engineer. 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 Engineer, 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.

(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 recognized Insurance Companies.

(e) Deleted.

(f) For purpose of enabling the Contractor to take the insurance cover in connection with this contract, the Engineer will advise the approximate price of all the HRIDC 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 Engineer at all times indemnified and protected against all claims made and liabilities incurred under Workmen's **Compensations Act, the Factories Act and the Payment of Wages Act and rules** made there under from time to time or under any other labour and Industrial legislation made from time to time.

(b) The Contractor shall indemnify and keep the Engineer 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 HRIDC/Railway premises and any loss or damage to HRIDC/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 Rest. 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 HRIDC/railway accidents, thefts, pilferage or any other cause, without delay to minimize or to avoid traffic detentions, in a section until the installations are provisionally handed over to the Engineer (See para 1.2.46).

**(e) CLEARING DAMAGED INSTALLATIONS**

The Contractor shall at his cost arrange for expeditious clearing of the HRIDC/railway track/s of traction installations obstructing or fouling the track/s when they are damaged as a result of HRIDC/railway accident or any other cause, upon the oral/telephonic/written instructions from the Engineer's representative, until installations are provisionally handed over to the Engineer. If the Contractor fails to clear the tracks expeditiously and within reasonable time, the Engineer 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 Engineer 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 ENGINEER, at the cost of the Engineer (Item 31 of Schedule 1, Section-1) until the installations are provisionally handed over to the Engineer. If the Contractor fails to slew the overhead equipment within reasonable time the Engineer 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.

---

**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 Engineer shall be entitled to withhold 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 Engineer 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 finalization 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 Engineer 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 any time thereafter may become payable to the Contractor under the same contract or any other Department of the Central Government pending finalization 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 Engineer 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 Engineer 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

Engineer 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 Engineer will be kept withheld or retained as such by the Engineer 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 HRIDC/Railway premises, but shall then conform to the rules and regulations of the HRIDC/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 HRIDC 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 ENGINEER. The Engineer 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 HRIDC/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
- (a) (I) Blasting of rock for foundation work shall be done only after due notice is given to the Engineer and time/s and date/s for blasting operations agreed to by the Engineer. Blasting, if required to be done in the vicinity of the track, shall not be undertaken until the Engineer'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 Engineer 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 HRIDC in respect thereof
- (b) 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.
- (c) 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 Engineer's representative authorizes in writing for the trolleys to be put on the tracks. Ladder trolleys shall be promptly removed on instructions from the Engineer's representative and well in advance of trains. No claims shall rest on the Engineer 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 ENGINEER. Protection of track by banner flags shall be done in accordance with General Rules of HRIDC/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 Any Government Doctor. Such medical

examination from Gov. Doctors shall be arranged by Contractor prescribed fee for which shall be borne by the contractor.

(d) The Contractor shall abide by all HRIDC/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.

(e) 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 ENGINEER staff.

(f) 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 HRIDC/Railway in such a way that they do not hinder HRIDC/Railway Operation or affect the proper functioning or damage any HRIDC/Railway equipment, structure or rolling stock except as agreed to by the Engineer, provided that all damage and disfiguration caused by the Contractor to any HRIDC/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.

(g) 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 Engineer shall, after giving due notice to the Contractor in writing, take necessary steps and recover the costs from the Contractor.

(h) 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 HRIDC/Railway regulations given to him by the authorized ENGINEER staff. The Contractor's employees and workers may for no reason operate an installation concerning train safety or train movement. They shall notify the authorized representative of the Engineer who will take all necessary steps in this regard.

(i) The Contractor shall be responsible for safe custody of all equipment's till provisional acceptance.

(j) 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 Rest. 25 lacks for any one accident.

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

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

(m) 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 HRIDC project in-charge.

#### **RECOVERY FOR DELAY IN COMPLETION: 1.2.44**

#### **EXTENSION OF TIME: 1.2.45**

1.2.45 17A Extension of Time in Contracts: Subject to any requirement in the contract as to completion of any portion or portions of the works before completion of the whole, the Contractor shall fully and finally complete the whole of the works comprised in the contract (with such modifications as may be directed under conditions of this contract) by the date entered in the contract or extended date in terms of the following clauses:

(i) Extension due to Modification: If any modifications have been ordered which in the opinion of

- the Engineer have materially increased the magnitude of the work, then such extension of the contracted date of completion may be granted as shall appear to the Engineer to be reasonable in the circumstances, provided moreover that the Contractor shall be responsible for requesting such extension of the date as may be considered necessary as soon as the cause thereof shall arise.
- (ii) Extension for Delay not due to Railway or Contractor: If in the opinion of the Engineer, the progress of work has any time been delayed by any act or neglect of Railway's employees or by other Contractor employed by the Railway under Sub-Clause (4) of Clause 20 of these Conditions or in executing the work not forming part of the contract but on which Contractor's performance necessarily depends or by reason of proceeding taken or threatened by or dispute with adjoining or to neighbouring owners or public authority arising otherwise through the Contractor's own default etc. or by the delay authorized by the Engineer pending arbitration or in consequences of the Contractor not having received in due time necessary instructions from the Railway for which he shall have specially applied in writing to the Engineer or his authorized representative then upon happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer within 15 days of such happening, but shall nevertheless make constantly his best endeavours to bring down or make good the delay and shall do all that may be reasonably required of him to the satisfaction of the Engineer to proceed with the works. The Contractor may also indicate the period for which the work is likely to be delayed and shall be bound to ask for necessary extension of time.
- (iii) Extension for Delay due to Railways: In the event of any failure or delay by the Railway to hand over the Contractor possession of the lands necessary for the execution of the works or to give the necessary notice to commence the works or to provide the necessary drawings or instructions or any other delay caused by the Railway due to any other cause whatsoever, then such failure or delay shall in no way affect or vitiate the contract or alter the character thereof or entitle the Contractor to damages or compensation therefor, but in any such case, the Railway may grant such extension or extensions of the completion date as may be considered reasonable.

The Contractor shall indicate the period for which the work is likely to be delayed and shall seek extension of time as may be considered necessary under clause 17A(i) or/and 17A(ii) or/ and 17A(iii) above, as soon as the cause thereof shall arise and, in any case, not less than one month before the expiry of the date fixed for completion of the works. The Engineer shall consider the same and shall grant and communicate such extension of time as in his opinion is reasonable having regard to the nature and period of delay and the type and quantum of work affected thereby. No other compensation shall be payable for works so carried forward to the extended period of time; the same rates, terms and conditions of contract being applicable, as if such extended period of time was originally provided in the original contract itself.

The non-submission of request for extension or submission of request within less than one month before the expiry of the date fixed for completion of the works, shall make him ineligible for extension under these sub clauses, subject to final decision of Engineer.

1.2.45 17B Extension of Time with Liquidated Damages (LD) for delay due to Contractor: 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 17A, 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 Annexure-VII) 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 17B	Rate of Liquidated Damages
(i)	Up to Twenty Five percent of original period of completion including period of extension of time granted under Section 17A(i)	As decided by Engineer, between 0.01% to 0.05% of contract value for each week or part of the week
(ii)	Above Twenty Five percent but up to Fifty percent of original period of completion including period of extension of time granted under Section 17A(i)	0.10 % of contract value for each week or part of the week
(iii)	Above Fifty percent of original period of completion including period of extension of time granted under Section 17A(i)	0.30 % 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 62 of these Conditions, whether or not actual damage is caused by such default.

**NOTE:**

In a contract, where extension(s) of time have been allowed once under clause 17B, further request(s) for extension of time under clause 17A can also be considered under exceptional circumstances. Such extension(s) of time under clause 17A shall be without any Liquidated damages, but the Liquidated damages already recovered during extension(s) of time granted previously under clause 17B shall not be waived. However, Price variation during such extension(s) shall be dealt as applicable for extension(s) of time under clause 17B.

**PROVISIONAL ACCEPTANCE: 1.2.46**

**For OHE, SCADA 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 the said switching stations hereinafter referred to as a sub-group, the Contractor shall certify and advise the Engineer 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 Engineer 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 Engineer of the equipment and installations shall be carried out jointly by the Engineer 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 Engineer 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

Engineer. 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 Engineer 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 Engineer 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 Engineer 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 after completion of the relevant sections as indicated in sub-Para/s above.

---

**NOTE 1): Deleted**

(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. HRIDC supply materials shall be given by HRIDC.*

*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 HRIDC*

#### **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 HRIDC due to faulty material, design or workmanship, or otherwise fails to fulfill the requirement of the Contract and/or its purpose, the Engineer 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 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 Engineer 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 Engineer 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 Engineer 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 Engineer to the Contractor in respect of such defective equipment. Should the Engineer 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 Engineer 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 equipment's 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 Engineer 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 energization (1.2.14) until such rejected equipment is rectified and/or replaced, but the Engineer 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 Engineer whichever is **later**. The guarantee for spares should be coincident with the guarantee for erected equipment.

(ii) **FOR TSS Works: - DELETED**

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 Engineer whichever is **later**. The guarantee for spares should be coincident with the guarantee for erected equipment.

(iii) **FOR SCADA 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 (Para 1.2.46) by the Engineer, whichever is earlier. The guarantee for spares should be coincident with the guarantee for erected equipment's.

--

(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 ENGINEER 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 Engineer at site. In such a case, the Contractor shall be informed in advance of the works propose to be carried out by the Engineer.

(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 ENGINEER or his successor/nominee being final in the matter. If any defect be not remedied within a reasonable time during the aforesaid period the Engineer may proceed to do work at the Contractor's risk and expense, but without prejudice to any other rights and remedies which the Engineer 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 Engineer.

(f) Any materials, fittings, components or equipment's 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 equipment's, 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 equipment's supplied by the Engineer 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 Engineer and such quantities will be considered for the purpose of final reconciliation over and above allowance as per Part-I, Chapter IV.

**(V) FOR GENERAL SERVICE WORK – See clause No- 27.0 of special condition for General Services.**

**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 Engineer.

(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 Engineer 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 suomoto on behalf of the Contractor at the Contractor's expenses. **After expiry of the period of guarantee for each section, a certificate of final acceptance for the section shall be issued by the Engineer 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 Engineer.**

(c) The Engineer 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 Engineer (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 Engineer 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 Engineer 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 Engineer 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 Engineer, 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 Engineer 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 Engineer 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 Engineer 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 HRIDC under or by virtue of arising out of this contract, nor shall the HRIDC entertain or consider any such claim, if made by the Contractor, after he shall have signed a "No claim certificate" in favour of the HRIDC in such forms as shall be required by the HRIDC, 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 Engineer'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 Engineer will arrange to get them removed at the cost of the Contractor. However, before the Engineer 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 HRIDC or to the movement of its staff or passengers.

**EQUIPMENTS, COMPONENTS AND MATERIALS RECEIVED FOR WORK: 1.2.53**

The Contractor shall utilize all equipment's, 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 Engineer in writing. The Engineer 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 Engineer'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-7. The materials so notified by the Engineer shall be taken over by the Engineer and paid for in full. The Contractor may use in any manner deemed fit, only such surplus materials which are not covered by the Engineer's notification after getting the approval of the Engineer 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 "Managing Director" 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. "Managing Director" 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, 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 HRIDC/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 "Managing Director/HRIDC" and the MD 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 ENGINEER, 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/HRIDC of any certificate to which the contractor may claim to be entitled to, or if the Railway/HRIDC 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/HRIDC, 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/HRIDC.
- (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/HRIDC shall submit its defense 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/HRIDC that the final bill is ready for payment, he/they will be deemed to have waived his/their claim(s) and the Railway/HRIDC 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/HRIDC 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/HRIDC not below JA grade, nominated by the MD/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 MD/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/HRIDC will send a panel of at least four (4) names of Gazetted Railway/HRIDC Officers of one or more departments of the Railway/HRIDC which may also include the name(s) of retired Railway Officer(s) empaneled 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 MD/General Manager. Contractor will be asked to suggest to MD/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/HRIDC. The General Manager/MD 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/MD 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.

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

- (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/HRIDC will send a panel of at least four (4) names of retired Railway Officer(s) empaneled 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/MD.

Contractor will be asked to suggest to General Manager/MD 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/HRIDC. The General Manager/MD 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/HRIDC will send a panel of at least four (4) names of retired Railway Officer(s) empaneled to work as Railway/HRIDC 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/MD.

Contractor will be asked to suggest to General Manager/MD 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/HRIDC. The General Manager/MD 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/MD 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/MD fails to act without undue delay, the General Manager/MD 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) Qualification of Arbitrator (s):
- (a) Serving Gazetted Railway/HRIDC 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/HRIDC 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 months.

- (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 arbitration shall be the place from which the Letter of Acceptance of Tender is issued or such other place as the Engineer at his discretion may determine.

**PAYMENT DURING ARBITRATION : 1.2.55**

Work under the contract shall, unless otherwise directed by the Engineer, continue during the Arbitration proceedings and no payment due to or payable by the Engineer 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**

**Same as Clause No 5.1 and 5.2 of preamble chapter.**

**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 Engineer 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 Engineer 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 Engineer due to the Contractor's failure to fulfill his statutory obligations under the aforesaid Act or the Rules, the Engineer 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 Engineer under Section 20 Sub-section (2) and Section 21 Sub-section (4) of the aforesaid Act, the Engineer 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 Engineer to the Contractor whether under the contract or otherwise. The Engineer 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 Engineer might become liable in contesting such claim. The decision of the Engineer



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/HRIDC 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.	ONE Engg. Degree holders and TWO Engg. Diploma holders	Duration of the contract

Under the above scheme it would be obligatory for the Contractor to give a declaration along with 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 HRIDC deduct the same from any moneys due to the contractor in terms of the contract. The HRIDC 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 HRIDC 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, HRIDC is obliged to pay compensation to a workman directly or through petty Contractors or sub-Contractors employed by the Contractor in executing the work. HRIDC will recover from the Contractor the amount of the compensation so paid, and without prejudice to rights of HRIDC under Section 12, sub-section (2) of the said Act HRIDC 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 HRIDC to the Contractor whether under these conditions or otherwise. HRIDC 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 HRIDC 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 HRIDC 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**

**1.2.63: DELETED**

**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-Convener 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 endeavor 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 than 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 empaneled 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 -IIB**

**SPECIAL CONDITIONS OF CONTRACT FOR**  
**GENERAL SERVICES**



**Chapter –II B**

**SPECIAL CONDITIONS OF CONTRACT FOR**

**(ELECTRICAL- General Services)**

1.0	<b>SCOPE OF WORK:</b>
1.1	<b>Electrification of Proposed station building and Provision of High Mast Tower at Maruti siding/ Maruti Yard</b> at Manesar in the states of Haryana.
1.2	Contractor will execute the complete work as per <b>MSIL (Maruti – Suzuki India Limited)</b> standard and coordination with HRIDC and MSIL authorities.
1.3	Before Commencing the work, the contractor will prepare the drawing of complete electrical power distribution system (power cable as well as wiring arrangement of station building). After that this drawing should be duly approved by Engineer In-charge of HRIDC and authorities of MSIL.
1.4	All the material Used in this work should be as per relevant <b>IS/BIS and MSIL</b> specification and standard. Reference List attached with this document
1.5	All the cable connections to various equipment / panels / DBs shall be done by using cable glands (Tin coated brass) and lugs of suitable size though specifically mentioned or not. Painting of the steel body shall be scratched so that the armoured of aluminum cable can have firm contact with the steel body of equipment/panel/DBs.. No material leftover after completing the work will be taken over by the HRIDC. In order to understand the actual scope of the work involved against each Sch. item, the tenderer shall go through the description of the item and its explanatory notes, relevant IS and tender specifications, drawings including site visit.
1.6	No extra quantity (more than schedule quantity) should be executed without prior and personal approval of Engineer-in-charge.
1.7	<p>The items like different sizes of LT cable, octagonal pole, High mast tower, LED light fitting, LT panel, HDPE pipes, AC etc. (decision of Engineer-in-charge regarding inspection of any material whether at manufacturers premises or otherwise will be final and binding to contractor) will be inspected by the representative of ENGINEER or agency nominated by ENGINEER such as RITES at the works of manufacturer, for that, manufacturer should have sufficient and adequate testing facilities. Other items excluding above mentioned items should be procured with original manufacturers' test reports and sample should be got approved from Engineer-in-charge before ordering full/ Parts schedule quantities.</p> <p>The tests on any of the item in the schedule/part of any job or assembly in schedule will be performed in an NAL/Govt. Lab. or manufacturer's premises as desired by Engineer-in-charge.</p> <p><b>THE COST OF FACTORY INSPECTION / LAB TESTS / DOCUMENTATIONS WILL BE BORNE BY THE CONTRACTOR.</b></p>

1.8	All the materials shall be procured as per relevant IS/BS specification. the contractor has to submit original delivery challans to Engineer along with 2 duplicate challans for office record and submitting to accounts. At the time of submission of drawings/sample, contractor has to submit relevant documents regarding the certification & specifications and technical catalogues reflecting all the technical parameters of the item. Only the ISI/BEE or any other relevant mark/label or any certificate produced in support, may not be enough to approve the sample, further verifications/ factory inspection/lab test may be carried out as per the discretion of Engineer-in-charge.
1.9	After completion of work contractor should be submitted completion certificate of all the work, duly signs by MSIL authorities to engineer.
1.10	All the work is to be carried out as per requirement MSIL and Engineer satisfaction. This aspect shall be considered by the tenderer while quoting the offer.
1.11	In case of any kind of confusion/conflict/dispute, the decision of ENGINEER will be final and binding on the contractor.  The reference list for make of products is given in <b>Annexure-A</b> .
2.0	<b><u>EMPLOYMENT OF TECHNICAL STAFF:</u></b>
2.1	All ready mention in part- 1 chapter- II para <b><u>1.2.35A</u></b>
3.0	<b>TERMS OF PAYMENT</b>
3.1	Payment shall be only be made after carrying out the work to the satisfaction of Engineer-in-charge.
3.2	Items wise payment for Electrical schedule shall be made as under per discretion of ENGINEER.  <ol style="list-style-type: none"> <li>1. <b>70% payment after supply and acceptance of material.</b></li> <li>2. <b>20% payment after successful erection of material.</b></li> <li>3. <b>Balance 10% payment after successful commissioning of items of work.</b></li> </ol>
3.3	<b>PAYMENT FOR SUPPLY OF MATERIALS:</b>
	Payments will be made for materials as specified below: (a) The material required for execution of the work to be supplied by the contractor will kept in firm store. Arrangement of store will be done by contractor at his own cost. After inspection by Engineer payment shall be made for supply of material required for the erection of the work in schedule as described below. Payments for equipment's, components, Cable and other materials required for execution of the work will be made up to 70% of the supply value of the item indicated in the tender schedule to the contractor subject to complying the following:  <ol style="list-style-type: none"> <li>(i) Supplier's Challan and manufacturer's challan for major items.</li> <li>(ii) Certificate of receipt of materials in good condition at Purchaser's depot/s duly accepted by the Purchaser's Engineers.</li> <li>(i) Anti-fire &amp; Antitheft insurance for the period covering till erection.</li> </ol>

	<p>(a) <b>Issue of materials to the Contractor for erection:</b></p> <p>The material will be issued by ENGINEER to the contractor for execution of work against indemnity bond for the supply value of the tender schedule or equivalent cost of material, as per the discretion of "Engineer-in-charge" till its erection. Materials will be issued in stages in such a way that no point of time cost of materials in Contractor's custody is more than the value of indemnity bond made available by the Contractor.</p>
3.4	<p><b>Stage payment for supply of Major Electrical material by the Contractor:</b></p> <p>Stage payment limited to 70 % of the rate of <b>Major Electrical material such LT XLPE Cable, HDPE pipe, HMT, LED fittings, octagonal poles etc.</b> awarded in the contract (as a separate NS item for the purpose) shall be made to the Contractor for above mentioned material physically brought by the Contractor to the site (even before its actual use in the work) subject to following: -</p> <ul style="list-style-type: none"> <li>(a) The material shall be strictly in accordance with the contract specifications.</li> <li>(b) The material shall be delivered at site and properly stored under covered sheds at Contractor's cost and protected against damage, deterioration, theft, fire etc. to the satisfaction of the Engineer-in-charge. The Contractor shall store the bulk material in the measurable stacks.</li> <li>(c) The quantities of materials shall be brought to the site only in such instalments that would facilitate smooth progress of work and consumed in reasonable time. The decision of Engineer-in-charge regarding quantity of Major Electrical material to be brought to the site shall be final and binding to the Contractor.</li> <li>(d) Proper accountal in the material registers to be maintained in the prescribed format at the site for the receipt and use of the material on day to day basis.</li> <li>(e) Submission of indemnity bond with validity up to the completion/extended period in the prescribed format at the Contractor's cost, vesting the ownership of such material with the HRIDC.</li> <li>(f) Submission of insurance policy with validity up to the completion/extended period at the Contractor's cost, in favour of ENGINEER against damage, deterioration, theft, fire etc.</li> </ul> <p>The balance payment shall be released only after material is actually consumed in the work. The price variation claim would continue to be governed as per extant PV clause and with reference to delivery at site.</p>

3.5	<p><b><u>Variation conditions: -</u></b></p> <ul style="list-style-type: none"> <li>• Unless otherwise specified in the special conditions of the contract, the accepted variation in quantity of each individual item of the contract would be up to 25% of the quantity originally contracted.</li> <li>• 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 up to the limit of 25% variation in quantity of individual item of works.</li> <li>• 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.</li> <li>• Quantities operated in excess of 125% but up to 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender.</li> <li>• Quantities operated in excess of 140% but up to 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender.</li> <li>• 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.</li> </ul> <p><b><u>Variation to quantities of Minor Value Item:</u></b></p> <p>The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). <b>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.</b></p> <ol style="list-style-type: none"> <li>a) Quantities operated up to 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;</li> <li>b) Quantities operated in excess of 100% but up to 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;</li> </ol> <ul style="list-style-type: none"> <li>• 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.</li> </ul>
4.0	<b>SECURITY OF MATERIALS:</b>
4.1	The contractor shall be responsible for the security of material irrespective of the fact that the material is kept in HRIDC premises/ Firm store premises. The contractor shall make adequate arrangements at site as deemed necessary for guarding the same from the thefts and any sort of damage by outsiders or his labour.
5.0	<b>DEALING WITH COMPOSITE WORK:</b>
5.1	Deleted
6.0	<b>Inspection and Testing</b>

6.1	Whenever the Engineer-in-charge or his representative gives notice to the Contractor(s) that materials are to be inspected at the site, the Contractor(s) shall having regard to the inspection, test or examination required give to the Engineer-in-charge or his representative sufficient notice of such materials being ready for inspection. <b>THE COST OF FACTORY INSPECTION/ SITE INSPECTION/ LAB TESTS / DOCUMENTATIONS WILL BE BORNE BY THE CONTRACTOR</b>
6.2	Delay to works arising from the late submission of such notice will not be acceptable as reason for delay in the completion of the works.
<b>7.0</b>	<b><u>REJECTION OF MATERIALS:</u></b>
7.1	Factory made material shall have to be tested before leaving the manufacturer's premises. However, appropriate materials may also be tested at the site and they may be rejected if found not suitable or not in accordance with the specifications, notwithstanding the result of tests at manufacturer's works or elsewhere or test certificate.
7.2	The Engineer or his representative shall have the right to order, at any time, that any construction materials which do not meet with his approval shall not be used in the works. Such rejected materials shall be removed from the site by the Contractor(s) at his own expenses, notwithstanding any prior approval which might have been given earlier. Once a particular material is rejected by Engineer-in-charge, an entry to that effect should be made in material passing register.
7.3	The instructions to the Contractor(s) to remove the rejected material within reasonable time as given by the Engineer-in-charge should be complied by the Contractor(s) at his own cost.
7.4	In case of default on the part of the Contractor(s) in removing rejected materials within the time specified in notice, the Engineer shall be at liberty to have them removed by other means at the cost of the Contractor(s). In addition, a penalty of up to Rs. 20,000/- per case for above default may also be levied on the Contractor(s).
<b>8.0</b>	<b>Quality Assurance Plan</b> The Quality assurance plan for the inspection of material at manufacturer's factory, post receipt inspection at Site's stores/ turnkey contractor's site stores, dispatch of material, supply lots, counter checking etc. is in force for the procurement and turnkey works which shall be applicable, as the case may be, along with up to date amendments, if any. <b>Note: - Inspection of material will be carried out by Engineer representative /RITES as decided by Engineer and as per codal provision up to amendment and extant rules.</b>
<b>9.0</b>	<b><u>MISCELLANEOUS:</u></b> Engineer shall not be responsible for any loss or damage to the Contractor/s men, materials, equipment, tools and plants etc. from any cause whatsoever. No claim for idle labour, idle machinery and plant etc., on any account will be entertained. Similarly, no claim shall be entertained for business loss or any such loss.
<b>10.0</b>	<b><u>GENERAL:</u></b>
10.1	ENGINEER shall not be responsible for any loss or damage to Contractor's men, material, equipment, tools and plants, etc. due to any cause whatsoever.
10.2	If any work (whether temporary or permanent) or materials, the value of which has been included in an on account bill is destroyed or damaged or has/have for any other

	reasons to be replaced or restored by the Contractor(s), the value of the work or other materials as destroyed may be recovered by Engineer from any payment due to the Contractor(s) or may be recovered at any time from the Contractor(s) as debit due to the Contractor(s) and no payment made by the ENGINEER to the Contractor(s) after the aforesaid amount becomes due and recoverable shall in any way prejudice Engineer right for lawful recovery.
10.3	The Contractor(s) will ensure that if minimum water way of the bridge is blocked during the course of construction, then such blockage is removed by him at his own cost before the middle of June every year or as directed by the Engineer-in-charge. Any damage to the bridge on this account will be the Contractor's responsibility.
10.4	In any case, in which by virtue of section 20(a) and 21(4) of the Contract Labour Regulation and Abolition Act-1970, ENGINEER is obliged to provide amenities and/ or pay wages to labour employed by the Contractor(s) directly or through petty Contractor(s) or sub-Contractor(s) under this contract, then the Contractor(s) shall indemnify the HRIDC fully and HRIDC shall be entitled to recover from the Contractor(s), the expenditure incurred on providing the said amenities and/or wages so paid by deducting it from the Security Deposit or from any sum due to the Contractor(s) provided that if any dispute arises as to the expenditure incurred by HRIDC or provision of the said amenities, the decision of the Engineer thereof shall be final and binding.
10.5	The Contractor(s) shall arrange for effective technical supervision of the work and shall be represented by the authorized representative at the site of work during the currency of the contract. He will arrange to receive all the correspondences at the site of work during execution of work.
10.6	No claim for extra payment shall be entertained on account of interruption to work due to rain, floods or delay in arranging closure of water channels, etc.
10.7	The pathways for the piers in water and elsewhere will have to be made and maintained by the Contractor(s) and nothing extra shall be payable on this account.
10.8	<b>There may be a water supply/sewerage/any other underground/overhead line passing at the site of work and any delay in its shifting/adjusting will not entitle the Contractor(s) to any claim whatsoever.</b>
10.9	Work will have to be done in close co-operation with the other Departments/ Agencies if any.
<b>11.0</b>	<b><u>SAFETY MEASURES/ PRECAUTIONS AND PENALTIES FOR VIOLATIONS:</u></b>
11.1	The Contractor(s) shall take all precautionary measures in order to ensure the protection of his own personnel, machinery and equipment moving about or working on the railway yard/premises and shall have to conform to the rules and regulations of the ENGINEER. If any unforeseen accident or injury happens at site of work, the Contractor(s) shall be solely responsible for the same. This work is being executed in close vicinity of running line and the Contractor shall deploy day and night continuously minimum 02 flagmen/patrol men with necessary equipment per km as per requirement during different stages of construction. Besides this if necessity arises, if and when in the course of the work, there is likely to be any danger to persons in the employment of the Contractor(s) due to running traffic while working in the railway yard/ premises, the Contractor(s) shall apply in writing to ENGINEER to provide flagmen or lookout men for protection of such persons. ENGINEER will, however, decide as to whether it is necessary to post such flagmen for various types

	<p>of work and also the number of such men required to protect the gang or gangs of the Contractor(s) working at site. ENGINEER shall remain indemnified by the Contractor(s) in the event of any accident occurring in the normal course of work, arising out of the failure of Contractor(s) or his men to exercise reasonable precautions at all places of work whether or not ENGINEER decides to post flagmen at any particular site of work.</p> <p>Notwithstanding the above provision, it should be clearly understood that the safety of men and material at the worksite will be the sole responsibility of the Contractor(s).</p>
11.2	<p>The Contractor(s) shall abide by the ENGINEER regulations in force for the time being and ensure that the same are followed by his representative, agents or subcontractor(s) or workmen. He shall give due notices and training to his employees and workers about provision of the above Para.</p>
11.3	<p>While working within station limits especially on passenger platforms, the Contractor(s) shall ensure that at all time 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 ENGINEER staff or his own workmen, machinery and equipment.</p>
11.4	<p>The work must be carried out most carefully without any infringement of the Indian Railway Act or the General and Subsidiary Rules in force on ENGINEER 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 ENGINEER provided that all damages and disfiguration caused by the Contractor(s) to any railway/HRIDC property must be made good by the Contractor(s) at his own cost failing which cost of such repairs shall be recovered from the Contractor(s). The work must be carried out in the yard without any infringement to the Schedule of Dimensions applicable for BG as issued by the Railway Board. It will be the responsibility of the Contractor(s) to ensure that there is no infringement to the track which will affect the smooth and efficient running of traffic.</p>
11.5	<p>Moreover, if at any time the works to be carried out directly concern the safety to trains &amp; locos, the Contractor's staff must comply fully with the railway/HRIDC regulations given to him by authorized ENGINEER staff. The Contractor's employee and workers may for no reasons operate an installation concerning train safety or train movement. They shall notify the authorized representative of ENGINEER who will take all necessary steps in this regard. Special attention of Contractor(s) is drawn to relevant clauses of Indian Railways Standard General Conditions of Contract, April 2022 and advised to take all precautions for the safety of public, ENGINEER staff and his own personnel.</p>
11.6	<p>If the work is to be executed in proximity of the running railway track, the Contractor(s) will be required to follow all precautions and carryout all works that may be necessary to ensure the safety of the running track/trains, without imposition of any speed restriction thereon as may be directed by the Engineer or his authorized representative. No claim whatsoever will be entertained for either any inconvenience or interruption caused to the Contractor(s) or for the rescheduling of the operations or for any other reasons on this account.</p>
11.7	<p>The Contractor(s) shall be responsible for safe custody of tools and for the safety of his labour. He should ensure that labour on work removes their tools clear of the track on the approach of any trains. After the day's work, the Contractor(s) should ensure that the tools are deposited in proper toolbox before the labourers proceed for their</p>

	<p>home. Tools issued should not be allowed to fall in unwanted hands that can tamper with the railway track. The Contractor(s) shall employ suitable supervisor to supervise the work at site.</p> <p>Though all the work relating to the safety of running trains shall be executed under ENGINEER supervision, presence of qualified supervisor from the Contractor's side is a must at the site of work.</p>
11.8	<p>In case of failure to adhere to above provisions or if unsafe practices/ safety violation by Contractor(s)/his staff are noticed at the site of work, the Contractor(s) shall be levied with a penalty of Rs 20,000/- for the 1st incident, Rs 50,000/- for the 2nd incident and Rs 1,00,000/- for subsequent such incident. Repeated safety violations shall become a valid ground for initiating the contract termination proceedings under Clause-62 of Indian Railways Standard General Conditions of Contract, April 2022.</p>
11.9	<p>In the event of occurrence of an accident at the work site, a departmental enquiry shall be held and in case it is established that the accident has occurred on account of Contractor's negligence or the negligence of his men, penalties up to an upper limit of 10% of the total cost of the work shall be imposed on the Contractor(s). Further, the Engineer reserves the right to terminate the contract with immediate effect if the Contractor(s) is found responsible for causing an accident after giving "show cause notice/notices" to the Contractor(s) in addition to lodging criminal case under Railway Act/IPC.</p>
11.10	<p>In the event of Contractor(s) not completing the work or leaving it unsafe at the end of day's work, warranting speed restrictions to be imposed, track shall be attended by ENGINEER immediately at the Contractor's cost without any further notice. In addition to the labour charges recoverable from the Contractor(s), supervision charges @ 12½% and train detention charges @ Rs.5,000/- every half an hour of delay or part thereof shall also be recovered.</p>
11.11	<p>In case of any damage to OFC/Cable occurred due to fault of Contractor(s), a flat penalty of Rupees One lakh will be imposed (Ref: - CAO/C's letter No. 74-W/O/WA/ Pt.X/CP dated 02.08.2007).</p>
<b>12.0</b>	<b><u>GENERAL RESPONSIBILITY AND LIABILITY OF CONTRACTOR:</u></b>
12.1	<p>The Contractor(s) shall be responsible for any type of structural damage to property or injury caused by work or his workmen to persons, animals, or things and shall indemnify the ENGINEER in respect thereof and shall be held entirely responsible for all works carried out by him until it is finally taken over by ENGINEER and he will be liable to be called upon to make good any damage or loss which may occur to the bridge work by inclemency of weather, flood, etc. or due to any other cause during entire period until the work is taken over.</p>
12.2	<p>Examination or approval by ENGINEER of any drawings or other documents submitted by the Contractor(s) shall not relieve the Contractor(s) of his responsibilities and/or liabilities under this contract.</p>
12.3	<p>Notwithstanding the specifications and conditions stated in the contract, the Contractor(s) shall keep Engineer fully indemnified and free from all liabilities and risks consequential to any lapse on his part in respect of material quality, standard of workmanship, accuracy of fabrication and the like. He shall provide all labour and material required for execution of the work as per listed standards and in absence of any IRS &amp; BIS specifications to the relevant British/American Standards.</p>



12.4	Latest edition of relevant Codes including up to date correction slips, on date of submission of tender/negotiated rates shall govern. These Codes of Practice are available from the Manager, Government of India publication Branch, Patiala House, New Delhi and Director, Indian Standards Institution, Manak Bhawan, Bahadur Shah Zafer Marg, New Delhi.
12.5	The Contractor(s) must have one copy of each relevant Code at site as applicable for ready reference of Engineer/other inspecting officials.
<b>13.0</b>	<b><u>SCHEDULE FOR TIMELY COMPLETION OF WORK AND PENALTY FOR DELAYS:</u></b>
13.1	The whole work shall be completed within the stipulated completion period from the date of issue of acceptance letter.
13.2	The sequence in which the various works & activities are programmed & scheduled to be carried out shall be prepared by Contractor(s) in the form of PRIMAVERA/ MS PROJECT and will be submitted to ENGINEER within 30 days from the allotment of the work and the same shall be got approved from the Contract Signing Authority. The various works and activities should be detailed with respect to nos. of man and machinery required to be deployed to complete each activity.
13.3	<b>Mid-term progress review and token penalty for slow progress:</b> The Contractor shall be required to maintain proportional progress in accordance with programme submitted by the Contractor duly approved by ENGINEER. During the course of work, the progress will be reviewed every 3 months, and if the progress achieved by the Contractor is found to be significantly lagging behind the proportional progress shown in the approved programme due to reasons entirely attributable to the Contractor, then a token penalty of up to Rs. 50,000/- per month or as decided by ENGINEER, can be imposed by the contract signing authority on the Contractor after issuing a 15 days "show cause notice". Decision of ENGINEER in this regard will be final and binding on the Contractor. However, the penalty so imposed, shall be waived off, if the Contractor achieves the scheduled progress as per approved programme in the subsequent quarters.
<b>14.0</b>	<b><u>RECORDS OF CONSTRUCTION WORK:</u></b>
14.1	The Contractor(s) is required to take and supply to Engineer-in-charge, coloured photographs and films on construction activities including the one prior to the work. The Contractor shall provide the photographs/films as documented of all activities at the time of submission / approval of on account bills to DGM/HRIDC office as directed by the site engineer. A recovery of Rs. 5000/- shall be made in case of failure to do this.
14.2	The coloured photographs shall be taken by the Contractor(s) of all the construction activities pertaining to the work at regular intervals as directed by Engineer-in-charge. Three sets of 5" x 7" prints of each snap shall be supplied. Out of the above, the Contractor(s) shall be required to supply, as directed by Engineer-in-charge, blow up size colour prints of up to 36" x 36" size up to 5 photographs of each important site (minimum 03 copies of each). The negatives of all the photographs taken shall also be supplied to the Engineer-in-charge The Contractor(s) shall show extreme promptness in supplying of the photographs on directions of Engineer-in-charge.
14.3	All the cost of reels, taking and recording, developing and printing, etc. shall be deemed to have been included in rates quoted against various items and nothing extra shall be paid for the items of work under this Clause as above.

14.4	HRIDC shall have full ownership and copy right of all these photographs and the Contractor(s)/tenderer(s) shall indemnify ENGINEER against any claim of any sort. The Contractor(s) shall maintain accurate plans and charts showing the dates and progress of all main operations and the Engineer-in-charge shall have access to this information at all reasonable times. Records of tests shall be handed over to the Engineer's representative after carrying out the tests.
<b>15.0</b>	<b><u>SITE REGISTERS:</u></b>
15.1	The following registers will be maintained at site by the Contractor(s): <ul style="list-style-type: none"> <li>i) <b>Site Order Register:</b> The Contractor(s) shall promptly sign orders given therein by the Engineer or his representative or his superior officers and comply with them. The compliance shall be reported by the Contractor(s) to the Engineer-in-charge in reasonable time so that it can be checked/verified</li> <li>ii) <b>Labour Register:</b> This register will be maintained to show daily strength of labour in different categories employed by the Contractor(s).</li> <li>iii) <b>Plant and Machinery Register:</b> This register will record daily particulars of machinery with the Contractor(s) and will be signed jointly by the Engineer's representative and the Contractor(s).</li> <li>iv) Quality control register for various materials</li> <li>v) Daily progress register</li> <li>vi) <b>Hindrance register:</b> This register will maintain the number of days when work could not progress/remained suspended and reason thereof. This list given above is not exhaustive.</li> <li>vii) Contractor(s) may be asked to maintain additional registers, if required by Engineer-in-Charge. Any other register instructed by Engineer-in-charge time to time shall also be prepared by contractor.</li> </ul>
<b>16.0</b>	<b><u>INTERRUPTION OF WORKS DURING MONSOONS:</u></b> The stipulated completion period is inclusive of the monsoon/rainy season. The Contractor(s) should, therefore, plan and prepare his work keeping this fact in mind.
<b>17.0</b>	<b><u>CONSTRUCTION EQUIPMENT:</u></b>
17.1	The Contractor(s) shall arrange and operate at his own cost, all necessary tools, plants, machineries and equipment necessary for successful and timely completion of work.
17.2	If in the opinion of the Engineer-in-charge, equipment/plants brought by the Contractor(s) are not suitable for the work concerned, the Engineer-in-charge shall have the right to order the Contractor(s) to replace them by suitable plants/ equipment. In the interest of public convenience, the Engineer-in-charge may insist on a specific way of execution of the work.
17.3	The Contractor(s) shall be required to give a trial run of the equipment for establishing their capacity to achieve the laid down specifications and tolerance to the entire satisfactions of the Engineer-in-charge before commencement of any work.
17.4	All equipment provided shall be of proven efficiency and shall be operated and maintained in a manner acceptable to Engineer-in-Charge.
17.5	No equipment shall be removed from the site without prior permission of the Engineer-in-Charge.
<b>18.0</b>	<b><u>EXTENSION OF TIME PERIOD:</u></b> - Same as Clause 1.2.45 of PART-I CHAPTER –II A

<b>19.0</b>	<p><b>DISCREPANCIES</b></p> <p>In case of discrepancies in the description or conflicting interpretation of provisions kept in different sections of contract or among various specifications/codes, following order of preference shall be followed:</p> <p><b>Technical Matters:</b></p> <p>a) Description of the item of BOQ.</p> <p>b) The specifications mentioned in this document including specifications of USSOR shall be prime governing. Codes/specifications specifically mentioned in this document shall have overriding preference over other codal provisions.</p> <p>c) Where there is conflict between provisions in IRS &amp; IS specifications, provisions in IRS specifications shall prevail.</p> <p>d) Where there is no provision of specifications in IRS, provisions in IS specifications should be adopted. Where there are no provisions in IRS and IS Specifications, provisions in IRC Specifications should be followed.</p> <p>e) The decision of Engineer-in-charge shall be final and binding in the interpretation of the clause of the codes of practice and specifications of this tender and no claim whatsoever shall be entertained on this account from the Contractor.</p> <p><b>General/Other than Technical Matters - For general matters, order of preference shall be as follows:</b></p> <p>(a) Description in the item of BOQ.</p> <p>(b) Provisions contained in "site data and specifications section of the tender document"</p> <p>(c) Provisions contained in General Tender Conditions and instructions to tenderer.</p> <p>(d) General Conditions of Contract.</p> <p>(e) Provisions contained in code of practice for Engineering department</p>
<b>20.0</b>	<b>TOOLS AND PLANTS:</b>
20.1	Necessary tools and plants required for handling, assembling and linking shall be arranged by the Contractor himself at his own cost. T & P on hire basis will be provided by the HRIDC if readily available with HRIDC and necessary hire charges will be recovered from the Contractor.
20.2	These tools shall be returned to HRIDC at the end of maintenance period i.e. after successful completion of the contract. Only normal wear and tear shall be accepted and the same shall be decided by the Engineer-in-charge and shall be final, binding on the Contractor. The Contractor shall have to pay for the tools damaged or lost
20.3	The Contractor shall be required to arrange for safe custody of tools & plants at the times, when the same are not being used and even when these are being used the Contractor shall ensure that labour does not use these tools and plants carelessly and or infringes the running line in any manner. For this, the Contractor shall construct suitable tools boxes at suitable locations to be decided by the Engineer-in-charge. Nothing extra on this account shall be payable to the Contractor.
<b>21.0</b>	<b>Responsibility for any mishap, derailment, accident arising out of this work:</b>
21.1	In the event of any accident during handling of materials, assembling and execution of Electrical works or any accident on existing running lines arising on account of Contractor or his own staff not observing safety precautions to various operations required for the execution of work, the Contractor shall be fully responsible the damages and also have to pay for the accident relief train arranged, if any at the following rates:

<b>22.0</b>	<b>GENERAL ARRANGEMENT:</b>
22.1	The Contractor shall provide communication facility at the work site for effective means of communication like VHF or mobile telephone service etc. between HRIDC office and site of work during the period of validity of contract in order to have effective monitoring of planning and progress of work. However, nothing extra will be paid to the Contractor for such a facility.
22.2	Contractor will have to produce license for labour to be engaged on for this work from the concerned Labour Enforcement Officer under Contractor Labour Regulation and Abolition Act-1970 prior to the commencement of the work failing which payment for the work done will not be made.
22.3	Tenderer(s) are required to observe all safety precautions at all time as mentioned in the section ' <b>Safety, Health and Environment (SHE) Protocol to be followed by the Contractor</b> ' of this tender document. Nothing shall be paid on this account.
22.4	The Contractor will have to arrange Electric connection if required at his own cost. However, necessary assistance in arranging Electric connection will be given by ENGINEER on the written request of Contractor. In case, ENGINEER is unable to arrange Electric connection, ENGINEER will not be responsible at all and the Contractor will have to make his own arrangements.
22.5	If proper approach road for transporting the various material are not available, the Contractor may have to handle the material involving head lead etc. Proper space for stacking the material may not be given in the yard and it may be away from the yard. The Contractor will be required to stack the material at the specified area nominated by the Engineer In-charge.
22.6	The work is to be completed on a strict time bound schedule. The Contractor(s) who have sound experience and necessary resources, requisite tools and plants, equipment and finance to handle the job shall be considered. Tenderer(s) are required to submit credentials about the experience of having executed these kinds of various works.
22.7	After the acceptance letter is issued, Contractor will be required to submit the detailed programme for completion of work.
<b>23.0</b>	<b>Documentation:</b> <ol style="list-style-type: none"> <li>a. The bidder shall furnish following documents along with his offer - Sectional view, showing the General constructional feature with conductor / conductor screen / insulation / armoring / inner and outer sheath etc.</li> <li>b. Drawing of cable drums with details of material dimension and paint etc.</li> <li>c. All the required type test reports.</li> <li>d. Literature, pamphlets for the supplied items.</li> </ol>
<b>24.0</b>	<b>Before purchasing of any Major value items, the contractor shall take prior Approval from Engineer .</b>
<b>25.0</b>	<b>Technical and guaranteed particulars:</b> The bidder shall furnish all Guaranteed Technical Particulars, as called for, in <b>Annexure-1 of Tender Notice</b> . Particulars, which are subject to guarantee, shall be clearly identified. Offer not containing this information will not be considered for acceptance.
<b>26.0</b>	<b>Challenge Clause: -</b> The material offered/received after the inspection by the authorized inspecting officer

	<p>may again be subjected to test for any parameter from any testing house/in-house technique of the ENGINEER and the results if found deviating/ un-acceptable or not complying to Technical specification, the bidder shall arrange to supply the replacement within thirty (30) days of such detection at his cost including to &amp; fro transportation. In addition, penalty @10% of cost of the inspected lot of material shall be imposed.</p>
<b>27.0</b>	<p><b>Guarantee Period: -</b></p> <ul style="list-style-type: none"> <li>• The Contractor shall guarantee satisfactory working of the installations erected by him for a period of <b>Eighteen months</b> (Except LED light/flood light fitting) from the date of commercial operation or from the date of provisional Acceptance of section by the Purchaser whichever is <b>later</b>.</li> <li>• <b>The guarantee of all type of LED light fitting/LED flood light fitting etc. will be 60 months from the date of commercial operation or from the date of provisional acceptance of section by the purchaser whichever is later.</b></li> <li>• The guarantee for spares should be coincident with the guarantee for erected equipment.</li> <li>• On expiry of the guarantee period (i.e. 18 months) and issue of the certificate of final acceptance of the entire installations the security deposit will be refunded or Bank Guarantee released to the Contractor after adjustment of any dues payable by the Contractor. The warranty period of all types of LED light fittings is 60 months. SD amount (5% of total LED fitting cost) will be released after completion of that warranty period. <b>Contractor will have to submit manufacture guarantee certificate for a period of 60 months for all type of LED fitting to MSIL and HRIDC office.</b></li> </ul>
<b>28.0</b>	<p><b>Railway crossing fee/ Permit fee:</b> Railway crossing Fee / permit fee / any other charges deposited to Railway if any will be borne by HRIDC on submission of original receipt issued by Railway.</p>
<b>29.0</b>	<p><b>Road crossing fee/ permit fee:</b> National Highways / State Highway / Other Roads crossing fee / permit fee / any other charges deposited to National Highways / State Highway Authorities if any will be borne by HRIDC on submission of original receipt issued by concern authorities.</p>
<b>30.0</b>	<p><b>Price variation Clause(PVC) - Same as clause 1.3.2 (D) of part-1 chapter-III(A) price and payment for OHE.</b></p>

XXXXXXXXXXXXXXXXXXXX

# **PART - I**

# **CHAPTER- III A**

**PRICES AND PAYMENT**

**FOR OHE**

**PART - I**  
**CHAPTER – III “A”**

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

<b>PARA NO.</b>	<b>SUBJECT</b>
1.3.1	Scope.
1.3.2	Schedule of prices.
1.3.3	Prices of equipment's, Components and materials
1.3.4	Prices of additional supplies.
1.3.5	Payment and Recoveries.
1.3.6	Invoicing procedure.
1.3.7	Payments for designs.
1.3.8	Advance payments for foundations.
1.3.9	'On Account' Payments.
1.3.10	Recoveries from the Contractor.
1.3.11	Progress Payments for supply and erection.
1.3.12	Payments for additional supplies.
1.3.13	Tax.
1.3.14	Payments on provisional Acceptance of each Sub-group/Sub-Section.
1.3.15	Payments for surplus materials
1.3.16	Final settlement.
1.3.17	Measurements.
1.3.18	Mobilization Advance.

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 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) on <https://etenders.hry.nic.in> site. **The rate at which payment are to made shall be arrived at by loading SOR rate uniformly for each item with escalation of estimate (% above SOR) and loading of percentages quoted by the tenderer over advertised value of the section.** The prices so obtained shall be the unit prices for the various items of works given in Schedule-1, Section-1 & 5. 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.

(a) (ii) **Rates of NON SOR Items (Non schedule items) (Schedule-1, Section-6&12)**

The rates of NON SOR items (**Schedule-1, Section-6 & 12**) have to be quoted separately on <https://etenders.hry.nic.in> site. The tenderer is 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 & 12 shall be derived after loading the Non 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-6 & 12.

The offers where more than one percentage has been given for different items for Non SOR items shall liable to be rejected.

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 Engineer. Minor changes in basic designs shall not affect the unit prices, so long as such changes are mutually agreed to by the Engineer 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, equipment's, fittings and components which will be supplied by the Engineer.

**(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 ENGINEER 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 ENGINEER .

The prices shall include all taxes (GST), 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 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 Engineer 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 are 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) PRICE VARIATION CLAUSE (PVC) For OHE, SCADA & GENERAL SERVICES WORK: -**

**D1. Applicability:** Price Variation Clause (PVC) shall be applicable only in tender having advertised value above Rs. 2 Crores and having completion period above 12 months. Provided further that, in a contract where PVC is applicable, following shall be outside the purview of price adjustments (i.e. shall be excluded from the gross value of the work for the purpose of price variation):

- a) Materials supplied by Railway to the Contractors, either free or at fixed rate;
- b) Any extra item(s) included in subsequent variation falling outside the purview of the Bill(s) of Quantities of tender, under clause 39. (1)(b) Of these Standard General Conditions, unless applicability of PVC and 'Base Month' has been specially agreed, while fixing the rates of such extra item(s).

**D2. Base Month:** The Base Month for 'Price Variation Clause' shall be taken as the one month prior to closing of tender, unless otherwise stated elsewhere. The quarter for applicability of PVC shall commence from the month following the Base month. The Price Variation shall be based on the average Price Index of the quarter under consideration.

**D3. Validity:**

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

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

**D4.** Components of various items in a contract on which variation in prices be admissible, shall be steel, cement, ferrous material, non-ferrous material, insulators, zinc and other materials, labour, plant & machinery, fuel, explosives, detonators etc. Adjustment for variation in prices of these items shall be determined in the manner prescribed.

**D5.** No price variation shall be admissible for fixed components.

**D6.** The percentages of various components in various type of works shall be as specified for all item (s)/ Bill(s) of Quantities in tender document and the same shall be fixed as per table & classifications given below: -

**(A) For Civil Engineering Works**

S N	Classification		1A, 2 & 3A	4A	5A	6A	7	8A	9A	1B, 3B, 4B, 5B, 6B 8B & 9B	1C, 3C, 4C, 5C, 6C, 8C & 9C	3D, 4D, 5D, 6D, 8D & 9D	3E, 4E, 5E, 6E, 8E & 9E
	Components												
1	Fixed	*	15	15	15	15	15	15	15	15	15	15	15
2	Labour	Lc	15	20	25	15	15	15	20	5	5	10	25
3	Steel	Sc	0	0	20	0	0	0	0	75	0	50	0
4	Cement	Cc	0	0	15	0	0	0	0	0	75	0	0
5	Plant Machinery & Spares	PMc	35	15	0	20	20	20	30	0	0	10	30
6	Fuel & Lubricants	Fc	25	15	10	35	35	35	15	5	5	10	20
7	Other materials	Mc	10	15	15	15	15	15	20	0	0	5	10
8	Detonators & Explosive	Ec	0	20	0	0	0	0	0	0	0	0	0
Total			100	100	100	100	100	100	100	100	100	100	100

\* It shall not be considered for any price variation.

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

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

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

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

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

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

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

$$(iv) \quad E = \frac{(W \text{ or } WS \text{ or } WC \text{ or } WSF \text{ or } WF \text{ or } WSFL \text{ or } WFL) \times (EQ - EB) \times EC}{EB \times 100}$$

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

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

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

**(B) For OHE and other work: -**

$$(i) \quad T = [0.4136x (CQ - CB) / CB] \times 85$$

$$(ii) \quad R = [0.94x (RT - RO) / RO + 0.06x (ZT - ZO) / ZO] \times 85$$

$$(iii) \quad N = [(PT - PO) / PO] \times 85$$

$$(iv) \quad I = [(IT - IO) / IO] \times 85$$

$$(v) \quad G = [(MQ - MB) / MB] \times 85$$

$$(vi) \quad Er = [(LQ - LB) / LB] \times 85$$

Where,

L	Amount of price variation in Labour
M	Amount of price variation in Materials
F	Amount of price variation in Fuel
E	Amount of price variation in Explosives
PM	Amount of price variation in Plant, Machinery and Spares
S	Amount of price variation in Steel Supply Item
C	Amount of price variation in Cement Supply Item
T	Percentage variation payable on the gross value of bill of Concreting (Bill(s) of Quantities for concrete items)
R	Percentage variation payable on the gross value of bill of Ferrous Items (Bill(s) of Quantities for ferrous items)
N	Percentage variation payable on the gross value of bill of Non-Ferrous Items (Bill(s) of Quantities for non-ferrous items)
I	Percentage variation payable on the gross value of bill of Insulator (Bill(s) of Quantities for Insulator items)
G	Percentage variation payable on the gross value of bill of General Works (Bill(s) of Quantities for General items)
Er	Percentage variation payable on the gross value of erection (Bill(s) of Quantities for Erection Item)
LC	% of Labour Component in the item(s)
MC	% of Material Component in the item(s)
FC	% of Fuel Component in the item(s)
EC	% of Explosive Component in the item(s)
PMC	% of Plant, Machinery and Spares Component in the item(s)
SC	% of Steel Supply Item Component in the item(s)
CC	% of Cement Supply Item Component in the item(s)

W	Gross value of work done by Contractor as per on-account bill(s) excluding the Gross value of work under WS or/and WC or/and WSF or/and WF or/and WSFL or/and WFL and cost of materials supplied by Railway either free or at fixed rate,
WS	Gross value of work done by Contractor for item(s) of supply of steel.
WC	Gross value of work done by Contractor for item(s) of supply of cement and /or supply of grout material.
WSF	Gross value of work done by Contractor for item(s) of Fabrication & Erection of Structures including supply of Steel.
WF	Gross value of work done by Contractor for Fabrication & Erection of Structures excluding supply of Steel.
WSFL	Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders including supply of Steel.
WFL	Gross value of work done by Contractor for item(s) of Fabrication, Assembly, Erection / Launching of Girders excluding supply of Steel.
LB	Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the base period
LQ	Consumer Price Index for Industrial Workers - All India: Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration
MB	Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the base period
MQ	Wholesale Price Index: All commodities – as published in the R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration
FB	The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the base period
FQ	The average of official prices of Diesel available on the official website of 'Petroleum Planning and Analysis cell' under Ministry of Petroleum and Natural Gas for Delhi, Kolkata, Mumbai & Chennai, for the 3 months of the quarter under consideration
EB	Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g). Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the base period.
EQ	Index number of Monthly Whole Sale Price Index for the category 'Explosive' of (g). Manufacture of other chemical products under (J) MANUFACTURE OF CHEMICALS AND CHEMICAL PRODUCTS, published by Office of Economic Adviser, Govt. of India, Govt. of India, Ministry of Commerce & Industry, Department of Industrial Policy & Promotion (DIPP), for the average price index of 3 months of the quarter under consideration.
PMB	Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI (Reserve Bank of India) Bulletin, for the base period.
PMQ	Index Number of Wholesale Prices in India by Groups and Sub Groups (Averages) for 'Manufacture of machinery for mining, quarrying and construction'– published in RBI (Reserve Bank of India) Bulletin, for the average price index of 3 months of the quarter under consideration.
SB	The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the base period.
SQ	The average rate provided by the Joint Plant Committee for the relevant category of steel item as mentioned in Clause 46A.9; for the 3 months of the quarter under consideration.

CB	Index No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the base period
CQ	No. of Wholesale Price Index of sub-group Cement, Lime & Plaster as published in RBI Bulletin for the average price index of the 3 months of the quarter under consideration
RT	IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is two months prior to date of inspection of material.
RO	IEEMA price index for Steel Blooms (size 150mmx150mm) for the month which is one month prior to date of opening of tender.
PT	IEEMA price index for Copper wire rods for the month which is two months prior to date of inspection of material.
PO	IEEMA price index for Copper wire rods for the month which is one month prior to date of opening of tender.
ZT	IEEMA price index for Zinc for the month which is two months prior to date of inspection of material
ZO	IEEMA price index for Zinc for the month which is one month prior to date of opening of tender
IT	RBI wholesale price index for the sub-group "Insulators" for the month which is two months prior to date of inspection of material
IO	RBI wholesale price index for the sub-group "Insulators" for the month which is one month prior to date of opening of tender

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.

---

**D7. Price Variation during Extended Period of Contract:**

The price adjustment as worked out above, i.e. either increase or decrease shall be applicable up to the stipulated date of completion of work including the extended period of completion where such extension has been granted under Clause 17-A of the 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.

**(E) QUANTITIES**

The approximate estimated quantities of various items of work are included in Schedule-1, Section-1 to 5, under column quantities.

**(F) 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.

**(G) 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 Engineer 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 Engineer 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 Engineer. However, if the contractor is not satisfied with the decision of the Engineer in this respect he may appeal to HRIDC Officer within 30 days of getting the decision of the Engineer, supported by analysis of the rates claimed. The HRIDC official's decision after hearing both the parties in the matter would be final and binding on the contractor and the ENGINEER.

**PRICE OF EQUIPMENTS, COMPONENTS & MATERIALS: 1.3.3**

Same as Para 1.3.2 OF THIS CHAPTER.

**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 Engineer 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 mobilization 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 Engineer 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 **ENGINEER** 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 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 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 Engineer prior to the submission of invoices. For this purpose, the Schedule of quantities and measurements submitted by the Contractor for approval of the Engineer may be only up to 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). **Payments for Design/Drawing shall be made in final bill only.**

**ADVANCE PAYMENTS FOR FOUNDATIONS : 1.3.8 Deleted**

**“ON ACCOUNT” PAYMENTS: 1.3.9**

(a) 'On Account' payment will be made for equipment's, components, fittings and materials required for the execution of work and additional supplies as described below.

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 Engineer's representative.
3. Certificate of receipt of materials at Contractor's Depot/s duly accepted by the 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/Nationalized 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 Engineer 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 works of Sch-1, Section-1 to 5, as per the latest approved assessment of quantities (Para 2.5.9)

'On Account' payments will commence only when Schedule 1, Section-1 to 5 (Assessment-1) is approved by the Engineer. No On account payment shall be admissible on the items included in Schedule-1, Section-6. However, progress payment shall be admissible as per provision in Para 1.3.11.

**SUPPLY OF MATERIALS BY THE CONTRACTOR/S: -**

Materials used in the work by the contractor shall conform to the Railway Board, CORE and RDSO Specifications and the relevant I.S.I./I.R. S Specifications, and should be approved by the ENGINEER officials before utilizing them on works.

It should be clearly understood that the tendered rates include wastage and wash away due to rains, storms, floods or any other cause whatsoever.

**No loading, unloading, lead, lift, stacking, octroi, sales tax, toll tax, royalty or any other charges will be paid for the materials, tools and plants and tools arranged and brought by the contractor to the site of work.**

**(e) Payment against Supply of Material: -**

Payment limited to 70% of rate of material awarded in contract by contractor to site (even before its actual use in work) subject to following:

- Material shall be strictly in accordance with contract specification.
- Material shall be delivered at site and properly stored under covered sheds at contractor's cost and protected against damage, deterioration, theft, fire etc. to satisfaction of Manager/engineer in charge. Contractor shall store bulk material in measurable stacks.
- Quantities of material shall be brought to site only in such installments that would facilitate smooth progress of work and consumed in reasonable time. Decision of Manager/Engineer-in-charge regarding quantity of steel/contact wire/catenary wire to be brought to site shall be final and binding to contractor.
- Proper accountable in material register to be mentioned in prescribed format at site for receipt and use of material on day to day basis.
- Submission of indemnity bond with validity up to completion/ extended period in prescribed format at contractor's cost, vesting ownership of such material with HRIDC.
- Submission of insurance policy with validity up to completion/ extended period at contractor's cost, in favour of HRIDC against damage, deterioration, theft, fire etc.
- The balance payment (20%) shall be released only after material is actually consumed in work. Price Variation claim would continue to be governed as per extant PV clause

- and reference to delivery at site (if applicable)
- **The contractor shall receive balance 10% payment against these items after issue of PAC.**

**RECOVERIES FROM THE CONTRACTOR: 1.3.10**

(a) All the recoveries for materials supplied and services rendered by the Engineer 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 Engineer under the second sub-para of 1.2.20.1(b) will be recovered in full by the Engineer 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**

Progress payment for foundations, mast erection, bracket erection and wiring shall be as under.

- **Foundation:** On completion of foundation, the contractor shall receive payments to extent of 70% of prices of foundation and 20% after mast erection & muffing.
- **Mast Erection:** On completion of erection of Masts and portals, contractor shall receive payments to extent of 90 % of the prices for erection of Mast & Portals.
- **Bracket Assemblies:** On completion of erection of bracket assembly's contractor shall receive payments to extent of 70 % of prices of erection of bracket assemblies and 20% after erection of OHE.
- **Erection of OHE:** On completion of erection of other items & wiring the contractor shall receive payment to the extent of 70%.
- After final adjustment of OHE and SED Checking Contractor shall receive 20% balance payment of Item above.
- **SWITCHING STATION BUILDING** : For each Switching station building, 90% 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 10% 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 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 Engineer 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 Engineer 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 10% 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 Engineer (see para 1.2.53) on delivery of such materials to the Engineer.

**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**

**All the measurement work will be done according to HRIDC Procedure order No-C/HRIDC/01/2021 dated 29.01.2021**

**1.3.17.1 (Measurement procedure for work costing Rs. 5 crore or more)**

Quantities in Bill(s) of Quantities Annexed to Contract: The quantities set out in the accepted Bill(s) of Quantities with items of works quantified are the estimated quantities of the works and they shall not be taken as the actual and correct quantities of the work to be executed by the Contractor in fulfillment of his obligations under the contract. For work costing Rs. 5 crore or more, contractor shall be responsible for carrying out measurement of work executed and recording of measurement for the release of on account/final payment as per standard engineering practice.

**(a)** The Contractor shall be paid for the works at the rates in the accepted Bill(s) of Quantities and for extra works at rates determined under Clause 1.3.2 of these Conditions on the measurements taken by the Contractor's authorized Engineer in accordance with the rules prescribed for the purpose by the Railway. The quantities for items the unit of which in the accepted Bill(s) of Quantities is 100 or 1000 shall be calculated to the nearest whole number, any fraction below half being dropped and half and above being taken as one; for items the unit of which in the accepted Bill(s) of Quantities is single, the quantities shall be calculated to two places of decimals. Such measurements will be taken of the work in progress from time to time. The date and time on which 'on account' or 'final' measurements are to be made shall be communicated to the Engineer.

The date and time of test checks shall be communicated to the Contractor who shall be present at the site and shall witness the test checks, failing the Contractor's attendance the test checks may be conducted in his absence and such test checks shall not be withstanding such absence be binding upon Contractor provided always that any objection made by Contractor to test check shall be duly investigated and considered in the manner set out below:

- (i) It shall be open to the Contractor to take specific objection to test checks of any recorded measurement within 7 days of date of such test checks. Any re-test check done by the concerned Railway's authority in the presence of the Contractor or in his absence after due notice given to him in consequent 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.

**(b) Incorrect measurement, actions to be taken:** If in case during test check or otherwise, it is detected by the Engineer that agency has claimed any exaggerated measurement or has claimed any false measurement for the works which have not been executed; amounting to variation of 5% or more of claimed gross bill amount, action shall be taken as following:

- (i) On first occasion of noticing exaggerated/ false measurement, Engineer shall recover liquidated damages equal to 10% of claimed gross bill value.

On any next occasion of noticing any exaggerated/false measurement, railway shall recover liquidated damages equal to 15% of claimed gross bill value. In addition, the facility of recording of measurements by Contractor as well as release of provisional payment shall be withdrawn. Once withdrawn, measurements shall be done by railway as per GCC clause 45(i).

#### 1.3.17.2 (Measurement procedure for work costing less than Rs. 5 crore or more)

For such contracts, contractor shall be responsible for facilitating either PMC or HRIDC for carrying out measurements of work executed and recording of measurements for the release of on account/final payment. In such cases the detailed procedure for recording of measurements, provisional payment, test check and final payment shall be as follows:

**Works supervised by HRIDC officials: -**

- a) Project which are directly supervised by HRIDC by regular employees, staff on deputation or staff on contract basis. HRIDC personnel for recording of measurement for the above activities will be in the following priority:
- 1) HRIDC personnel (Regular / on deputation)
  - 2) Re-employed personnel
  - 3) Contract employees
- b) In case, regular/deputationist/re-employed officials in the rank of Asst. Manager are not available, Executive/Sr. Executive may be authorized to carry out duties connected with measurement with the approval of Project Director.
- c) Recording of measurement by HRIDC
- In the case of project directly supervised by HRIDC on receipt of requisition from agency for preparation of bill as per contract agreement (stage wise or item wise payment), HRIDC official should record measurement as detailed below:

SN	Function	Duties of HRIDC officials
1	Recording of measurement	Assistant Manager (Equivalent ranked re-employed personnel/Contract employee)
2	100% Test checks of measurements	Manager/ Sr. Manager (Equivalent ranked re-employed personal/contract employee).
3	Spot test check by HRIDC officials Certification for correctness of bill	Test check by HRIDC official not below the rank of DGM
4	Certification of Payment	Project Director

PD will nominate the officials to perform function at S.NO. 1,2,3 AND 4 above. Measurement as recorded shall be test checked by DGM or higher officials of all items (minimum of 10% of bill value) pertaining to the bill including 20% of value of hidden measurement of each hidden item and item of supply i.e. Ballast, Steel, Cement, P. Way material. Electrical equipment foundations, Erection of structure, Cable laying, Earthing of electrical installations, all fitting and S&T item will etc. if there is some ambiguity/dispute, whether a particular item requires a 20% test check or not, Project director will decide and his decision will be final. After recording of measurement and test check, the DGM concerned will submit the measurement book along with certificates of quality test and other documents related to bill like test report etc. as prescribed above to the Project Director office within period of 6 days.

**MOBILISATION ADVANCE : 1.3.18 ..... DELETED.....**



# **PART - I**

## **CHAPTER – III B**

### **PRICES AND PAYMENT**

#### **FOR - TSS**

# **DELETED**

<b><u>Para No.</u></b>	<b><u>Subject</u></b>
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.

$$P = P_o \{ 10 + 29 \underline{C} + 27 \underline{ES} + 7 \underline{IS} + 5 \underline{IM} + 7 \underline{TO} + 15 \underline{W} \}$$

$$100 \{ \quad \quad \quad \underline{Co} \quad \quad \underline{ESoISoIMoTOoWo} \}$$

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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> May 2015 and all India average consumer price index no. (W0) should be for the month of 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> October 2015 and Transformer Oil (TO), Plates 10 mm thick (IS), should be 1<sup>st</sup> 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 1<sup>st</sup> 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 1<sup>st</sup> 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 :

$$P = P_0 \{ 10 + 29 C + 27 ES + 7 IS + 5 IM + 15 W \}$$
$$93 \{ CoESoISoIMoWo \}$$

Where description of P, P0, C, ES, IS, IM, W etc. remains same as mentioned earlier.

**(II) Price variation on erection**

(Refer para 1.3.2 (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.

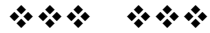
### **1.3.16 MEASUREMENTS**

- 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)



# **PART - I**

# **CHAPTER- III C**

**PRICES AND**  
**PAYMENT**  
**FOR**  
**SCADA WORKS**

**PART -I**  
**CHAPTER-III C**

**PRICES AND PAYMENT**  
**FOR SCADA WORKS**

---

<b>Para No.</b>	<b>Subject</b>
1.3.1	Scope.
1.3.2	Schedule of Prices.
1.3.3	Prices of equipments, components and Materials.
1.3.4	Prices of Spares, spare components and Fittings and 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.
1.3.11	Payments for spares, special tools And plants and 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	Mobilization Advance

**PART- I**

**CHAPTER –III C**

**SUPERVISORY CONTROL AND DATA ACQUISITION**

**PRICES AND PAYMENTS**

**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 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 conditions of the Contract.

**1.3.2 SCHEDULE OF PRICES**

**(a) Unit Prices**

The unit prices of various items of work shall be included in Schedule-1, Section- 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 Engineer. Minor changes in basic designs shall not affect the Unit Prices, so long as such changes are mutually agreed to by the Engineer and the Contractor. All unit prices shall be in RUPEES. The prices shall be for materials and erection except for the material, if any, supplied by the Engineer for which only erection charges will be payable, and for execution of work in accordance with specification and approved drawings and designs. Unit prices shall be quoted as % Above/Below/At par the estimated value for all items of work in Schedule 1, Section-7.

- i. During the contract period, it may become necessary for making certain changes in the scope of work as additions/ deletions of TSS, SP, SSP, addition/ deletion of tele-signals, tele-commands, measured etc. Adjustment rates may be quoted % Above/Below/At par the Estimated value against the appropriate columns in Schedule-1, Section-7 for this purpose. While quoting these rates, care should be taken to include all the components or materials / work including erection, supervision, operation and maintenance, and hardware/ software, if any, for making the desired changes. Any limitation in the adjustment rates such as the maximum limit of such adjustments that could be made within the design limits of the equipments should be clearly brought out.
- ii. . Engineer may modify the scope of work in accordance with the actual requirements at site based on the adjustment rates quoted by the tenderer up to the limits prescribed in the tender.
- iii. If during the execution of the work, the Contractor is called upon to carry out any new item of work not included in Schedule 1, Section 7 , the Contractor shall execute such work at such prices as may be mutually agreed with the Engineer before commencement.

**(b) UNIT PRICES FOR MATERIALS & ERECTION**

The unit prices for supply indicated in Schedule-1, Section-7 shall include 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 banker's charges for bank guarantee, collection of HRIDC receipts, indemnity bonds, inclusive of cost of stamps etc. as also siding or shunting charges, if any, levied by the HRIDC. 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 livable in the event of sale through works contract to the Central Government organization, etc. 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 for erection in Schedule-1 Section-7 shall include cost of erection and testing to be done by the contractor to the extent indicated in Part-I-Chapter-IV and also cover all cost of administration of the contract, 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 are carried out.

**(c) OTHER PRICES ADJUSTMENT**

No adjustment of unit price or prices of fittings, materials, equipments or components on account of price fluctuation of raw materials, will be permitted. No adjustment on account of variation in insurance and freight charges (road or rail) will be permitted.

**(d) QUANTITIES**

The approximate estimated quantities of various items of work are included in, Schedule-1 Section 7, under col.-4 Quantities.

**(e) SUPPLEMENT TO SCHEDULE OF PRICES --- (Deleted)**

**(f) EXPLANATORY NOTES**

Explanatory notes for various items of work included in Schedule 1, Section 7 are given in Part I, Chapter IV C.

**(g) NEW ITEMS OF WORK**

If during the execution of the work, the Contractor is called upon to carry out any item of work not included in Schedule 1 Section-7, the Contractor shall execute such work at such prices as may be mutually agreed with the Engineer before commencement.

**1.3.3. PRICES OF EQUIPMENTS, COMPONENTS, & MATERIALS.**

The prices of individual equipments, components and materials required for the work inclusive of Excise Duty, Sales Tax and Insurance Premia under the Emergency Risk (Goods) Insurance Act in force (See Para 1.2.40 (c), if any shall be included in Sch.-1, Section-7. The prices shall be related to the actual prices of the components and the materials to the Contractor as obtained by him at the time of submitting his tender. If required by the Engineer, the Tenderer/ Contractor shall substantiate such prices. No adjustment of rates is permissible if alternative approved fittings are used for any reason whatsoever.

**1.3.4 PRICES OF SPARES & SPARE COMPONENTS & FITTINGS & ADDITIONAL SUPPLIES**

The spares, spare components and fittings and additional supplies will be taken over from the Contractor at the prices indicated in [Para 1.3.3 (See paras 1.3.11 and 1.3.12), {(Pt. I, Ch. III)}].

**1.3.5 PAYMENTS AND RECOVERIES**

Subject to any deduction or recoveries which the Engineer 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) Payments for designs.
- ii) On account payments.

- iii) Progress payments for erection.
- iv) Payments for spares and additional supplies.
- v) Payment for surplus materials taken over.
- vi) Payment on provisional acceptance.
- vii) Final Settlement.

### **1.3.6 INVOICING PROCEDURE**

- (a) The Contractor shall submit his invoicing procedure for approval by the Engineer 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 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 Engineer with his consent.
- (b) Invoices shall be submitted only on the basis of agreed principles and prices, quantities and measurements of works completed shall be approved by the Engineer Prior to the submission of invoices. For this purpose, the schedule of quantities and measurements submitted by the Contractor for approval of the 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. IIIC).

### **1.3.7 PAYMENT FOR DESIGNS**

Payments for designs in respect of supervisory Remote Control and Data Acquisition Equipment shall be made on the basis of prices included in schedule-1, Section-7. payments shall be made in two installments, the first 50% being paid on approval of designs and drawings and the balance 50% on submission of completion drawings and technical booklets and on fulfillment of Para's 8.7.2 to 8.7.8 of Tender Specification Part -II & RDSO specification No. TI/RCC/SCADA/0130 (Rev-2) with A&C slip No.-1 and amendments.

### **1.3.8 ON ACCOUNT PAYMENTS**

- (a) On account payments will be made for equipments, components, fittings and materials required for the erection of work as described below. On account payments made will subsequently be adjusted against progress payments (see Para 1.3.10) (Pt. I, Ch. IIIC). All on account payments shall be covered by a standing indemnity bond in the Approved form (See Form No. 16, Part V).



- (b) (i) On account payments for supply of schedule items of Sch.1, Sec-7 will be made to the Contractor on receipt of materials at contractor's depot at the rate of 60% of the supply rate quoted by the Contractor in Sch.1, Sec.7 in stages as under: -
- (A) The first ONA payment shall be made when all RCC equipments of (Schedule -1, Sec-7) and RTUs items have been supplied.
- (B) The subsequent ONA payments for balance RTUs (if required) shall be made on supply of individual RTUs.
- (b)(ii) All the invoices shall be accompanied by the following: -
- A) Statement indicating the requirement of quantity of sub-section and quantity claimed in the bill.
- B) Supplier's Challans.
- C) Inspection Certificate granted by the Engineer's representative.
- D) Certificate of receipt of materials at the Contractor's depot duly accepted by the Engineer.
- E) Certificate that the stores have been insured.
- (c) The Contractor should furnish a Bank Guarantee for 10% 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 Para 1.1.5 (b) and valid for two months beyond the date of completion of work. In the event of extension to the time of completion the 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 Engineer from the payments due to the Contractor.

The Bank guarantee submitted for any ONA payment as mentioned above or equivalent cash held by the Engineer 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 OF ON ACCOUNT PAYMENTS**

The total on account payment shall not exceed 60% of the total value of the material required for (Sch.1, Sec.-7) completing the work as per the latest approved assessment of the quantities.

- (e) On account payments will commence only when Schedule-1, Sec.-7 (Assessment-1) is approved by the Engineer.

**1.3.9 RECOVERIES FROM THE CONTRACTOR**

- (a) All the recoveries for materials supplied and services rendered by the Engineer 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. IIIC) and from payments on Provisional Acceptance (Para 1.3.13) (Pt. I, Ch. IIIC).

- (b) The cost of materials supplied by the Engineer if any, under sub-Para 1.2.20.2 (b) Will be recovered in full by the Engineer at the prices laid down in Note at the end of Para 1.4.5 (Pt. I, Ch. IV). Adjustment for quantity taken back by the Engineer shall be made through the payments, under Para 1.3.13(Pt. I, Ch. IIIC).

- (c) The cost of the 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 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 initial deposit in the form of earnest money will be recovered from the ONA / progress bills of the contractor, @ 10% till it reaches 5% of the contract value.

**1.3.10 PROGRESS PAYMENTS**

Progress payments for erection will be affected as under: -

- (a) The first progress payment shall be made after completion of erection and testing of all RCC equipments and RTUs equipment in Sch.1, Sec.-7. The system is commissioned /put into trial operation. The contractor shall receive the following payments: -
- i. 20 % payments of supply cost and 80% payment of erection cost shall be made on erection, testing & commissioning/putting into trial operation of individual RTUs on the same basis and fulfillment of relevant Pares of RDSO specification No.: TI/SPC/RCC/SCADA/0130 (04/2014) with A&C slip no. 1 Or latest amendment.

- ii. The contractor shall get balance 20 % of payment (Supply + Erection cost) after issue PAC by competent authorities.

**1.3.11 PAYMENTS FOR SPARES SPECIAL TOOLS AND PLANTS & ~~ADDITIONAL~~ SUPPLIES**

----- DELETED -----

**1.3.12 TAX**

- (a) All taxes, duties and levies (including octroi, etc.) 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 Engineer to deduct any amount towards Sales Tax on the Works Contract, the same will be deducted and remitted to the authority concerned.

**1.3.13 PAYMENT ON PROVISIONAL ACCEPTANCE**

The contractor shall get balance 20 % of payment after issue PAC.

**1.3.14 PAYMENTS FOR SURPLUS MATERIALS - Deleted**

**1.3.15 FINAL SETTLEMENT**

On expiry of the Guarantee period and issue of the Certificate of final Acceptance of the entire installation (See Para 1.2.50), the Security Deposit will be refunded or Bank Guarantee released to the Contractor after adjustment of any dues ~~paid~~ by the Contractor to the Engineer and after the conditions under Para 1.2.56 have been satisfied.

**1.3.16 MEASUREMENTS**

Same as para 1.3.17 of part -1 chapter III- A.

**1.3.17 MOBILISATION ADVANCE - Deleted**

XXXXX



# **PART-I**

## **CHAPTER-IV A**

**EXPLANATORY NOTES FOR OHE, SWS,  
BT STATION & LT SUPPLY**

1  
1.4

**PART-I**  
**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 Engineer.

**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 Engineer (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 Engineer in terms of para 1.2.20.1 (see Annexure 4) for OHE.

(b) All the materials supplied by the Engineer 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 Engineer 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 Engineer chooses to supply to the Contractor the following galvanized 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 Engineer. Based on this verified assessment the Engineer 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 Engineer 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 utilized 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 Engineer 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 HRIDC** : In case the Engineer chooses to supply galvanized, 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 HRIDC** : In case the Engineer 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 Engineer. The Engineer 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 Engineer 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 Engineer all wires and conductors which have been supplied to him but not utilised on works. Should the Contractor be unable to do so, the Engineer 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 Engineer 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 cutpieces 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 HRIDC**: In case the Engineer chooses to supply Auxiliary Transformers and Interrupters to the Contractor, the contractor shall return the unused equipments to Engineer 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 Engineer 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 Engineer 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 Engineer 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 Engineer's source of supply and the Contractor's depot 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 Engineer 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.**

The price shall cover overhead equipment pegging plans indicating location of structures in stages, and preparation of all drawings and designs required to be furnished by the Contractor. The price shall include the following: -

- (i) Making minor modifications with the approval of the Engineer 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 Engineer.
- (vii) Deleted

**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 chain ages 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 feeder's/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 Engineer, 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 Engineer (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 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 (as) (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 Engineer free at the Contractor's depot or work spot according to convenience of the Engineer. Dowel bars as may be required for bond with bridge structures shall be supplied and erected free of cost by the Engineer. 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. 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 augur, supply and handling of all materials and accessories including re- reinforcement 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 mast. 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 Galvanized 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 3.1 of IS-808/1989 duly drilled as per RDSO's Drawing No. ETI/OHE/G/00144, Sh.No.3 Mod-C, with latest mod. and galvanized 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 galvanized 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 galvanized 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 galvanized 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 galvanized 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 & galvanized 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 & galvanized 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, galvanization, 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 galvanization 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 Engineer or the Contractor. The prices shall also include supply and erection of galvanized 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 Engineer. The price shall also include straightening of masts/portals uprights wherever approved by the Engineer 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 Engineer.

(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.

**Standard weights of Galvanized steel structures**

S. No.	Structure Type	Standard Length in Meters	Black Wt. (kg) as per Drawing	Weight of finished Galvanized Structure (kg)
1	RSJ	9.50	494.00	499.77
2	BFB	9.50	352.45	357.64
3	B-150	9.50	369.69	378.67
4	B-175	9.50	422.89	432.40
5	B-200	9.50	474.19	483.95
6	B-250	9.50	659.27	672.34
7	NU	10.445	365.26	385.30
8	NE1	5.38	183.88	193.63
9	NE2	5.88	199.18	209.80
10	NB 1.5	1.5	68.83	70.33
11	NB 3.0	3.0	110.99	113.69
12	NB 4.5	4.5	160.58	164.47
13	NB 6.0	6.0	210.20	215.14
14	NB 7.5	7.5	252.36	258.50
15	NB 9.0	9.0	301.95	309.28
19	RU	10.58	627.48	651.87
20	RE-1	11.6	634.33	662.13
21	RE-2	12.1	660.56	689.75
22	RB 7.5	7.5	432.58	440.78
23	RB 9.0	9.0	507.71	517.15
24	RB 10.5	10.5	586.49	597.65
25	RB 12.0	12.0	665.26	677.78
26	RB 13.0	13.0	717.88	731.60
Note: The tolerance of (+/-) 2.5% of the weight of finished galvanized structures as per Column-E above will be the limit.				

**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 up to 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 Engineer 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 Engineer 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 Engineer 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 Engineer.

The structure shall be fabricated from steel conforming to IS - 2062/ 2006 No. E - 250 (Fe 410W) quality- A, IS - 808 / 1989 and galvanized 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 galvanized 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 Engineer. 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 Engineer.

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	1 of

	mast/S.P.S including appropriate fittings	
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 Engineer.

**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 unauthorized 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 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 ROB/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 galvanized 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 galvanized 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 conductor's/ 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(as)(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 head span**

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, nuts and lead washer for m 10 bolts but excluding SPS for attachment of number plate to masts/structures.	-do-
1110-2	Contact wire ending clamp	-do-
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 bridle wire)**

The price shall cover the supply of contact wire (107 Sqmm HDGCC), dropper wire (5mm), 7/2.10, 20 Sq.mm Bridle wire as per the specifications indicated under para 2.4.9 of the tender paper, erection and provision of bridle 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 fog 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 Engineer. 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 conductors (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 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(az) : 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 Engineer 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, lightning 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 HRIDC.

**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 Engineer. 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 Engineer. 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 Engineer. 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. 17(h) Supply and Erection of Earthing station at Switching Posts (SSP & SP) with Conventional earthing system.**

The rate covers cost of supply & erection of one set of earthing station for single line / single track .The earthing station using 13 meter long Buried Rail, shall be as per RDSO SMI No. TI/SMI/0032 with the latest amendments thereof.

The released Rail shall be made available by the Engineer to the contractor at any location on "as is where is" basis. Contractor shall transport the rail upto site of installation. The price covers transportation of rail, excavation of trench 0.6X15mX1m from the ground level, lowering of Rail duly prepared into the trench and refilling the soil including compaction and making the surface good after connection to earth electrodes and Running Rails.

The price shall cover the cost of supply of 75X8 mm Galvanized flats for connection between Buried Rail and Earth electrode /Running Rail and erection of 75X8 mm Galvanized flats for connection between Buried Rail and Running Rail. Price shall also cover cost of required Nut Bolts, Copper rivets, Plain/Spring Washers etc. including shaping and drilling of 75X8 mm galvanized flats.

Price does not cover:-

- (i) Cost of supply and erection of 2 nos earth electrodes which is payable under item 17(a) in schedule-1 section 3.
- (ii) Connection between Buried Rail and these earth electrodes, which is **payable under Erection portion** of item 16(a)(i) in schedule-1 section 3.

**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 lightning arrestors.**

The price shall cover supply and erection of 42 kV lightning 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 lightning 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 lightning arrestors 7.5 kV.**

The price shall cover supply and erection of 7.5 kV lightning arrestor complete with all fittings and accessories. The cost of supply and erection shall include proper alignment of the lightning 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 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, 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 Engineer in the control cubicles. The price shall not include supply and erection of any cable for connecting the charger to the 110 V batteries 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 Indications**

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/HRIDC.. 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 Engineer 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 Engineer provided such modifications are not on account of non-compliance of specifications, approved drawings and instructions given by the Engineer 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 Engineer at his own cost.

In all the following cases, the dismantled equipment shall be handed over by the contractor to the Engineer at the spot of dismantlement or at the contractor's Depot, as required by Engineer. Where prices under this item are applicable, the Contractor shall finalise the quantities of work jointly with the 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 Engineer 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. These 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 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 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 Engineer 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 Engineer, 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 finalized jointly with the Engineers before taking the work in hand.

(c) The dismantled material has been handed over to the Engineer.

**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 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 Engineer

and on issue of competency certificate. The staff deployed shall act in accordance with instructions/directions given by Traction Power Controller/representative of Engineer. The staff shall not leave the working place (Switching station and Traction Sub-station) in any case without prior permission of Engineer'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 Engineer during execution of contract and manning shall commence on receipt of intimation in writing from the Engineer 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 Engineer 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 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 Engineer 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 Engineer 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 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 masonry 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 masonry 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 Masonry 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 masonry 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 34 (j) :-** the price shall cover Supply & Spreading of standard size of Ballast/Gravel in the Switch Yard.

**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 outlets, 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 Engineer.

**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/ trailer/ truck over and above the requirement given by the contractor 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/ trailer/ truck over and above the requirement given by the contractor 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, Bridle wire, Jumpers etc) and Aluminium conductors (spider conductor etc) into BFR/ Tower wagon/ trailer/ truck over and above the requirement given by the contractor 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, Bridle wire, Jumpers etc) and Aluminium conductors (spider conductor etc) into BFR/ Tower wagon/ trailer/ truck over and above the requirement given by the contractor for the completion of the present work or actual qty utilised in the completion of work; whichever is higher.

XXXXXXXXXX

**EXPLANATORY NOTES TO NON SCHEDULE ITEMS**

**Item No NS- 1a :- Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution clearance to OHE nearby rectified" Board Size 400mmx270mmx2mm.**

The price shall cover all cost of labour and materials required for OHE caution board with all accessories of size 400x270x2mm as per requirement and satisfaction of Engineer.

**Item No NS- 1b :- Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Power Block working Limit " Board Size 400mmx270mmx2mm.**

The price shall cover all cost of labour and materials required for "Power Block working limit" with all accessories of size 400x270x2mm as per requirement and satisfaction of Engineer.

**Item No NS- 1c :- Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for " caution unwired turnout " Board Size 900mmx600mmx2mm.**

The price shall cover all cost of labour and materials required for "caution unwired turnout" Board Size 900mmx600mmx2mm" with all accessories as per requirement and satisfaction of Engineer.

**Item No NS- 1d :- Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for " Electric Engine Stop Board" Board Size 900mmx600mmx2mm.**

The price shall cover all cost of labour and materials required for "Electric Engine Stop Board" Board Size 900mmx600mmx2mm with all accessories as per requirement and satisfaction of Engineer.

**Item No NS- 1e :- Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for " Caution live wire" Board Size 400mmx270mmx2mm"**

The price shall cover all cost of labour and materials required for "Caution live wire" Board Size 400mmx270mmx2mm" with all accessories as per requirement and satisfaction of Engineer.

**Item No NS-2 - Design, Manufacturing supply of retro reflective type sigma board as per RDSO drawing no. T1/DRG/OHE/PLTBRD/RDSO/00036/12/0 (Sixe-450mmx60mm) and RDSO Specification No. ETI/OHE33A (12/97) Rev.8.**

The price shall cover all cost of labour and materials required for Design, Manufacturing supply of retro reflective type sigma board as per RDSO drawing no. T1/DRG/OHE/PLTBRD/RDSO/00036/12/0 (Sixe-450mmx60mm) And RDSO Specification No. ETI/OHE/33A(12/97) Rev.8. for identification of all signals shall be provided two masts prior to all signal locations for easy identification during foggy weather as per requirement and satisfaction of Engineer.

**Item No NS-3a -. Fabrication, developing and supply of sectioning diagram, schematic and TSWR board Fabrication and supply of pre compressed particle laminated board white in colour with Aluminum beading 1/2" x 1/2" on all around the board and an arrangement of fixing/hanging on wall of adequate strength of top of board as required**

The price shall cover all cost of labour and materials required for developing and supply of sectioning diagram, schematic and TSWR board Fabrication and supply of pre compressed particle laminated board white in colour with Aluminum beading 1/2" x 1/2" on all around the board and an arrangement of fixing/hanging on wall of adequate strength of top of board as per requirement and satisfaction of Engineer.

**Item No NS-3b :- Fabrication, developing and supply of sectioning diagram, schematic and TSWR board developing the sectioning diagram, schematic diagram & TSWR diagram with computerized digital printing on adhesive vinyl of adequate size as required.**

The price shall cover all cost of labour and materials required for fabrication, developing and supply of sectioning diagram, schematic and TSWR board developing the sectioning diagram, schematic diagram & TSWR diagram with computerized digital printing on adhesive vinyl of adequate size as per requirement and satisfaction of Engineer.

**Item No NS- 4 a & b :- Dismantling of Mast/Gantry**





**PART-I**

**CHAPTER-IV B**

**DELETED**



**PART-I  
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 scaffolding arrangement, required for the construction of brick wall and its curing. The price shall also include dismantling of all connected temporary arrangements, back filling required and removal of spoil. The price shall 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 (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.

**Standard weights of Galvanised steel structures**

S. N.	Structure Type	Standard Length in Meters	Black Wt. (kg) as per Drawing	Weight of finished Galvanised Structure (kg)
1	RSJ	9.50	494.00	499.77
2	BFB	9.50	352.45	357.64
3	B-150	9.50	369.69	378.67
4	B-175	9.50	422.89	432.40
5	B-200	9.50	474.19	483.95
6	B-250	9.50	659.27	672.34
7	NU	10.445	365.26	385.30
8	NE1	5.38	183.88	193.63
9	NE2	5.88	199.18	209.80
10	NB 1.5	1.5	68.83	70.33
11	NB 3.0	3.0	110.99	113.69
12	NB 4.5	4.5	160.58	164.47
13	NB 6.0	6.0	210.20	215.14
14	NB 7.5	7.5	252.36	258.50
15	NB 9.0	9.0	301.95	309.28
19	RU	10.58	627.48	651.87
20	RE-1	11.6	634.33	662.13
21	RE-2	12.1	660.56	689.75
22	RB 7.5	7.5	432.58	440.78
23	RB 9.0	9.0	507.71	517.15
24	RB 10.5	10.5	586.49	597.65
25	RB 12.0	12.0	665.26	677.78
26	RB 13.0	13.0	717.88	731.60
Note: The tolerance of (+/-) 2.5% of the weight of finished galvanized structures as per column-E above will be the limit.				

**Note:** (ii) 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 an 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, lightning 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 gentries 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 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 HDDB) 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 part of the Contractor the same shall be recovered from 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 KVAR 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 KVAR 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.

◆◆◆◆◆

◆◆◆◆◆

# **PART-I**

## **CHAPTER-IV C**

### **EXPLANATORY NOTES FOR SCADA**

**PART-I**

**CHAPTER-IV C**

**EXPLANATORY NOTES OF SCHEDULE**

**(FOR SCADA WORKS AS PER SPEC. NO. TI/SPC/RCC/SCADA/0130 (Rev-2)  
With A&C slip no.-1 and latest amendments**

**SCHEDULE OF PRICES**

**PART - SCADA GENERAL**

Explanatory notes for various items of work in Schedule 1 section-7 are given below: -

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 ~~is to~~ 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 Engineer.

Erection of any item of equipment, whether supplied by the Contractor or by the Engineer will include testing, commissioning and bringing the equipment into operation in accordance with Part II, and to the satisfaction of the Engineer.

Special notes for measurements are included in SCADA particular of this Chapter under various items, where necessary.

Reconciliation of materials supplied by the Engineer, if any (See Para 1.2.20).

- (a) The following procedure shall be adopted for the final reconciliation of the various equipments and materials, supplied by the Engineer in terms of Para. 1.2.20.
- (b) All the materials supplied by the Engineer shall be correctly accounted for the quantities reconciled on completion of the work by the Contractor. On completion of the work all surplus materials supplied by the Engineer 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) If there are any shortages during final reconciliation, their cost will be recovered by the Engineer from the Contractor at the prices inclusive of all charges as specified in the note below: -

**NOTE:** If there are any shortages during final conciliation, their cost will be recovered by the Engineer from the Contractor at the issue rate or the market rate prevailing at the time of supply, whichever is higher plus 5% on account of initial freight, 2% incidental charges together with supervision charges at 12.5% of the total cost (inclusive of material, freight and incidental charges) or schedule 3 rate whichever is higher. This recovery will be made from any bill submitted by the contractor subsequently either "on account" or "progress payment". Freight between the Engineer's source of supply and the contractor's depot or ENGINEER shall be to the contractor's account.

The scope of work shall be approved to supply the entire SCADA system/equipment/hardware/ as per RDSO specification No. TI/SPC/RCC/SCADA/00130/ (Rev-2) with A&C slip no. 1 or latest amendments. However, the software for RCC has to purchase from RDSO approved software vendors only.

The scope of work shall also include effective Liaisoning with the software vendor and RDSO to understand the standard SCADA system as a whole. Periodic meeting shall be held with RDSO and the software vendor to ensure effective working of the SCADA system as a whole.

**SCADA- PARTICULAR AS PER SPEC. NO.**  
**TI/SPC/RCC/SCADA/0130 (Rev-2)**  
**with A&C slip no. 1 and latest amendments for Schedule-1.**  
**Section-7**

**Item No. 1: Designs and Drawings:**

The price shall cover on a flat rate basis preparation, submission and approval from Engineer for all designs and drawings required in connection with supply, erection, testing and commissioning of supervisory control and Data Acquisition System for the remote control center and the controlled stations listed in FORM-5 (Sch.-1, Sec.- 7) of SCADA portion of the Tender. The price shall include the supply of requisite number of copies of designs, drawings, operating, maintenance and trouble-shooting manuals, technical booklets and completion drawings as mentioned in RDSO's standard specification No TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.

**Item No.2: Supply, erection, testing & commissioning of SCADA equipments (Master Station Equipments) at RCC as per RDSO Specification No. TI/SPC/ RCC/ SCADA /0130 (Rev-2) with A&C slip no. 1 and latest amendments.**

The lump sum price shall include the Supply, erection, testing & commissioning of standard Supervisory Control and Data Acquisition system (SCADA) equipments (Master Station Equipments) at RCC as per RDSO Specification. The price shall also cover all items/equipments for SCADA software to meet all requirements as mentioned in RDSO spec. no. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.

The tenderer can offer a better version than this in case of obsolescence; however, in such a case tenderer shall indicate the deviations clearly.



**Items No.3 (a): Supply, installation & testing of standard SCADA software as per RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.**

The price shall cover Supply, installation & testing of standard SCADA software as per RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments the license fee for the supply and installation of Standard Electric Traction SCADA Software. The successful tenderer has to purchase this from the RDSO approved supplier for standard software as per RDSO Specification TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 with amendments.

**Items No.4: Supply, erection, testing & commissioning of GPS Receiver as per RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.**

The price shall cover Supply, erection, testing & commissioning of GPS Receiver at RCC including all items required as mentioned in the RDSO Specification.

**Item No.5: Supply, erection, testing & commissioning of Remote station Equipments as per RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.**

Rates will be quoted for Supply, erection, testing & commissioning of RTUs as per RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments each controlled station listed in the tender schedule. The lump sum price shall cover on a flat rate basis the cost of Remote Terminal Units per controlled station. The price shall also cover the cost of all equipment/items including power supply units etc as mentioned in RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments and the steel cubicles required for housing the RTUs, cost of interconnecting cables and wiring etc., and all materials necessary for proper functioning of the RTUs. The price shall also cover testing of materials and equipments at the manufacturer's works. The RTU shall be supplied in accordance with RDSO's standard specification and capable of successful working on standard communication protocol as defined in the specification.

Prices shall also cover provision of separate earthing of communication cable shield at controlled stations:

NOTES: RTUs supplied for the controlled posts shall include the necessary transducers, summation CT, PT, supply change over arrangement, digital analogue input modules, limit settings, CPU cards, power supply unit, surge arrester, relays and contactors etc. at Traction sub-stations/ SPs/SSPs for different analogue parameters and measurements as per mentioned in the specifications and tender documents.

**Items No.6: Modification/up gradation, testing & commissioning in existing standard SCADA software at RCC Equipments for configuration, integration/ hooking up of additional RTUs of adjacent section with master station.**

The price shall cover Modification/up gradation, testing & commissioning in existing standard SCADA software at RCC Equipments for configuration, integration/hooking up of additional RTUs of adjacent section including any associated work for hooking up & satisfactory operation of RTUs with Master Equipments/RCC as per particular specification of the tender.

**Item No.7: Supply, erection, testing & commissioning of 2x5 kVA dual redundant hot stands by UPS System as per RDSO Specification No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.**

The price shall cover Supply, erection, testing & commissioning of 2x5 kVA dual redundant hot standbys UPS System so as to meet the requirements, as enumerated in RDSO standard specification.

**Item No.8: Supply, erection, testing & commissioning of Low Maintenance Lead Acid Battery Sets as per RDSO Specification No. TI/SPC/ RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments.**

The price shall cover Supply, erection, testing & commissioning of Low Maintenance Lead Acid Battery Sets. of suitable voltage and adequate Amp. Hrs. capacity to work with UPS as per RDSO Spec No. TI/SPC/ RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments. and shall be complete with all parts and accessories including stand and a tool board required for its efficient operation.

**Item No.9: Supply & Erection of RCC Furniture:**

The lump sum price shall cover the Supply & Erection of RCC Furniture for operators to work independently and shall meet the requirements as enumerated in RDSO standard specification or latest. The price shall include all control accessories required to be provided at the console Desk except for the color VDUs with their Keyboards and Data Logging printer including necessary items if any.

**NOTE:**

1. The price for the above adjustment shall be indicated to cater for any change in the scope of the work which may be advised by the Engineer during the currency of the contract. This rate will be effective both in case if any posts are added/ deleted from the scope of the work as indicated at the time of tendering or in the Letter of Acceptance subject to the conditions laid down in para 1.2.34 (a) of the Tender Paper.
2. The price will include the cost of Remote Terminal unit at controlled station as per item-5 of the schedule as well as the necessary equipments to be added/deleted at the Remote Control Center. The price shall also include the equivalent price for erection charges thereof along with the supervision of operation and maintenance on pro-rata basis.
3. The price shall also include the cost of surge arrestors, catenary indication circuits, under/low voltage circuits, interposing contactors and necessary telemetering equipments etc.

XXXXXXXXXXXXXXXXXX

# **PART-I**

## **CHAPTER-IV D**

### **EXPLANATORY NOTES**

### **FOR GENERAL SERVICES**

NO.	NS NO.	Details specification of NS-Items
1.	NS.1	<p><b>Point wiring by 03 x 1.5 sqmm cu wire (with modular switches &amp; socket):-</b>  Supply of material and wiring of LP/TP/FP/Ex-Fan point. Wiring shall be done by 03 x 1.5 sqmm multi stranded copper flexible PVC insulated ISI marked copper wire 1100 volts grade wire, confirming to IS: 694-1990 and make as per reference list attached with tender document.</p> <p>Wire for phase, neutral and earth shall be laid/done in concealed with heavy duty ISI marked PVC conduit pipe, minimum 19/20 mm dia and thickness 1.5 mm along with bend / junction, inside PVC duct/ conduit as per instruction of site engineer. One-way piano type modular switch 5/6 amp shall be provided on phase wire. The entire MS box shall have modular plate for switches and 05 amp modular plugs with required modular design groove cutting for fixing of switches / sockets etc. The wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. Samples of all wiring items shall get approved from Engineer before installation. <b>The copper wire used for earthing purpose shall not be less than wire used for wiring and sub-mains respectively</b> and used for other electric purpose wire shall be ISI marked confirming to relevant IS code, specifications and make of reference list shall be used.</p> <p>The circuit wiring in is to be done by 03 x 1.5 sqmm insulated multi-strand copper wire for phase, neutral and earth inside pvc duct/ conduit 19/20 mm as per instruction of site engineer. The pvc conduit shall be properly fixed with the help of ms clamps /rawal plugs as per the instructions of site engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and color of wall on which conduit pipe has been laid. There should be no loose connections in the wiring circuit. Joints in wires are not allowed.</p> <p>Sub-main shall be run in separate conduit pipe, the wire of sub-main and the loop of sub-main belonging to same circuit may be taken through the pipe from the same sub-main. The sub-main wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner. At least one junction box near one side of each conduit bend should be provided metal boxes recess in wall. It shall be fixed at an approximate Height of 1.5 mtr from the floor level or as per direction of the site engineer. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the contractor, at his own cost. All metallic parts, fittings etc. Shall be connected to the earth wire.</p> <p><b>Sample of all wiring material shall be got approved from Engineer before installation and make of all wiring material should be as per Reference list attached with Chapter.</b></p>
2.	NS-2	<p><b>5/6 Amp MOULAR SOCKET: -</b>  Supply and fixing of 5/6 Amp plug 5-pin 230V or above modular type switch socket of standard size on existing board and connection with 2.5sqmm PVC CU cable. A switch for controlling power supply of plug shall be connect in phase wire and earth wire size shall be same size of wiring to flow maximum fault current. <b>Sample of material shall be got approved from Engineer before installation and make as per Reference list attached with chapter.</b></p>

3.	NS-3	<p><b>15 / 16 Amp MOULAR POWER PLUG: -</b></p> <p>Supply and fixing modular type 15/16A plug 6 -pin power plug 230V or above and switch modular type with metal box concealed in wall and connection with 4sqmm PVC CU cable. A switch for controlling power supply of plug shall be connect in phase wire and earth wire size shall be same size of wiring to flow maximum fault current. <b>Sample of material shall be got approved from Engineer before installation and make as per Reference list.</b></p>
4.	NS-4	<p><b>02 Module Plate MS Box: -</b></p> <p>Supply and fixing 2 module modular plates for fixing of switches and sheet metal box of thickness 2/3 mm, good quality concealed fixing of MS box. M. S. box should be of standard size and <b>sample should be Got approved by Engineer before fixing on wall.</b></p>
5.	NS-5	<p><b>04 Module Plate MS Box: -</b></p> <p>Supply and fixing 4 module modular plates for fixing of switches and sheet metal box of thickness 2/3 mm, good quality concealed fixing of MS box. M. S. box should be of standard size and <b>sample should be Got approved by Engineer before fixing on wall.</b></p>
6.	NS-6	<p><b>08 Module Plate MS Box: -</b></p> <p>Supply and fixing 8 module modular plates for fixing of switches and sheet metal box of thickness 2/3 mm, good quality concealed fixing of MS box. M. S. box should be of standard size and <b>sample should be got approved by Engineer before fixing on wall.</b></p>
7.	NS-7	<p><b>12 Module Plate MS Box: -</b></p> <p>Supply and fixing 12 module modular plates for fixing of switches and sheet metal box of thickness 2/3 mm, good quality concealed fixing of MS box. M. S. box should be of standard size and <b>sample should be got approved by Engineer before fixing on wall.</b></p>
8.	NS-8	<p><b>03 X 2.5 SQMM SUB-MAINS: -</b></p> <p>Wiring of sub-main with single core insulated, multi-stranded 2x2.5sqmm PVC CU cable in PVC conduit ISI mark 19/20mm or (as per site engineer) concealed in stone/ bricks masonry wall separate or same conduit &amp; 2.5 sqmm PVC CU cable insulated multi-stranded for earth wire.</p> <p>The sub main wiring shall be done in concealed, heavy duty PVC Conduit pipe ISI Marked 19/20 MM Dia 1.5 mm thick, minimum 25 mm bend / junction, Wire shall be ISI marked confirming to relevant IS specifications and make of reference list. The sub wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible.</p> <p><b>Samples of all wiring items shall be got approved from Engineer before installation. The copper wire used for earthing purpose shall not be less than wire used for phase wiring.</b></p> <p>The PVC conduit shall be properly fixed with the help of MS clamps /rawal plugs as per the instructions of site Engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and color of wall on which conduit pipe has been laid. There should be no loose connections and joints in the wiring circuit. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth wire.</p>

9.	NS-9	<p><b>03X 04 SQMM SUB-MAINS: -</b></p> <p>Wiring of sub-main with single core insulated, multi-stranded 2x4.0 sqmm PVC CU cable in PVC conduit ISI mark 19/20mm or (as per site engineer) concealed in stone/ bricks masonry wall separate or same conduit &amp; 4.0 sqmm PVC CU cable insulated multi-stranded for earth wire.</p> <p>The sub main wiring shall be done in concealed, heavy duty PVC Conduit pipe ISI Marked 19/20 MM Dia 1.5 mm thick, minimum 25 mm bend / junction, Wire shall be ISI marked confirming to relevant IS specifications and make of reference list. The sub wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible.</p> <p><b>Samples of all wiring items shall be got approved from Engineer before installation. The copper wire used for earthing purpose shall not be less than wire used for phase wiring.</b></p> <p>The PVC conduit shall be properly fixed with the help of MS clamps /rawal plugs as per the instructions of site Engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and color of wall on which conduit pipe has been laid. There should be no loose connections and joints in the wiring circuit. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth wire.</p>
10.	NS-10	<p><b>03 X 06 SQMM SUB-MAINS: -</b></p> <p>Wiring of sub-main with single core insulated, multi-stranded 2x6.0 sqmm PVC CU cable in PVC conduit ISI mark 19/20mm or (as per site engineer) concealed in stone/ bricks masonry wall separate or same conduit &amp; 6.0 sqmm PVC CU cable insulated multi-stranded for earth wire.</p> <p>The sub main wiring shall be done in concealed, heavy duty PVC Conduit pipe ISI Marked 19/20 MM Dia 1.5 mm thick, minimum 25 mm bend / junction, Wire shall be ISI marked confirming to relevant IS specifications and make of reference list. The sub wiring shall be done in such fashion that minimum conduit pipes run inside the room as far as possible.</p> <p><b>Samples of all wiring items shall be got approved from Engineer before installation. The copper wire used for earthing purpose shall not be less than wire used for phase wiring.</b></p> <p>The PVC conduit shall be properly fixed with the help of MS clamps /rawal plugs as per the instructions of site Engineer. The contractor will be responsible for proper plastering and distempering / fixing of tiles to restore the original finish of wall such that it matches with original surface and color of wall on which conduit pipe has been laid. There should be no loose connections and joints in the wiring circuit. Bends or flexible conduits should be used as per the site requirement. The wiring should be in well dressed up manner. Any discrepancy occurred in engineering work during the wiring should be restored in the original</p>
11.	NS-11	<p><b>SITC OF ceiling FAN: -</b></p> <p>The item price includes supply &amp; erection cost of all materials including cost of 230V A.C. 1200 mm ceiling fan having 3/4 blades, double ball bearing, copper wound motor, suitably sized down rod, canopies and capacitor etc. complete with all accessories including fixing phenolic laminated sheet cover on the fan box, FR PVC insulated multi-stranded single/three core copper conductor cable wiring and connecting with earthing system etc. Fan should have ISI mark and as per IS-374/1979 and 5-star energy rating issued by BEE.</p> <p><b>Samples of fan shall be got approved from Engineer before installation and make should be as per Reference list.</b></p>

12.	NS-12	<p><b>FAN REGULATOR: -</b> Supply and providing of ISI marked modular type electronic fan regulator 5 step type on existing board and connection as per requirement. <b>Samples of fan regulator shall be got approved from Engineer before installation</b> and as per <b>Reference list.</b></p>
13.	NS-13	<p><b>Supply of 4x16 cable: -</b> Supply of 1.1 KV grade 4x16 sqmm LT XLPE insulated armored aluminum conductor cable, making good the damages, end terminations with aluminum crimping sockets/lugs, gland, testing and meggering etc. as per required Technical specifications &amp; Confirming to IS: 7098 Part-II-1985, IS: 8130-1984 and IEC-502 standards with latest amendment. The contractor shall arrange inspection of cable at manufacture's works before dispatch, at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of cable.</p>
14.	NS-14	<p><b>Supply of 4x35 cables: -</b> Supply of 1.1 KV grade 4x35 sqmm LT XLPE insulated armored aluminum conductor cable, making good the damages, end terminations with aluminum crimping sockets/lugs, glands, testing and meggering etc. as per required technical specifications &amp; Confirming to IS: 7098 Part. II, 1985, IS: 8130-1984 and IEC-502 standards with latest amendment. The contractor shall arrange inspection of cable at manufacture's works before dispatch, at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of cable.</p>
15.	NS-15	<p><b>Supply of 4x70 cables: -</b> Supply of 1.1 KV grade 4x70 sqmm LT XLPE insulated armored aluminum conductor cable, making good the damages, end terminations with aluminum crimping sockets/lugs, glands, testing and meggering etc. as per required technical specifications &amp; Confirming to IS: 7098 Part. II, 1985, IS: 8130-1984 and IEC-502 standards with latest amendment. The contractor shall arrange inspection of cable at manufacture's works before dispatch at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of cable.</p>
16.	NS-16	<p><b>Supply of 4x120 cables: -</b> Supply of 1.1 KV grade 4x120 sqmm LT XLPE insulated armored aluminum conductor cable, making good the damages, end terminations with aluminum crimping sockets/lugs, glands, testing and meggering etc. as per required technical specifications &amp; Confirming to IS: 7098 Part. II, 1985, IS: 8130-1984 and IEC-502 standards with latest amendment. The contractor shall arrange inspection of cable at manufacture's works before dispatch at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of cable.</p>
17.	NS-17	<p><b>Supply and laying of HDPE pipe (75/80mm dia): -</b> This item covers supply &amp; laying of HDPE pipe in already excavated trench under road/ground/floor/railway track etc. as per site requirement size 75/80 mm Dia wall thickness 3mm PN-4 conforming to IS 4984:1995 or latest as per site requirement. Pipe should be laid in trench such that It shall be possible to withdraw the cables for repair or replacement without disturbing the work. The pipes shall be laid with a gradient to facilitate drainage of water and it shall be at</p>

		right angle to the track. The contractor shall arrange inspection of HDPE pipe at manufacture's works before dispatch at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of HDPE pipe.
18.	NS-18	<p><b>Supply and laying of HDPE pipe (50 mm dia): -</b></p> <p>This item covers supply &amp; laying of HDPE pipe in already excavated trench under road/ground/floor/railway track etc. as per site requirement size 50 mm Dia wall thickness 3mm PN-4 conforming to IS 4984:1995 or latest as per site requirement. Pipe should be laid in trench such that It shall be possible to withdraw the cables for repair or replacement without disturbing the work. The pipes shall be laid with a gradient to facilitate drainage of water and it shall be at right angle to the track. The contractor shall arrange inspection of HDPE pipe at manufacture's works before dispatch at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of HDPE pipe.</p>
19.	NS-19	<p><b>Supply and laying of HDPE pipe (160 mm dia): -</b></p> <p>This item covers supply &amp; laying of HDPE pipe in already excavated trench under road/ground/floor/railway track etc. with technical specification 160 mm dia (OD), wall thickness between 6.2 mm to 7.1 mm, material grade PE-80 and class of pipe should be PN-4 with confirming to IS: 4984/1995 of latest. After laying of HDPE pipe, the trench should be refilled with same soil and restored to original position &amp; pipe should be laid in trench such that possible to withdraw the cable for repair or replacement.</p> <p>The pipe shall be laid with a gradient to facilitate drainage of water and it shall be right angle to the track, for each power crossing, contractor shall have to lay two lengths of pipe, for 02 Nos. of cable to be laid or as per instruction of site engineer. Accessories related with laying of HDPE pipe like fitting, bends joints/coupler junction, flange end cap etc. as per site requirement will be provide by contractor and no extra payment will be given for above items. The contractor shall arrange inspection of HDPE pipe at manufacture's works before dispatch at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of HDPE pipe.</p>
20.	NS-20	<p><b>GI Pipe (50 mm): -</b></p> <p>The contractor will Supply &amp; fixing/laying of 50 mm dia GI Pipe medium 'B' class as per IS 1239. The GI pipe shall be fixed with pole/wall/structure etc. by MS flat clamps size 25 x 3 mm &amp; nut-bolt-washer etc. In the case of GI pipe in road/permanent floor/other civil structures etc. is to be laid, repairing up to original condition shall be done by the contractor and no extra cost will be paid for it. <b>Samples of GI Pipe shall be got approved from Engineer before installation and as per Reference list.</b></p>
21.	NS-21	<p><b>Laying of LT cable (All size): -</b></p> <p>Laying and commissioning of PVC / XLPE insulated armored sheathed aluminum conductor 1100 volts grade cable underground /under the road / under the track along- with pole/wall/trench/air in already laid pipe. Before laying of cable in the trench, it should be thoroughly checked for sharp ballast and stones so that the cable may not be damaged. Before and after laying cable, the IR. Value should be checked. While laying the cable, care should be taken that no tree roots/water logging area come on the way of cable, as it may damage the outside insulation of cable. Armoring at both ends of the cable should be earthed. At termination point of cable aluminums lugs and Brass glands of suitable size and good quality shall be provided. The contractor shall restore the original condition of the Roads/PF/ pakka flooring after laying of cable. Bending radius of the cable shall</p>



		not be less than 16 times of dia. Of the cable. Where ever the cable emerges out of the ground at least two loops of sufficient radius should be laid. Installation of cable along with wall / pole/roof top /underneath sheds wherever required shall be done with support of G.I. Saddles/clamp of proper size /G.I. Pipe. The cost of G. I. Pipe is taken separately. Breaking of floor /wall / road and other civil structures and repairing up to original condition, shall be done by the contractor, and no extra cost will be paid for it. Permission for crossing any road/track if required shall be arranged by the contractor in coordination with concerned site engineer, and all the expenditures will be borne by the contractor. All the instruments required for insulation testing high voltage testing shall be arranged by contractor at his own cost. The cable shall be transported by the contractor through his own means from major electrical depot to required site of work. Before transportation of the cable it shall be tested at site to ascertain the serviceability of the cable by the contractor.
22.	NS-22	<b>Excavation &amp; Refilling of trench of size 0.5 mtr wide x 1.2 mtr deep: -</b> Excavation & Refilling of 0.5 Mtr Width 1.20 Mtr Deep trench in all kinds of soil for laying of HDPE/GI pipe for underground cable crossing. Contractor will clear all metallic parts & stones etc. in trench. After cable/pipe laying contractor will clear all site refilling by available soil and ramming the same for made good in same level. Complete work will be as per instruction & satisfaction of site engineer.
23.	NS-23	<b>SITC OF EXHAUST FAN: -</b> Supply and fixing of exhaust fan 300mm sweep with louver shutter heavy duty (ISI marked, as per IS-2312), min 3-star energy rating issued by BEE (if available in Indian market) and making hole in wall if not exist including repairing the same properly with cement-sand or concrete and connection complete in all respect, fixing of suitable plywood framing etc. as approved by engineer. The price also covers supply and erection of suitable clamps/brackets & cost of all materials including cost of FR PVC insulated multi stranded single core copper conductor cable, earthing connection etc. for fixing above. <b>Sample of exhaust fan should get approved by Engineer before installation and as per Reference list.</b>
24.	NS-24	<b>Supply and fixing of Double Door MCB TPN DB: -</b> Supply and fixing of Double Door MCB TPN DB 8 modules 4 row, neutral and earth link, and suitable IP protection with one no four pole MCB 40 amp, one no FP RCCB 40 amp 30 mA and twenty-four no SP MCB 40/32/25/16/10/6 amp. 'C' series. All MCB should be of 'C' series with breaking capacity not less than 10 kA. MCB, RCCB and DB should be of same make. The distribution board shall be fixed in such a fashion that its door flushed with the wall on which it is fixed. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>
25.	NS-25	<b>Supply and fixing of Double Door MCB DB SP 12 way: -</b> Supply and fixing of Double Door MCB DB SP 12 way (10+ 2 module), neutral and earth link and suitable IP protection, with one no DP MCB 40amp, one no DP RCCB 40 amp 30 mA and eight no SP MCB 32/25/16/10/6 amp. 'C' series. All MCB should be of 'C' series with breaking capacity not less than 10 kA. MCB, RCCB and DB should be as per tech. specification and same make. The distribution board shall be fixed in such a fashion that its door flushed with the wall on which it is fixed. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>

26.	NS-26	<p><b>Supply, Fixing, testing &amp; commissioning of LED tube light 22 Watt: -</b></p> <p><b>SFTC</b> of surface/wall mounted Energy efficient LED tubular lamp four feet with its driver and Luminaries (22 watt), of CRCA steel sheet enclosure, IP-20 for indoor application, operating voltage (140-270) V, minimum 2000 Lumens, color temperature 6500°K, CRI&gt;65 complete with all accessories of approved make etc. as approved by ENGINEER officers. The item price also includes labour &amp; cost of all materials including cost of FR PVC insulated multi stranded single core copper conductor cable, earthing connection etc. The price also covers Supply and erection of suitable clamps/brackets etc. to fix light fittings under COP/FOB/Poles/roofs/walls/ sheds etc. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
27.	NS-27	<p><b>Supply, Transportation, erection, testing, Installation of water cooler (150 liters): -</b></p> <p>Supply, Transportation, erection, testing, Installation &amp; commissioning of self-contained drinking water cooler 150 liters' capacity (cooling capacity 150 Lts. per hour) water cooler [conforming to IS-1475 (part-1)/2001], ISI marked, min 3 star rated, suitable for operation on 230 volts+/-10%, 50Hz, AC supply system complete with all connected standard fittings, accessories etc. and 5KVA , wall mounted, I.C. controlled electronic auto-voltage corrector conforming to relevant IS (latest version), suitable for operation on single phase 180 to 260 volts, 50Hz incoming AC supply and output 200 to 230 volts A.C. supply, complete with time delay relay, voltmeter, instant start provision with push button switch, supply and erection of earth electrodes( 3 meters depth) and connection to earthing system etc. as required. <b>Complete work should be up to the satisfaction &amp; as per instruction of Site Engineer. Make of water cooler should be as per Reference list.</b></p> <p>Note:</p> <p>(i) Price shall also cover supply &amp; erection of suitable clamps/brackets for fixing of water coolers, making of foundation other masonry work at Platforms, Service buildings, sheds etc.</p>
28.	NS-28	<p><b>Octagonal pole (6 mtrs) :-</b></p> <p>Supply, erection, testing and commissioning of 6 mtrs. long octagonal pole made with 3 mm thick GI sheet, Top Dia 70 mm, Bottom dia 130 mm with single /double arm hot dip galvanized steel octagonal Poles with galvanized base plate of 220 x 220x 12 mm (as per IS 2062) and GI bolt size M20 X 600mm X4 no in position including excavation of pit and filling the same with concrete M-20 including supply of material as required or recommended by pole manufacturer.</p> <p>The pole shall be galvanized internally &amp; externally by single dipping method as per IS: 2629/1985, BSEN ISO 1461. The allied accessories such as GI single/ double cross arms Bakelite sheet with SP MCB (6 amps, c series) and stud terminals, clamping, etc. are included. Single or double arms of 500 to 1500 mm length are to be provided as per the site requirement and the instructions of ENGINEER. The Bakelite sheet with MCB &amp; stud terminals shall be provided in the base compartment of the poles. All the connecting terminals shall be properly tightened and crimped in order to avoid any loose connection. Earthing of pole through armored of XLPE LT cable shall be done in proper manner as per the direction of site Engineer.GI octagonal pole shall be as per latest IS Specification and code of practice. <b>GI Octagonal pole shall be from approved make list as per Reference list.</b> Confirming to latest relevant IS also <b>Prior approval of foundation and poles/ Arm drawing will be required from Engineer</b></p>

29.	NS-29	<p><b>Supply, fixing and commissioning of street light fitting accessories: -</b> Supply &amp; fixing of LED Street light fitting accessories i.e. GI pipe, clamps, nuts, bolts etc. GI pipe should be medium 'B' Class (Blue) conforming to IS 1239 Part-I or latest and size of (Dia) GI pipe as per LED fitting. <b>Contractor will prepare complete drawing of accessory and got approval from Engineer.</b> Complete work should be up to the satisfaction &amp; as per instruction of Site Engineer.</p>
30.	NS-30	<p><b>Supply, Erection, testing &amp; commissioning of 40 Watt LED Street light fitting:</b> - Supply, Erection, testing &amp; commissioning of 40 Watt LED Energy efficient LED based street light fitting with pressure die cast aluminum housing with driver &amp; suitable fixing arrangement, IP-65 for outdoor application, operating voltage (140-270) V, System efficacy more than 100 lm/W, color temperature 6500K, CRI&gt;65. Complete with all accessories of approved make etc. as approved by Engineer. The item price also includes labour &amp; cost of all materials including cost of FR PVC insulated multi-stranded single core copper conductor cable, earthing connection etc. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
31.	NS-31	<p><b>Supply, fixing testing and commissioning of (OFF delay) modular digital timers: -</b> Supply, fixing, testing and commissioning of modular digital timer for automatic operation of platform, circulating area, street light etc. complete with required power contractor, digital timer and MCB etc. in enclosure of suitable size and power Contractor will submit Drg. &amp; <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
32.	NS-32	<p><b>Supply, fixing, testing and commissioning of fabricated Feeder Pillar: -</b> Supply, erection, testing and commissioning of feeder pillar size 900x600x300 mm fabricated from 16 SWG MS sheet (tolerance as per IS permitted) hut shape suitable for outdoor installation, painted/ with red oxide and enamel/ powder coated complete enclosed type dust and vermin proof, with gland plate in bottom as required including connecting incoming &amp; outgoing cables with aluminum lugs and brass glands, with 63 amp MCCB and 4 nos. aluminum bus bars suitable for 200A, complete with locking arrangement with MS angle stand 2 feet height angle size 40 x40 x6 mm Grouted in cement concrete mixture 1:3:6.. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
33.	NS-33	<p><b>Drilling of horizontal bore below Rly track by pushing method for laying of HDPE/SPUN/DWC/CI/GI pipe: -</b> This item covers drilling of Horizontal bore by pushing method (trenchless technology) in all types of soil / rock for laying of GI/CI/Spun/HDPE/DWC pipe dia. up to 450 mm by pushing method in presence of ENGINEER representative taking all necessary safety precautions relate to Road/Canal/Bridges/track and movement of Road transport &amp; trains. Horizontal boring will be done at minimum 1.5 Mtr. Below or as per site requirement from ground level at Roads/Canals/Bridges/railway track portion but in case, where bank is high then boring should be such that outer side and under track RCC/HDPE/DWC pipes are in same alignment. All work will be done in presence of ENGINEER without disturbing the Roads/Canals/Bridges/Railway track taking all necessary safety precautions related to Roads/Canals/Bridges/track and movement of Road transport &amp; trains. Complete work will be carried out as per instruction &amp; satisfaction of Site Engineer.</p>
34.	NS-34	<p><b>Supply installation Testing &amp; Commissioning of rechargeable batten type Emergency light: -</b> Supply installation Testing &amp; Commissioning of rechargeable batten type Emergency light, 60 LEDs 4 watts or higher with one-hour minimum backup, light</p>

		should be ISI/BIS make of a reputed make or as per Reference list. <b>Sample of material shall be got approved from Engineer before installation.</b>
35.	NS-35	<p><b>Supply / preparing of drawing in Auto CAD drawing: -</b>  Contractor will Supply / preparing of drawing in Auto CAD (Original + 2 copies) showing electrical installation i.e. panel, phase selector, cable, HMT, octagonal poles etc. being done through this contract for station, S&amp;T structure etc. Drawing to be supplied in tracing paper in hard copies as per ENGINEER requirement &amp; satisfaction of ENGINEER and MSIL authorities. <b>Contractor will coordinate with HRIDC and MSIL authorities and got approved this drawing from both authorities before commissioning of work.</b></p>
36.	NS-36 & 37	<p><b>Supply, installation, testing and commissioning of Single sided and double sided LED signage board: -</b>  Design, manufacture, supply, fixing, testing and connecting of LED back lit single &amp; double sided signage boards with IP-65 CRCA housing, vinyl print on acrylic sheet which is back lit with high grade, high brightness LED modules inbuilt SMPS driver, without battery backup. Operating voltage 80-270VAC. LED with L70 life of minimum 50,000 hours, LPM technology, including fabrication and supply of clamping arrangements as desired by site engineer. The ENGINEER Authorities will decide the size, color &amp; content to be printed on the signage Board. Signage Board shall be pre wired with flexible copper wire and terminated in a connector from where 3-core flexible wire shall be brought out for connecting the board to ceiling rose, as per site requirement. The body of Glow sign board to be connected with earth. The pictogram and letter of desired color and size made by translucent vinyl sheet cut through computerized machine shall be pasted on acrylic sheet. Acrylic sheet with pictogram shall be fixed on CRCA/GI sheet powder coated box with suitable arrangement. Subject matter and pictogram can be seen in the standard book of signage available in office.</p> <p><b>LED signage board:</b> - Depth of box shall be approximately 3.5 inches (for single sided) 5.5 inches (for double sided) and made by 0.8 mm thick CRCA/GI sheet with powder coated having louvers for ventilation on two sides having suitable gaskets for protection against water and vermin ingress. Louvers should be covered with wire mesh to avoid entry of insects/lizards of suitable size as per requirement. LED light shall be provided inside the box in such way that intensity of light on both side of box (no dark spot) remains same. Individual SMPS operated from AC source ranging from 80V to 270 Volts, 50 Hz AC, single phase shall be supplied in each board and fitted in such way that no impression is appeared outside the board. The box is to be fitted in shed with approx. size 40x40x5 mm slotted angle nut bolt etc. at a minimum clear height as per advised by ENGINEER officers.</p> <p>Script slogan shall be advised to the contractor by the Site Engineer.  All IC's shall be of industrial grade.</p> <p>Electrolytic capacitor shall be rated for max. temp of 105 °C.  Paper polyester capacitor to be rated for max. temp of 85 °C.  All resistance shall preferably be metal film of adequate rating.  All switching devices such as transistors, MOSFET's, IGBT's shall have junction temperature of 150 °C.</p> <p>All devices shall have adequate thermal margin at ambient of 55 °C.</p> <p>All protective cum adhesive coating used on PCB's should be clean and transparent and should not affect color code of electronic component or the product code of the component.</p> <p>Heavy components should be properly fixed and the shoulder connection should be with good finishing.</p>

Fiber glass epoxy of grade FR 4 or superior shall be used for PCB boards having a nominal board thickness of 1.6mm and copper cladding thickness of 35 microns. Both track width and spacing between the tracks shall be 0.5 mm nominal and in no case shall be less than 0.3 mm. Assembled PCB's shall be given a conformal coating.

**LED:** - Clear cool white color 5.00 mm LEDs of uniform intensity and luminosity shall be used for excellent Visibility. The intensity of the illumination is such that it shall be possible to read the information clearly from a distance of 20 meters or higher. NICHIA /PHILIPS/LUMILIDE / AVAGO/Seol semiconductor/OSRAM make LED with L70 life of minimum 50,000 hours and with specified parameters as per latest data sheet of Original Equipment Manufacturer shall be used.

**SMPS:** - All power supply units supplied are Switch Mode Power Supply type (SMPS) operated from AC source ranging from 80V to 270 Volts, 50 Hz AC, and single phase. All the power units are tested at 50% load of maximum working capacity. Protection against transient coming in the power supply source or generated by some other source is provided. Protection against voltage fluctuations of short durations is also provided. All fuses used are reset baled. Over voltage and short circuit protection is incorporated within the power supply. Power factor should be > 0.95.

**Signage board has following specifications:**

Acrylic sheet thickness	3 mm
Dimension of LED module	295 mm x 295 mm or 600 mm x 295 mm approx.
Protection	IP-65
LED System Wattage	6 W max per square feet
LED Wattage	0.06 W per LED
Luminosity	700 mcd
LED Color	Cool White
Viewing Angle	70 Deg.
Solid Angle	70 Deg.
Distance between LEDs	1.5" Diagonally
No. of LEDs in each module	72 (for 295 mm x 295 mm)
Lux level inside the surface	≥3400 Lux @2" +/- 10%
Color Temperature	5500K/6500K

37.	NS-38	<b>Supply of Rubber mat: -</b>
		Supply & Fix of (ISI marked) Rubber mat non-stick type suitable for 11 kv AC supply of size 2000x1000x25mm. <b>Sample of material shall be got approved</b>

		<b>from Engineer before installation and as per Reference list.</b> .
38.	NS-39	<b>Supply, installation, testing and commissioning of LT heat shrinkable straight through joint: -</b> Supply, installation, testing and commissioning of LT heat shrinkable straight through joint with required accessories complete in all respect suitable for LT XLPE 4 core cable as per site requirement. Make as per Reference list Complete work will be as per instruction & satisfaction of ENGINEER.
39.	NS-40	<b>Supply and fixing of cable route marker: -</b> Route marker should be provided along straight runs of the cables at locations approved by the Engineer-in-Charge and generally at intervals not exceeding 100 Mtrs (or as per site engineer) Wherever the cable route is changing or it is entering a fixed installation, route marker must be provided. Route marker shall also be provided at joints of cable. The item price includes labour & cost of all materials including cost of cable route markers of size not less than 200x150x3mm thick M.S. Plate and welded to MS rod of min 5 mm dia including bending and fixing with the cable. <b>Drawing of cable route marker shall get approved from Engineer before installation.</b>
40	NS-41	<b>Dismantling of Rail/cable tray, Pole &amp; Overhead line, EFT's, cable tray complete: -</b> The contractor shall cut the rail/pole below one feet from ground and handed over to store or any other site as per instruction of site Engineer with own cost & Transport. Material deposit certificate to this regard shall be handed to the site engineer.
41	NS-42	<b>Supply, installing, testing and commissioning earth electrode complete: -</b> The earthing shall be done with 3 meters long 50 mm dia. 'B' class G.I. Pipe (As per IS 1239) earth electrode with 12 mm dia. holes around the pipe at distance of 30 cm, down side tapered. Earth electrode to be put vertically 3-meter-deep with alternate layer of salt & charcoal approx. 50 kg charcoal and 10 kg salt. 8 SWG hot dip G.I. or 7/4 mm dia. galvanized steel stranded earth wire shall be connected from earth electrode top with 12 mm dia. G.I. nut bolt to main board / equipment with masonry / RCC earth enclosure of size 300x300x300 mm (In side to inside) with 125 mm wall thickness & suitable size MS/RCC pull out cover. The G.I. wire shall run in 12 mm 'B' class G. I. Pipe along with wall / pole up to height of 1.5 meter. The depth of 8 SWG hot dip G. I. or 7/4 mm dia galvanized steel stranded earth wire including connections from earth pipe to main board / equipment /H pole/Tower in ground shall be 30 cms. And 15 cm in pakka floor. G.I. top cap shall also be provided on top of earth pipe. Value of each earth shall be measured and marked on MS / cast iron plate size 150 x 100 x 1.5mm painted with black enamel paint shall be fixed near the earth, and following information shall be indicated (I) Earth No. (ii) Individual value of earth (iii) Date of testing. Earth resistance at each electrode shall be measured jointly by the contractor & ENGINEER. Complete work should be as per IS-3043. The distance between two earths shall not be less than 6 M or 2 x length of earth electrode. Each earthing should have a minimum resistance as specified in IE rule & complete work will be as per instruction & satisfaction of Site Engineer.
42	NS-43	<b>Design, manufacture, Supply, testing, erection and commission of indoor type LT PANEL: -</b> Supply erection, testing and commissioning of 1.5 mm CRCA sheet steel fabricated, cubicle, having outdoor type LT panel distribution board, having suitable IP protection, floor mounted front operated, mounted on MS base channel of suitable size, with top / bottom removable cable gland plate as required, earth bus, hinged and lockable doors, dust and vermin proof, complete with all inter connections, small wiring by min 2.5 sq. mm copper

		<p>wires. The panel should consist of (A) incoming 2x250 amp 4 pole MCCB's with changeover provision (if required) with microprocessor release having integral overload, short circuit, earth fault and neutral protection and breaking capacity 60 KA (Ics=100%Icu). (B)outgoing 2x125 amps, 2x100 amps and 2x63 amp 4 poles MCCB's with adjustable overload and adjustable short trip unit and breaking capacity 36KA (Ics=100%Icu). the panel is to be provided with over voltage protection with suitable relay. The bus bar shall be insulated by heat shrinkable sleeves. The copper earth bus shall also be provided for suitable length and capacity for earthing purpose. The instrument shall be of flush type ammeter, voltmeter, and selector switches with CTs, feeder name &amp; danger board. General arrangement and wiring diagram shall be supplied by the successful tendered for approval of ENGINEER authority before fabrication of panel. Special tools required if any shall be supplied free of cost with the panel. Danger notice plate shall be placed on the front. All metal structures shall be painted with one coat of primer and 2 coat of paint/powder coated. The final finishing shall be smooth and attractive. Caution board in English/Hindi shall be provided of metallic type. The contractor shall have to submit the design and dimensional drawing of the distribution board for approval before fabrication. The contractor shall arrange inspection/testing of the board when it is completed in all respected at his own cost. Foundation of panel and trenching with GI/CC/Stone cover work is included up to the satisfaction of site Engineer. Circuit identification by means of engraved on poly propylene sheet as per design approved by <b>Engineer</b> shall be provided. The panel shall be fixed on MS Channel of 100x50x6mm size with lifting hooks also.</p> <p><b>NOTE:</b> - LT panel shall be got made by CPRI approved firms and as per Reference list. Inspection of panel will be done at manufacture's site before dispatch.</p>
43	NS-44	<p><b>Supply, erection, testing and commissioning of phase change over distribution board: -</b></p> <p>The contractor shall have to supply, install, fabrication, test and commission 1.6 mm thick CRCA power coated box of size 610 x 450 x 190 mm approximate with Din rail. The distribution board shall be indoor type dust vermin proof Knock out/glands plates as applicable shall be provided in the box for incoming and outgoing cables. Earth terminals shall be provided. Danger notice shall be provided at appropriate place. The complete internal wiring for each phase selector is to be done with copper wire of size 10 sqmm.</p> <p>it comprises of following items: -</p> <ul style="list-style-type: none"> <li>• 01 no. 100 amp TPN MCCB as incomer</li> <li>• 01 no. 100/63 amp (as per requirement) SPN MCCB as outgoing.</li> <li>• 04 nos integrated LED pilot lamp (3 incoming+1 outgoing)</li> </ul> <p>01 no. 63-amp selector switch (phase selector switch) without OFF Three pole three ways (Three phase incoming &amp; only one phase outgoing. <b>Sample of material shall be got approved from Engineer before installation.</b></p>
44	NS-45	<p><b>Supply and fixing of PVC cable duct 40 x 60 (w x h): -</b></p> <p>Supply and fixing of PVC cable duct 40 x 60 (w x h) 1 M STD slot greenish gray of standard &amp; fixing as per site requirement. <b>Sample of material shall be got approved from Engineer before installation.</b></p>

45	NS-46	<p><b>Arrangement of electrification of gumties at the time of NI work: -</b></p> <p>The contractor will arrange following items for one gumati and one 4-wheel vehicle like bolero/camper pickup for complete work of one/stn. NI as per required period on temporary hiring basis to transport staff and material as required.</p> <ul style="list-style-type: none"> <li>• Portable generator of approx. capacity 2kVA with required kerosene &amp; Petrol– 01 No.</li> <li>• Emergency light- 04 No.</li> <li>• Wooden board with min. 04 Nos.</li> <li>• 5A Power sockets with switches- 01 No.</li> <li>• LED/Tube light fittings- 04 No.</li> <li>• Sufficient temporary lighting arranges by LED light fitting 100 / 125 W in Yard/Points. As per requirement of site as decided by ENGINEER.</li> <li>• Pedestal fan – 02 no. (As per site requirement).</li> <li>• Min. 1 skilled staffs to be deputed for each Gumti during NI work.</li> <li>• Min. 2 or 3 Gumti require for one station as per site requirement.</li> </ul>
46	47	<p><b>Supply and fixing of HMT(30mtrs): -</b></p> <p><b><u>STRUCTURE:</u></b> The high mast shall be of continuously tapered, polygonal cross section at least 20 sided, presenting a good and pleasing appearance (as per manufacture design) and shall be based on proven in-tension design confirming to be standards referred to above, to give an assured performance, and reliable service. The structure shall be suitable for wind loading as per IS-875, part-III 1987.</p> <p><b><u>CONSRUCTION:</u></b> The Mast shall be fabricated from special steel plates, to BSEN-10025 cut and folded to form polygonal section and shall be telescopically jointed and fillet welded. The welding shall be in accordance with BS: 5135. The mast section shall have one longitudinal seam weld and no Circumferential weld as per section. The Mast shall be delivered in minimum sections as per design without any circumferential welding at site, which shall be joined together by slip-stressed-fit method. The jointing shall be with stressing equipment, thus forming the sleeve joint. No site welding or bolted joint will be accepted. The overlap distance shall have full penetration of longitudinal welds. The overlap distance shall be 1.5 times the diameter <b>at</b> penetration. The base plate of the mast shall be at least 25mm. Thick. A door opening of min. 950mm x 225mm shall be provided at the base of each Mast. The opening shall be such as to permit clear access to equipment like winches, cable pug and socket, etc. the opening shall be complete with a close fitting vandal resistant, weatherproof door, provided with a heavy duty double internal lock with special paddle key. For metal protection of the Mast, the entire fabricated Mast shall be hot dip galvanized internally and externally, having minimum average thickness of 75 microns for wind velocity as per IS 875 part-3</p> <p>. The mast sections shall be galvanized by single dipping method. Sections galvanized by double/multiple dipping methods shall not be accepted.</p> <p><b><u>FOUNDATION:</u></b> - The tenderer shall see the site closely and minutely with regard to the nature of the soil, average depth of decomposed garbage and debris at proposed site. Mast location and the other site conditions before working out the type of foundation and specification for the proposed High Mast. The tendered shall be responsible of the design of the foundation and safe erection and installation of the High Mast in mechanically and structurally safe working condition for the design life of the Mast. The load bearing (safe) capacity of the soil shall be indicted by purchaser to decide the type of foundation and its specifications. The holding down bolts shall be minimum 8 Nos. of high tensile strength (EN – 19 grades) and shall be supplied complete with anchor plate of 6 mm thick for casting into the foundation. The precision made steel template with</p>



tube holes shall be provided to ensure correct vertically and horizontally of bolt alignment. The casting shall be with M-20 concrete with safe soil bearing cap at site as 10 T/Sq. M at 2 m Depth. Prior approval of drawing shall be required from ENGINEER officers.

**DOOR OPENNING:** An adequate door opening shall be provided at the base of the mast and the opening shall be such that it permits clear access to equipment's like winches, cables, plugs and sockets etc. and also facilitate easy removal of the winch. The door opening shall be complete with a close fitting, vandal resistant, weatherproof door, provided with a heavy-duty double internal lock with special paddle key.

The door opening shall be carefully designed and reinforced with welded steel section; so that the mast section at the base shall be unaffected and undue bucking of the cut portion is prevented Size of door opening shall not be more than 950 x 220 mm to avoid bucking of the mast section under heavy wind condition.

**DYNAMIC LOADING FOR THE MAST:** The Mast structure shall be designed for an assumed maximum reaction arising from the maximum wind speed (3 seconds gust) likely to be exceeded only once in 50 years (180 km per hour) and is measured at height of 10 mtrs. Above ground level. The design life of the Mast shall be 25 years. Wind excited oscillations shall be damped by the method of construction and adequate allowance is made for the related stresses. (The offered High Mast shall be a tested design

#### **FABRICATION**

A fabricated lantern carriage shall be provided for fixing and holding the flood light fittings and control gearboxes. The lantern carriage shall be of special Design and shall be of steel tube construction, the tubes acting as conduits for wires, with holes fully protected by grommets. The lantern carriage shall be so designed and fabricated to hold the required number of flood light fittings and the control gearboxes also have a perfect self-balance. The lantern carriage shall be fabricated in two halves and joined by bolted flanges with stainless steel bolts and nylon type stainless steel nuts to enable easy installation or removal from the erected mast. The inner lining of the carriage shall be provided with protective PVC arrangement, so that no damage is caused to the surface of the mast during the raising and lowering operation of the carriage. The entire lantern carriage shall be hot dip galvanized after fabrication

**RAISING AND LOWERING MECHANISM:** For the installation and maintenance of the luminaries and lamps, it will be necessary to lower and raise the lantern carriage assembly. To enable this, a suitable winch arrangement shall be provided, with the winch fixed at the base of the mast and the specially designed head frame assembly at the top.

**WINCH:** The winch shall be of completely self-sustaining type, without the need for brake shoe, springs or clutches. Each driving spindle of the winch shall be positively locked when not in use, by gravity activated PAWLS. Individual drum also should be operated for fine adjustment of lantern carriage. The capacity, operating speed, safe working load, recommended lubrication and serial number of the winch shall be clearly marked on each winch.

The gear ratio of the winch shall be 53:1. However the minimum-working load shall be not less than 750kg. The winch shall be self-lubricating type by means of an oil bath and the oil shall be readily available grades of reputed producers. The winch drums shall be grooved to ensure perfect seat for stable and tidy rope lay, with no chances of rope slippage. The rope termination in the winch shall be such

that distortion or twisting is eliminated and at least 5 to 6 turns of rope remains on the drum even when the lantern carriage is fully lowered and rested on the rest pads.

It should be possible to operate the winch manually by a suitable handle and/or by an integral power tool. Operation of the winch with manual handle shall be independent of the power tool. Winches with manually operation through the power tools shaft shall not be accepted. Individual drum operation of the winch shall be possible. A Double drum winch shall have 2 drums and two worm gears independent in operation for increased safety. It shall be possible to remove the double drum after dismantling, through the door opening provided at the base of the mast. Also, a winch gearbox for simultaneous and reversible operation of the double drum winch shall be provided as part of the contract.

The winch shall be type tested in presence of a reputed institution and the test certificates shall be furnished before supply of materials. A test certificates shall be furnished by the contractor from the original equipment manufacturer, for each winch in support of the maximum load operated by the winch.

**HEAD FRAME:** The head frame which is to be designed as a capping unit of the mast, shall be of welded steel construction, galvanized both internally and externally after assembly. The top pulley shall be of appropriate diameter, large enough to accommodate the stainless steel wire ropes and the multi-core electrical cable. The pulley block shall be made of non-corrodible material, and shall be of die-cast Aluminum Alloy (LM-6). Pulley made of synthetic materials such as plastic or PVC is not acceptable. Self-lubricating bearings and stainless steel shaft shall be provided to facilitate smooth and maintenance free operation for a long period.

The pulley assembly shall be fully protected by a canopy galvanized internally and externally. Close fitting guides and sleeves shall be provided to ensure that the ropes and cables do not dislodged from their respective positions in the grooves. The head frame shall be provided with guides and stops with PVC buffer for docking the lantern carriage.

**STAINLESS STEEL WIRE ROPES:** The suspension system shall essentially be without any intermediate joint and shall consist of only non-corrodible stainless steel of AISI 316 or better grade. The stainless steel wire ropes shall be of 7/19 construction, the central core being of the same material. The overall diameter of the rope shall not be less than 6mm. the breaking load of each rope shall not be less than 2350kg giving a factor of safety of over 5 for the system at full load as per the TR-7 referred to in the beginning of this specification. The end constructions of rope to the winch drum shall be fitted with talurit. The thimbles shall be secured on ropes by compression splices. Three continuous lengths of stainless steel wire ropes shall be used in the system and no intermediate joints are acceptable in view of the required safety. No intermediate joints/terminations, either bolted or else, shall be provided on the wire ropes between winch and lantern carriage.

**POWER TOOL FOR THE WINCH:** A suitable high powered, electrically driven, internally mounted power tool, with manual over ride shall be supplied for the raising and lowering of the lantern carriage for maintenance purposes. The speed for the power tool shall be to suit the system. The power tool shall be single speed. Provided with motor of the required rating. The power tool shall be supplied complete with a suitable control switch so that the operation of the mast can be done at a safe distance. The capacity and speed of the electric motor used in the power tool shall be suitable for the lifting of the design load installed on the lantern carriage. The power tool mounting shall be so designed that it will be not only self-supporting but also aligns the power tool perfectly with respect to the winch spindle during the operations. Also, a handle for the manual operation of the winches in case of problems with the electrically operated tool, shall be

provided and shall incorporate a torque limiting device.

There shall be a separate torque-limiting device to protect the wire ropes from over stretching. It shall be mechanical with suitable load adjusting device. The torque limiter shall trip the load when it exceeds the adjusted limits. There shall be suitable provision for warning the operator once the load is tripped off. The torque limiter is a requirement as per the relevant standards in view of the overall safety of the system. Each mast shall have its own power tool motor.

**ELECTRICAL SYSTEM, CABLE AND CABLE CONNECTIONS:** A suitable terminal box shall be provided as part of the contract at the base compartment of the high mast for terminating the incoming cable. The electrical connections from the bottom to the top shall be made by special trailing cable. The cable shall be EPR insulated and PCP sheathed to get flexibility and endurance. Size of the cable shall be minimum 5 cores 2.5 Sq.mm. copper. The cable shall be of reputed make. At the top there shall be weatherproof junction box to terminate the trailing cable. Connections from the top junction box to the individual luminaries shall be made by using 3 core 1.5 Sq.mm. flexible PVC cables of reputed make. The system shall have in-built facilities for testing the luminaries while in lowered position. Also, suitable provision shall be made at the base compartment of the mast to facilitate the operation of internally mounted, electrically operated power tool for raising and lowering of the lantern carriage assembly. The trailing cables of the lantern carriage rings shall be terminated by means of specially designed, metal clad, multi-pin plug and socket provided in the base compartment to enable easy disconnection when required.

**INCOMING POWER CABLE:** 4 x 2.5 Sq.mm. copper conductor armored cable for motor supply shall be provided from feeder pillar to the base compartment of the high mast. Cable shall be taken to the base compartment of the high mast through the provision made in the foundation. Power cable of suitable size up to the feeder pillar from supply point shall be laid by the contractor. All copper cables required are included in the cost of the tender.

**AVIATION OBSTRUCTION LIGHTS:** Aviation lighting arrangement shall be made on the top of high mast system as per ISS and two nos. light fittings shall be fitted on each high mast. The fittings shall be of Bajaj ref. BJAOL-I or similar Philips/Crompton make. The complete wiring shall be done as per IS.

**EARTHING TERMINALS:** Suitable earth terminal using 12 mm diameter stainless steel bolts shall be provided at a convenient location on the base of the mast for lightning and electrical earthing of the mast.

**FEEDER PILLAR BOX/control panel:** - Each mast shall be provided with a feeder pillar fabricated out of 14 swg CRCA sheet and finished with two coats of red oxide primer and gray enamel paint of shade 631 of IS-5. It is to be mounted on a raised plate from above ground level. Construction endures suitability for outdoor use.

Basic components inside the Feeder Pillar-Box should consist of the following: -

- 1X63 A TPN MCB for incoming supply
- 3X32 A SPN MCB for outgoing (50% lighting, 100% lighting, motor)
- Automatic timer with contactor for controlling above lights of suitable capacity.
- 1 no multi plug socket 16A for Auxiliary power supply.
- Two numbers of contactors for forward and reverse operation of winch motor.

Feeder Pillar Box should be connected with the help of a cable to the remote

control switch for raising and lowering of the lantern carriage The power feed cable should be flexible, sheathed copper type and to be connected between the feeder pillar box and the junction box on the lantern carriage. The feeder pillar box shall be suitable for outside use weather proof.

**TECHNICAL DATA FOR HIGH MAST AND COMPONENTS:**

**A. HIGH MAST STRUCTURES:**

- i). Height of Mast (Meters) : 30/25/16
- ii) Material of construction : High tensile steel  
As per BS/ASTM/DIN Standard
- iii) Thickness (in mm)

Section	Thickness ( 30 MTR)	Thickness ( 25 MTR)	Thickness ( 16 MTR)
Top	4 mm	3mm	3mm
Middle	5 mm	4mm	4mm
Bottom	5 mm	4mm	4mm

- iv) Cross section of mast : In polygon 18 sides or more as per design
- v) No. of section of Masts : 3 (30 Mtrs & 25 Mtrs), 2 for 16 Mtrs
- vi) Base and top diameters : 150mm (min) at Top  
350mm to 610mm as per design of manufacture for 16m/25m/30m
- vii) Type of joints : Telescopic stress fit (slip over joint system) with no circumferential weld
- viii) Thickness of galvanization : Minimum 75 Microns
- ix) Size of opening of door at base : Not less than 950mmx225mm
- x) Length of overlap minimum : 1.5 times the diameter at penetration

**B. DYNAMIC LOADING:**

- i) Max. Wind speed : 180 Km/h.
- ii) Max. Gust speed with time : 50 Mtrs/sec.
- iii) Height from the ground level : 10 Mtrs. For measurement of wind Velocity
- iv) Factor of safety for wind loads : More than 1.25
- v) Factor of safety for material : More than 1.15 (as per TR No.7)
- vi) Factor of safety of Tower : More than 1.5

**C. LANTERN CARRIAGE:**

- i) Material of construction : M.S. (Hot dip galvanized)
- ii) Buffer arrangement between Carriage & mast. : PVC sleeves

**D. WINCH.**

- i) No. of winch per mast : One (Double drum)

**E. METHOD OF OPERATION:**

- i) Lubrication. : Self-lubricating permanent oil bath
- ii) SWL if the winch : 750 Kg.
- iii) Breaking system : In built
- iv) Gear ratio : 53:1

**F. POWER TOOL:**

- i) Power supply : 230 Volts, 50 C/S, AC supply
- ii) Speed of power tool : 1.2 mt/min
- iii) Number of speeds : Single speed
- iv) Reversible/ non-reversible : reversible.
- v) Remote control switch
- a) Type : Push Button.
- b) Length of control cable : 5/6 Mt. (Approx) copper.

**G. FOUNDATION:**

- i) Type of foundation : Open raft shallow RCC type
- ii) Size of foundation : As per site conditions considered
- iii) Considered wind speed /pressure : 200 Kg/Mtr. Sq.
- iv) Design safety factor considered : More than 1.75.

**H. STAINLESS STEEL WIRE ROPE:**

- i) Grade : AISI 316 or better Grade
- ii) Nos. of ropes : Not less than 2 continuous. Ropes
- iii) Construction : 7/19 with central core SS
- iv) Center core material : Stainless steel wire.
- v) Breaking load capacity : 2350 Kgs.
- vi) Factor of safety : 8.5 per wire rope.

**I. TORQUE LIMITOR:**

- a) Lifting capacity : Upto 700 Kgs.
- b) Adjustable /non- Adjustable : Adjustable

**Note:** - Each mast shall be completely enclosed from all sides and top with M.S. Jali (Mesh 1"x1") of dimensions at least 4x4x4ft having proper entrance / gate supported with suitable MS flat/ angle iron and locking arrangement etc. This enclosure will be embedded in masonry work as per site requirement and satisfaction to ENGINEER Representative. No extra payment shall be made to firm for this works.

**THE RELEVANT IS- STANDARDS APPLICABLE FOR MAST.**

S. NO.	STANDARD NO.	NAME
1)	IS-875 Part-III of 1987	Code of practice for wind and dynamic loading on structures
2)	BS 4360 or equivalent to STM/DIN standard	Grade of MS plates.
3)	BS 5135 or equivalent to ASTM/DIN standard	Welding of MS Plates as material of Construction
4)	BS 729 or equivalent to ASTM/DIN standard	Galvanizing of steel structure.

		<p>5) Technical report No.7-1976 Specification for high mast</p> <p>6) IS-456 RCC foundation</p> <p>7) BSEN ISO 1461 of hot section Metal protection treatment of mast deep Galvanizing</p> <p>8) EN 19 material Foundation Bolts</p> <p><b>NOTE:</b> Contractor shall arrange inspection of high mast tower at manufacturer's works before dispatch at his own cost. <b>Prior approval of foundation will be required from Engineer before installation and make of HMT as per Reference list.</b></p>														
47	NS-48	<p><b>Laying of cable under the road/Railway track, recessing in platform /wall: -</b> Laying of underground cable under the road/Railway track, recessing in platform /wall along with Railway Track. in laid HDPE /GI pipe as required 1.1 KV grade LT XLPE insulated armored, aluminum conductor cable including making chase &amp; plastering after laying of cable/digging of cable trench, sand cushioning, protective covering with second class bricks, provision of cable route marker as per tech. Spec. including end terminations with Al. Crimping socket/lugs testing and commissioning of following sizes. NOTE: - I) All cable connection shall be made with proper size of crimping socket /grandest by the contractor at his own cost and labour ii) Road/floor where cable is to be laid shall be made good as original by the firm at his own cost and to the satisfaction of <b>Engineer.</b></p>														
48	NS-49	<p>Supply, fixing, testing and commissioning of LED type flood light luminaries (400 watt): - The contractor shall have to install, test &amp; commission of 400 watt pre wired LED Flood light fitting complete confirming to BAJAJ Cat. No. BARFEG-400W LED with IP- 66 protection equivalent with LEDs and driver and all accessories. The contractor shall have to make necessary fixing/suspension arrangement for LED fitting. Specification of LED fitting:</p> <p>The LED Lamps, driver &amp; luminaries shall be suitable for outdoor lighting/facade lighting and other installations under the following Environmental conditions:</p> <p>Environmental Conditions:</p> <table border="1"> <tr> <td>Maximum ambient air temperature</td> <td>55°C</td> </tr> <tr> <td>Minimum ambient air temperature</td> <td>-5°C</td> </tr> <tr> <td>Maximum relative humidity</td> <td>90 %</td> </tr> <tr> <td>Atmosphere</td> <td>Extremely dusty and desert weather, desert Terrain in certain areas. The dust content in The air may reach as high as 1.6 mg/m<sup>3</sup>.</td> </tr> <tr> <td>Salt laden &amp; corrosive Area</td> <td>The equipment shall be designed to work in Humid, salt laden and corrosive area.</td> </tr> <tr> <td>Maximum PH value</td> <td>8.5</td> </tr> <tr> <td>Sulphate</td> <td>7mg/liter</td> </tr> </table>	Maximum ambient air temperature	55°C	Minimum ambient air temperature	-5°C	Maximum relative humidity	90 %	Atmosphere	Extremely dusty and desert weather, desert Terrain in certain areas. The dust content in The air may reach as high as 1.6 mg/m <sup>3</sup> .	Salt laden & corrosive Area	The equipment shall be designed to work in Humid, salt laden and corrosive area.	Maximum PH value	8.5	Sulphate	7mg/liter
Maximum ambient air temperature	55°C															
Minimum ambient air temperature	-5°C															
Maximum relative humidity	90 %															
Atmosphere	Extremely dusty and desert weather, desert Terrain in certain areas. The dust content in The air may reach as high as 1.6 mg/m <sup>3</sup> .															
Salt laden & corrosive Area	The equipment shall be designed to work in Humid, salt laden and corrosive area.															
Maximum PH value	8.5															
Sulphate	7mg/liter															

Max. concentration of chlorine	6mg/liter
Annual rain fall	Ranging from 1750mm to 2000mm with Thunder storm.
Altitudes	Not exceeding 2000m above sea level

Technical requirements of LED Flood light fitting:

- (i) LED efficacy shall be  
100 Lm/watt for luminaire system wattage up to 45Watt.  
120 Lm /watt for luminaire system wattage above 45 Watt.
- (ii) LED used should be of SMD type only.
- (iii) LM-80 Test Reports of specific LED make, series, model, cat-part from Accreditation certificate from accrediting authority for LM-80 Test.
- (iv) L70 Reported Life span of LEDs used in the luminaries shall be greater Than 50,000 hrs. at the soldering point temperature of 85°C.
- (v) Make of LEDs: Nichia, Osram, Seoul, Philips Lumileds, Cree and Lednium.
- (vi) Color temperature of the proposed white color LED shall be 6500 K.
- (vii) Color Rendering Index (CRI): Greater than or equal to 65.

Technical requirements of Driver:

- (i) Min. efficiency of driver (a) For driver power output rating < 100 watt=85%  
(b) For driver power output rating less > 100 W = 90%
- (ii) Power factor of complete fitting: 0.90.
- (iii) Input Operating Voltage: 140V to 270 V.
- (iv) Short circuit protection: Yes.
- (v) Open load protection: Yes
- (vi) Driver Surge Protection standard :(a) 3 kV Min (b) 10 kV for lighting  
Prone location (External to driver circuit.
- (vii) Total Harmonic Distortion (THD): Less than 20% at full load.
- (viii) Tc (Maximum Driver case temperature) must be declared on the data sheet.
- (ix) Isolated driver should be used.
- (x) Potting of LED Driver: (a) For driver power output rating < 50W  
(Not mandatory) (b) For driver power output rating > 50W  
(Mandatory).
- (xi) LM-79 Test report from NABL accreditation Laboratory should be submitted.

Technical requirements of Luminaire:

- (I) Manufacturer shall submit the LM-79/IS: 16106 test report. The manufacturer shall submit accreditation that the luminaire submitted for LM-79 testing was equipped with the LED Driver now being offered by the contractor.
- (ii) Colour temperature: 6500 K.
- (iii) CRI: Greater than 65.
- (iv) Housing of luminaire: Pressure die-cast LM6/ADC12/LM24 housing.
- (v) Cover type: Toughened glass or UV stabilized polycarbonate cover. (vi) Housing protection: IP-65 for outdoor application. If the LEDs and LED Driver are in different compartments, then the two compartments must be individually IP-65.

6) WARRANTY: The financial viability of LED luminaire is not possible without quality and thereby, life of the luminaire. Therefore, it is absolutely essential and inescapable to specify the warranty in this technical document. The supply shall be covered by warranty of 60 months from the date of commissioning or 72 months from the date of supply, whichever is earlier.

The LED light fitting shall be confirming to specification No. CEE Spec No: CEE/NR/121-Elect/PS/2018(REV-03) Dated-28.06.2018 & CEE Spec No: CEE/NR/121-Elect/PS/2019(REV-04) Dated-04.11.2019 or latest.

The contractor shall arrange inspection of LED fitting at manufacture's works before dispatch at his own cost if required by the ENGINEER and have to submit manufacture's test certificate of cable. Make of LED fitting as per Reference list.

49	NS-50	SITC of mono-block submersible pump 2.0 HP complete with all Accessories: - Supply, fixing, testing and commissioning of single stage Mono-block open well submersible pump set with control panel rating 2HP/1.5KW, Head range (M) :26 meters and above, size (MM) suction X delivery 50X40, Discharge (LPM):180 or above at 26-meter head suitable for single phase 50Hz AC supply make CRI, CG, Kirloskar and as per ref list. Sample of material shall be got approved from Engineer before installation and as per Reference list.
50	NS-51	<b>Supply and fixing of MS jail 1"x1" welded on MS angle: -</b> Supply and fixing of MS jail 1"x1" welded on MS angle frame 30x30x3mm which is fixed on base angle frame of 50x50x6 mm and 40 x 6 mm MS flat in center to support the jail. The whole structure painted with one coat of red oxide and two coats of enamel paint as per instruction of <b>Engineer</b> . The structure is to be supported by erection of rails or any other structure if required. Providing roof on existing MS rail/angle structure by AC/GI sheet with 50x50x6 mm support angles, nut bolts and washer if required.
51	NS-52	<b>Supply &amp; fixing of G.I. pipe 50 MM dia B class with flanges &amp; sockets: -</b> Supply and fixing of delivery GI pipe B class 50mm dia as per IS 1239 or latest for bore well/open well with flanges/sockets/bends as required as per site conditions in 6 mtr lengths or as per requirement. <b>Samples of all items shall get approved from Engineer before installation</b> and as per <b>Reference list</b> .
52	NS-53	<b>Supply and fixing pipe fitting bends, sockets, flanges, delivery valve, Non Return valve: -</b> Supply and fixing pipe fittings bends sockets flanges, delivery valve and non-return valve and supporting clamps (2 sets) etc. complete in all respect. <b>Samples of all items shall get approved from Engineer before installation.</b>
53	NS-54	<b>Supply, fixing, testing, commissioning of 3 core 6.00 Sq.mm. CU flat cable: -</b> Supply and laying of flat submersible cable copper 3Cx6 sq.mm for pump set ISI mark as per IS 694 Part-I 1964 or latest. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>
54	NS-55	<b>Supply of Submersible mono block pump (150 mm dia) 5 HP: -</b> Supply, fixing and connecting of Three phase, monoblock Horizontal/sump pump, 05 HP, 3.75KW (dia 150 mm), 20-25 mtrs. Head, discharge 11 LPS complete with all accessories Make: CGL, Kirloskar, KSB, SABER or as per ref list. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>
55	NS-56	<b>Supply, fixing, testing and commissioning of automatic control panel with DOL starter: -</b> The contractor will Supply, fixing, testing and commissioning of automatic control panel with DOL starter for 5 HP three-phase pumps including connections and providing cable from main board to control panel. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>
56	NS-57	<b>Lowering, testing and commissioning of monoblock submersible pump set: -</b> Erection, testing and commissioning of horizontal type mono block submersible pump complete with DOL starter conforming to IS 8034 - 89 of KSB, BEACON or from approved make list and provide with all required accessories i.e. nut-bolts, clamps, valve etc. All supports shall be correctly aligned before connecting and masonry work if required shall be done by the contractor. Piping work from sump to overhead tank with all required accessories like GI pipe, bend, copper cable, coupling etc. will be done by contractor. Complete work will be as per instruction & satisfaction of site engineer.



57	NS-58	<b>Supply, installation, testing and commissioning of 32 Amp. SPN DP MCB: -</b> SITC of Double Pole MCB of 32 Amp, 10 kA C series is to be provided in the metal enclosure as per the site requirement and at locations as per the instruction of the site engineer. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>																																														
58	NS-59	<b>Supply, Fixing, testing &amp; commissioning of heavy duty 5 star 1.5 Ton Split inverter type Air conditioner: -</b> supply, commissioning & testing of 1.5 Ton heavy duty, 5-star inverter type split air conditioner with required suitable size nuts, bolts, fasteners, cu pipe & petty hard ware in all respect. Top up the required refrigerant & maintain the pressure (If required) as per company recommendation or latest Eco-friendly refrigerant. No extra payment will be made to the contractor for that. Complete work will be carried out as per instructions and satisfaction of the <b>Engineer. Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>																																														
59	NS-60	<b>Supply and fixing of Metal Clad Plug Socket 20A single phase with 32A MCB: -</b> Supply and fixing metal clad plug socket 20A single phase with 32A MCB SP 10kA, C series including fixing and sheet metal enclosure box with one 20A plug top (Ray roll type) to be supplied with board. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b>																																														
60	NS-61	<b>Supply, fixing, testing and commissioning of storage type 5-star rating geyser 25-liter capacity: -</b> Supply, fixing, commissioning & testing of 25 Liters. Storage water geyser with required suitable size nuts, bolts, fasteners & petty hard ware in all respect. Geyser should be ISI/BIS marked with 5 star rated. Repair the civil work up to the original position & extra payment will be mad for that. Complete work will be carried out as per instructions and satisfaction of the <b>Engineer. Sample of material shall be got approved from Engineer before installation. Make of geyser should be as per Reference list.</b>																																														
61	NS-62,63 &64	<p><b>Supply, installation, testing and commissioning of 100 LPD solar water heating system: -</b></p> <table border="1"> <thead> <tr> <th colspan="2">Specification of item</th> </tr> </thead> <tbody> <tr> <td>(a)</td> <td>System Capacity</td> <td>100</td> <td>200</td> </tr> <tr> <td>(b)</td> <td>System Output Temperature</td> <td colspan="2">60 degree C year average basis on clear sunny days</td> </tr> <tr> <td>(c)</td> <td>Number of Vacuum Tube</td> <td>12</td> <td>24</td> </tr> <tr> <td>(d)</td> <td>Circulation</td> <td colspan="2">Thermos phone</td> </tr> <tr> <th colspan="2">Evacuated Tube Collector</th> <td colspan="2"></td> </tr> <tr> <td>(a)</td> <td>Collector size</td> <td colspan="2">47 mm outer dia +0.5 mm, -0.0 mm 37 mm inner dia +0.5 mm, -0.0 mm</td> </tr> <tr> <td>(b)</td> <td>Absorber area of the collector</td> <td colspan="2">Area covered by each manifold is 6 Sq. m.</td> </tr> <tr> <td>(c)</td> <td>Water output</td> <td colspan="2">Rated LPD at 60-65 °C* * Under normal sunny conditions</td> </tr> <tr> <td>(d)</td> <td>Stagnation Temperature</td> <td colspan="2">180 °C maximum</td> </tr> <tr> <td>(e)</td> <td>Material of construction (Absorber)</td> <td colspan="2">Tube made of borosilicate glass</td> </tr> <tr> <td>(f)</td> <td>Coating</td> <td colspan="2">Graded Al-N /Al outer surface of the inner</td> </tr> </tbody> </table>	Specification of item		(a)	System Capacity	100	200	(b)	System Output Temperature	60 degree C year average basis on clear sunny days		(c)	Number of Vacuum Tube	12	24	(d)	Circulation	Thermos phone		Evacuated Tube Collector				(a)	Collector size	47 mm outer dia +0.5 mm, -0.0 mm 37 mm inner dia +0.5 mm, -0.0 mm		(b)	Absorber area of the collector	Area covered by each manifold is 6 Sq. m.		(c)	Water output	Rated LPD at 60-65 °C* * Under normal sunny conditions		(d)	Stagnation Temperature	180 °C maximum		(e)	Material of construction (Absorber)	Tube made of borosilicate glass		(f)	Coating	Graded Al-N /Al outer surface of the inner	
Specification of item																																																
(a)	System Capacity	100	200																																													
(b)	System Output Temperature	60 degree C year average basis on clear sunny days																																														
(c)	Number of Vacuum Tube	12	24																																													
(d)	Circulation	Thermos phone																																														
Evacuated Tube Collector																																																
(a)	Collector size	47 mm outer dia +0.5 mm, -0.0 mm 37 mm inner dia +0.5 mm, -0.0 mm																																														
(b)	Absorber area of the collector	Area covered by each manifold is 6 Sq. m.																																														
(c)	Water output	Rated LPD at 60-65 °C* * Under normal sunny conditions																																														
(d)	Stagnation Temperature	180 °C maximum																																														
(e)	Material of construction (Absorber)	Tube made of borosilicate glass																																														
(f)	Coating	Graded Al-N /Al outer surface of the inner																																														

		Tube selective-black chrome.
(g)	No. of layers of coating	12
(h)	Length of each tube	1800 mm

(i)	Vacuum of the tube	$\leq 5 \times 10^3$ Pa*
(j)	Hail resistance/ impact resistance	< 25 mm dia
(k)	Absorptive (%ge) of the collector	>92%
(l)	Emissivity (%ge) of the collector	<8%
(m)	Collector frame	Tubes mounted on painted M.S of 1.4 mm frame With reflector at the bottom to withstand 200-km/hr wind speed.
(n)	Glass beading and sealing	Silicone rubber ring
(o)	Grommets	EPDM with inside and outside locking collar
(p)	Absorber-mounting structure	Frame made up of painted mild steel 1.2 mm and 1.6 mm thick
(q)	Tilting Arrangement	Fixed

#### **Hot Water Insulated Storage Tank**

(a)	Tank Capacity	100   200
(b)	Material	1.22 mm. Stainless steel (special 304 grade)
(c)	Linear and collar welding	Uniform machine TIG welding.
(d)	Circumferential welding	Uniform machine resistance welding.
(e)	Thermal insulating material	Rock wool, density of 48kg/m <sup>3</sup>
(f)	Thickness of insulation	75 mm CFC free PUF / 100 mm Glass wool
(g)	Heat loss	Overnight temperature loss 4-6 °C
(h)	Tank cladding	Aluminum of 0.71 mm thickness/ coated steel
(i)	Tank design	Suitable for gravitational pressure

#### **Miscellaneous**

- (a) Fasteners → All fasteners used are stainless steel 304 (nut, bolt, flat washers)
- (b) Interface between dis-similar materials → Special silicone rubber
- (c) Temperature indicator → Good quality of temperature indicator will be provided with system delivery line.

		<p>(d) Gate valves and NRV → Heavy duty hot water gate valve will be Provided for each manifold. Total 4 valves Will be provided for 02 manifolds each in inlet and out and one in main inlet line to manifolds.</p> <p>(e) Internal piping → EPDM piping / GI B class.</p> <p>(f) Electrical Backup → Electrical backup of standard capacity with associated accessories and equipment's are to be provided.</p> <p>(g) Wire Mesh Cover → Wire Mesh Cover Stand support should be made of suitable size of MS angle iron. For protection of tubes mesh cover of suitable size should be provided Made of 1"X1" wire mesh.</p>
62	NS-65	<p><b>Supply, fixing, testing and commissioning of cold water tank: -</b> Cold water Storage Tank with MS stand and associate piping work good quality PVC tank to Be supplied &amp; erected for hot water system. These tanks shall be kept at a height of minimum 300 mm above than the hot water storage tank. These tanks should be provided with proper Stand of suitable size of MS angle iron duly painted. Stand should be fixed properly at site With cement &amp; concrete mixture as required. All necessary piping work to be done by Contractor along with accessories required to be done for collecting cold water from any Station building.</p>
63	NS-66	<p><b>Supply, installation, testing and commissioning of 125 KVA Capacity radiator cooled Silent DG Set: -</b></p> <p>The item price includes labour &amp; cost of all materials including cost of DG set with acoustic enclosure, AMF panel and all other accessories, construction of plinth with materials as per OEM recommendations and approved drawing, first filling of lubricating oil, supply of High speed Diesel oil required for testing, commissioning at site etc. as per details given in specifications. DG set shall be complete with diesel engine, copper wound alternator, battery set, anti-vibration pads, fuel tank and all other accessories/equipment's/protective devices etc. and AMF control panel conforming to relevant IS, fabricated with CRCA, 16 SWG sheet, powder coated and comprising of incoming 4 pole, MCCB 50KA, 4 pole 800 Amps ACB (MDO) for 500 KVA DG Set, copper bus-bars, 4 pole, heavy duty contactors, multifunction panel meter for display of current and voltage on phases and lines, power factor, frequency, KWH, MD etc., LED indications lights including connections with single core 1.1 kV grade LT XLPE insulated copper conductor control cable between LT panel, AMF panel and alternator for auto and manual operation etc. Noise level shall be less than 75-dBA averages or as per latest CPCB norms.</p>
64	NS-67	<p><b>Supply and providing of Maintenance Free Earthing: -</b> Supply and providing of Maintenance Free Earthing with primary MS conductor 40 mm dia 3000 mm long and secondary MS Electrode 80 mm dia 3000 mm long including digging pit of size 5ft.x5ft.x10ft. And using earth enhancement chemical compound minimum 75 kg. Per pit suitable for 40 KA current capacities and as per RDSO specification No. RDSO/PE/SPEC/PS/0109(REV-0)-2008.</p>

65	NS-68	<p><b>Rolling Light MS box:</b> - Supply of material, fabrication, installation and commissioning of rolling in Examination light MS box of suitable dimension as decided by <b>Engineer</b> comprising of sheet steel 1.6 mm thick,60-micron power coating -gray shed, gland plates neoprene EDPM/rubber gasket padlock arrangement, zinc passivated earth bolt canopy etc. All the material should be good quality. <b>Sample of material shall be got approved from Engineer before installation.</b></p>
66	NS-69	<p><b>Supply, Fixing, testing &amp; commissioning of LED light 30 Watt: -</b> The item includes cost of LED flood light fitting of 30 watts similar to BAJAJ model no –BJFL30WLED-I pre die cast aluminums, IP-66 protection, complete with all accessories of approved make etc. as approved by ENGINEER. The item price also includes labour &amp; cost of all materials including cost of FR PVC insulated multistranded single core copper conductor cable, earthing connection etc. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
67	NS-70	<p><b>Supply, fixing, testing and commissioning of recess mounted LED foot/step light fitting: -.</b> Supply, fixing, testing and commissioning of recess mounted LED foot/step light fitting indirect type, complete with driver and all accessories, operating voltage 230 VAC model no. PE-12-D-L-5X00B of Pyrotech with power LED lamp of required wattage complete with all accessories etc. as approved by ENGINEER. The item price also includes labour &amp; cost of all materials including cost of FR PVC insulated multistranded single core copper conductor cable, earthing connection etc. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
68	NS-71	<p><b>Supply &amp; fixing of flexible stand type LED reading bed side light: -</b>The item includes cost of LED reading bed side light fitting of suitable size and watt with power LED lamp of required wattage complete with all accessories etc. as approved by ENGINEER. The item price also includes labour &amp; cost of all materials including cost of FR PVC insulated multistranded single core copper conductor cable, earthing connection etc. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
69	NS-72	<p><b>Supply and fixing of junction box size 390x305x170mm:</b> Supply and fixing of junction box size 390x305x170mm comprising of SMP/FRP material with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. similar to Sintex model no. GSJB 3525 or similar with 4 no. aluminums bus bar cap 200 Amp. Suitable for 415-volt supply requirement. The box shall be fixed robustly with clamps at pole/ wall as per requirement. All the material should be of good quality. <b>Sample of J/B shall get approved from Engineer Before installation and make as per Reference list.</b></p>
70	NS-73	<p><b>Supply, fixing commissioning and installation of perforated cable Tray of size 300x75 mm with thickness 2 mm: -</b> The item price includes Design, Supply, erection, labour &amp; cost of all material including cost of the hot dip galvanized perforated cable trays of required size and their fittings shall conform to the Indian Standards or their latest amended editions or equivalent International Standard. Entire work shall be done as per instruction by ENGINEER officers. <b>Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>

71	NS-74	<p><b>Supply, fixing, commissioning and installation of Perforated Cable Tray of size 150x50 mm with thickness 1.6 mm: -</b></p> <p>The item price includes Design, Supply, erection, labour &amp; cost of all material including cost of the hot dip galvanized perforated cable trays of required size and their fittings shall conform to the Indian Standards or their latest amended editions or equivalent International Standard. Entire work shall be done as per instruction by <b>Engineer. Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
72	NS-75	<p><b>Supply, erection, testing &amp; commissioning of control and distribution panel for color light signaling for 5 to 10 kva AT supply: -</b></p> <p>The item price includes labour &amp; cost of all materials including cost of automatic changeover panel complete as per RDSO specification No. TI/SPC/PSI/CLS/0020 (12/02) with A&amp;C slips No. 1 to 4 or latest, connections as required. . <b>Sample of material shall be got approved from Engineer before installation.</b></p> <p><b>Note: Make of panel shall be on the approved list of manufacturers issued by RDSO/Lucknow.</b></p>
73	NS-76	<p><b>Supply, fixing commissioning, installation and testing of 2kVA pure sine wave 24-volt online inverter consist of intelligent battery charging mechanism with adaptive battery charging: -</b></p> <p>The item price includes Supply, fixing, commissioning, installation and testing of 2 kVA pure sine wave 24-volt online inverter consist of intelligent battery charging mechanism with adaptive battery charging and 150 AH tubular battery of voltage 12 volt (2 Nos) suitable for heavy duty application. <b>Warranty of inverter is 24 months and for Battery - 36 months. Sample of material shall be got approved from Engineer before installation and as per Reference list.</b></p>
74	NS-77	<p><b>Supply, installing, testing and commissioning earthing system complete in all respect with 600mmx600mmx6mm thick G.I earth plate: -</b></p> <p>The item price includes labour &amp; cost of all material including cost of supply of GI earth Plate of size (600x600x6 mm) concrete enclosure, MS cover plate with lifting handle, G. I. watering pipe, charcoal or coke and salt etc. The price shall also cover erection including digging of earth pit in any kind of soil at the specified location. The work shall also cover the earth treated to obtain earth resistance of less than 1 ohm. Connection of earth electrode should be made by providing GI clamps nuts, bolts. Work shall be in conformity to IS 3043/1987 (Latest Version) and as per approved drawing. Excavation shall be done complying with Code of Safety as per IS 3764/1992. Earth resistance shall not be greater than 1 ohm in normal soil and 2 ohms in rocky area.</p>
75	NS-78	<p><b>-Supply and laying 25mm x6mm G.I. strip for earth connection at not less than 0.50 meter below ground: -</b></p> <p>The item price includes labour &amp; cost of all materials including cost of G.I. strip on surface or recess or digging in ground/making chase in wall/floor and making good the damages, connections including soldering/riveting etc. as required.</p>
76	NS-79	<p><b>Supply and fixing of suitable GI angle for fixing support for cable tray with suitable foundation arrangement: -</b></p> <p>The item price includes labour &amp; cost of all materials including Supply and fixing of suitable GI angle for fixing support for cable tray with suitable foundation arrangement as per specification and satisfaction of site engineer.</p>
77	NS-80	<p><b>Supply of 4x185 cables: -</b></p> <p>Supply of 1.1 KV grade 4x185 sqmm LT XLPE insulated armored aluminum conductor cable, making good the damages, end terminations with aluminum crimping sockets/lugs, glands, testing and meggering etc. as per required technical specifications &amp; Confirming to IS: 7098 Part. II, 1985, IS: 8130-1984 and IEC-502 standards with latest amendment. The contractor shall arrange inspection of cable at manufacture's works before dispatch at his own cost if required by the Engineer and have to submit manufacture's test certificate of cable.</p>

--	--	--

MATERIAL REFERENCE LIST.

S. N.	Item	Relevant Standards/ Specifications (Latest Ver.)	Reference Makes
1	Power Transformer	IS: 2026/1977 -2011 (Part- 1 to 10) and IS: 1180/1989 & IS: 2026/1977 for up to 100 KVA, 11 kV outdoor type Transformer.	Alstom / Crompton Greaves / Bharat Bijlee / Schneider/ ABB / BHEL / Prime Meiden or similar
2	11 kV/HT Vacuum Circuit Breaker, SF-6/11kV gas filled Circuit Breaker.	IS: 3427/1997	GEC, Siemens, Crompton Greave, Alstom (Areva), ABB, BHEL, L&T, Schneider or similar
3	ACB(11kV)	IS: 13118/1991	ABB / Mitsubishi /Schneider filled Circuit Breaker filled Circuit Breaker or similar
4	PSS/CSS with HT/LT switch gear, transformer and connected accessories	IS:11171/1985 for dry type Power transformer	ABB, Siemens, L&T, Crompton Greave, BHEL, GEC, Kirloskar, Alstom (Areva), Schneider or similar
5	MCCBs, MCBs, ELCBS/ RCCBs, RCBO, DB, ICTPN, TP, HRC fuse, Changing over switch, Switch Fuse Unit	IS: 8828/1996 for MCB IS: 13947(Part-1)/1993 & part 5/Sec1)/2004 for MCCB IS: 12640/2008 (Part-1) for RCCB & (Part-2) for RCBO. IS: 13703/1993 for LV HRC fuse IS: 13947(Part-3)/ 1993 for SFU	ABB / Legrand/ / Schneider/Mitsubishi or similar
6	XLPE HT Cable 11/33kV grade	IS:7098(Part-2)/2011	CCI/KEC RPG / Universal Cable / Sterlite or similar
7	PVC/XLPE Power Cables up to 1.1kV grade	IS: 694/2010 for PVC cable, IS: 1554(Part-1&2)/1988 for heavy duty PVC cable, IS:7098(Part-1)/1988 for XLPE cable	CCI / KEI / Finolex / Lapp Cable / / RPG / Universal or similar
8	Instrument Voltmeter, Ammeter, PF meter	IS:1248/2003 for Analog, IS:13875/2008 for digital	AE / Precise / IMP / Secure or similar
9	11kV Cable End Termination & Jointing kits	IS: 13573/1992 Part-1,2&3/2011	Raychem RPG / 3M or similar

10	Relays	IS: 3231(Part-0&1)/1986 (Part-2&3)/1987	ABB / Schneide or similar
11	Luminaries, MH, HPSV, T-5 fittings, CFL & related accessories	IS: 9974(Part-1)/1981 for HPSV IS:15111/2002 for CFL	Phillips, Crompton, Bajaj, GE, Osram, Wipro. or similar
12	PVC insulated Elect. Wires  Sheathed/ unsheathed, PVC flexible LT cable, multicore, single core, Flat cable for submersible pumps	IS: 694/2010 for PVC cable	Finolex / Polycab / KEI / Havells / Lapp or similar
13	Current Transformer	IS: 2705/1992	AE / Kappa / Pragati / Precise / Hitachi / Plastofab / Mehru or similar
14	On line UPS, Servo Stabilizer, Inverter, CVT	IS:13314/1992 for Inverter  IS:11260/1985 for voltage Stabilizer	APC Schneider / Emerson Network Power / Eaton or similar
15	Rotary Switches. Selector Switches	Relevant IS	ABB / Idec / Kay Cee / L&T / Salzer / Schneider or similar
16	Exhaust fan/Air Circulator/  Bracket & Pedestal fans/Ceiling fan	IS: 374/1979 for ceiling fan IS: 2312/1967 for Exhaust fan	Crompton Greaves / Usha / Bajaj / Havells / Schneider or similar
17	Galvanized High Mast Tower / Tubular pole/ Octagonal pole for general purpose lighting	IS:875(Part-3)/1987 for High mast Structure, BSTN-10025/1993 for High Mast Shaft, IS:2026 for other component IS: 2629 / 1985, BSEN ISO-1461 for Galvanization	Bajaj, Philips or similar
18	Electronic Energy Meter	IS:13779/1999  IEC:62053-21	L&T, IMP, HPL, Secure, ABB, Enercon or Similar.
19	Central Air Conditioning Plants & Package type plant	IS: 8148/2003 for package type. IS: 1391/1992 for Room Air Conditioners.	Voltas, Blue Star, Carrier, Hitachi, O General, Mitsubishi or Similar.
20	Capacitors- PF correction for Electrical General	IS:13340/1993  IS:13341/1992	Elspec / Schnider / ABB or similar



	Services		
21	DG Sets- Portable	<i>IS: 13364(Part-1)/1992 for Alternator IS:10001/1981 for Diesel Engine</i>	Birla Yamaha, CGL, Shriram, Mahindra Honda or Similar.
22	DG Engine	<i>IS:13364/1992 For Alternator</i>	Sudhir / Sterling / Powerica / Jackson or similar
23	Alternator for DG set	<i>IS:4722/2001 IS:4728/1975</i>	Stamford / Lerroy soumer / Marreli or similar
24	Induction Motor	<i>IS:325/1996 IS:12615/2011</i>	ABB / BBL / Crompton Greaves / Kirloskar or similar
25	LT Switchgear & control gears- Contactors & motor starters, Energy Efficient Soft Starter panel/ Earthing Switch, Single phase preventer	<i>IS:13947(Part1)/1993 IS:13947(Part4)/1993 IS:13947 (Part-5)/2004</i>	GE / Schneider / ABB or similar
26	Pumps- Submersible	<i>IS: 8034/2002 for submersible pump sets IS: 9283/1995 for motors of submersible pump sets IS: 14220/1994 for open well submersible pump sets</i>	ABB / BBL / Crompton Greaves / Kirloska or similar
27	Timers- electronic solid state	<i>IEC: 60947(2004)</i>	ABB / Schneider Electric / Omron or similar
28	Water Coolers	<i>IS: 1475 Part-1/2001 IS:1475/2005</i>	Blue Star, Kelvinator, Shriram, Voltas or Similar.
29	Electrical accessories  (Piano switch, Plugs & sockets, ceiling rose, Angle holder, holders, Modular switch and socket)	<i>IS: 3854/1997 for switches IS: 1293/2005 for plugs&amp; sockets IS: 371/1999 for ceiling rose IS: 1258/2005 for lamp holder Bakelite</i>	Anchor /Roma / North-West / Schneider / Legrand / Havells Crabtree or similar
30	Bell Buzzer	<i>IS:2268/1994 or latest</i>	CONA, MAX, Anchor, SSK or similar
31	Electronic fan regulator/modular Fan Regulator	<i>IS:11037/1984</i>	Anchor /Roma / North-West / Schneider / Legrand / Havells Crabtree or similar
32	Solar cell/Module system	<i>IS: 12834/1989 IEC 61215/2005</i>	TATA BP, BEL, BHEL, REIL, MOSER BEAR, CEL or Similar.

		IEC 60904-2006	
--	--	----------------	--

33	Solar Lighting system	RDSO/PE/SPEC/PS/0093-2008, Rev. 'O' – Amendment '1'	-----
34	GI/MS Pipe	IS: 1239(Part-1)/1990	TATA, Jindal, Prakash, Surya Sail or similar
35	Geysers	IS:2082/1993	Bajaj, Usha, Crompton, or similar
36	Lifts & Escalators	IS-14665/2000 for Lift RDSO/2013/EM/SPEC/0016 Rev (0) for Lift (Elevator)RDSO/PE/SPEC /TL/0095-2008 Rev (0) for Escalator	OTIS, ThyssenKrupp, Shindler, KONE, Mitsubishi, Jhonson or Similar.
37	LEDs	IS: 16101-2012, IS: 16102-2012 Part-1, 2 IS: 16103-2012	NICHIA, OSRAM, SEOUL SEMICONDUCTOR, PHILLIPS LUMILEDS, LEDNIUM or Similar.
38	Solar Water Heaters	RDSO/PE/SPEC/PS/0094-2008 Rev '0'	As per MNRE approved sources.
39	Solar Distilled Water Plants	Relevant IS	As per MNRE approved sources.
40	Energy savers used for lighting loads	RDSO/PE/SPEC/PS/0083-2008 Rev. '0'	As per MNRE approved sources.
41	Air Cooling Plants	Relevant IS for its concern equipments	Voltas, Blue Star, Carrier or Similar.
42	HDPE PIPE	IS:4984/1995 Or latest	Duraline / Godavari / Rex Polyextrusion/ Eflex or similar
43	Battery Charger for battery room	As per RDSO specification having re-generation facility	Amar Raja, Exide, RS Power or Similar.
44	<b>Conduits GI / PVC include accessories</b>	IS:9537/2000	BEC / AKG / Polypack or similar
45	Aluminium Ladders	IS:4571/1977	Sumer, Beatfire or Similar.
46	LT Panels	IS: 2147-1952 IS:2675-1966	Rittal / ABB / Schneider or similar
47	Air Curtain	Relevant IS	Aircon, ALMONARD, Technocrate, Thermadyne, Mitzwak or Similar.
48	Glands	Relevant latest IS code	Comet / Dowells / Lapp Kabel /

			Hummel or similar
49	Insulating Mats	Relevant latest IS code	Vardhman / ERDI certified / as per IS & approved by CEIG or similar
50	Lugs	Relevant latest IS code	Dowells / Jainsons or similar
51	Lights High Mast	Relevant latest IS code	Philips / Bajaj or similar
52	Lights and Luminaire	Relevant latest IS code	Philips / Bajaj or similar
53	Light aviation	Relevant latest IS code	Philips / Bajaj / Aviads or similar
54	MCB Distribution Boards	Relevant latest IS code	ABB / Havells / Legrand / Schneider or similar
55	Cable Trays & Covers	Relevant latest IS code	Adarsh / Indiana / Maheshwari or similar
56	Chemical Earthing	Relevant latest IS code	Erico / Indlec / Duvalmession or similar
57	Split Ac	Relevant latest IS code	Voltas / Hitachi / Carrier / Daikin / Mitsubishi / Toshiba or similar

XXXXXXXX



# **PART II**

# **CHAPTER I**

## **GENERAL SPECIFICATIONS**

**PART II  
CHAPTER I**

**GENERAL SPECIFICATIONS**

**SECTION-1: GENERAL**

<b>PARA No</b>	<b>SUBJECT.</b>
2.1.1	Introduction.
2.1.2	Climatic Data.
2.1.3	Wind pressure
2.1.4	System particulars.
2.1.5	Rolling stock
2.1.6	Power supply

**SECTION -2: OVERHEAD EQUIPMENT**

2.1.10	Track.
2.1.11	Sectioning.
2.1.12	Pantographs.
2.1.13	Overhead equipment.
2.1.14	Types of equipments
2.1.15	Plane of contact
2.1.16	Tensions.
2.1.17	Clearances.
2.1.18	Height of contact wire
2.1.19	Stagger.
2.1.20	Termination.
2.1.21	Type of structures
2.1.22	Cantilever assembly
2.1.23	Overlaps.
2.1.24	Points and crossings.
2.1.25	Section insulators
2.1.26	Isolators.
2.1.27	Return conductors
2.1.28	Bridges and tunnels
2.1.29	Bonding and earthing.
2.1.30	L.T. supply transformer stations.
2.1.31	Lightning Arrestors
2.1.32	Ceramic beaded glass fiber type short neutral section assembly.

**Section 3: Switching Stations, Booster Transformer Stations and L.T.  
Supply Transformer Stations.**

<b>PARA No</b>	<b>SUBJECT.</b>
2.1.40	Description.
2.1.41	Scope of work.
2.1.42	Clearances.
2.1.43	Setting of gantries.
2.1.44	Datum level.
2.1.45	Mounting of equipment and bus-bar arrangements.
2.1.46	Fencing and anti-climbing devices.
2.1.47	Numbering.
2.1.48	Interlocking arrangements.
2.1.49	Earthing arrangements.
2.1.50	Cable connections.

**SECTION-4 TRACTION SUB-STATIONS**

<b>PARA No</b>	<b>SUBJECT.</b>
2.1.51	Introduction.
2.1.52	Definitions.
2.1.53	Functions.
2.1.54	Locations.
2.1.55	System Particulars
2.1.56	Description
2.1.57	Auxiliary Supplies
2.1.58	Scope of Work
2.1.59	Clearances
2.1.60	Equipment & Bus bar Layout
2.1.61	Numbering
2.1.62	Bus bars
2.1.63	Earthing
2.1.64	Earth Screen

**SECTION-5 SCADA WORKS**



**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 HORC Project 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, raise upto 27.5 kV. One terminal of the 25 kV systems 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.



## 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 140 km/h if regulated 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<sup>0</sup> curve. Inside station limits, the curvature at a 1 in 8.5 turnout is 8 degrees 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  $\pm 100$  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 indicates 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<sup>2</sup>.

**(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 equalizer 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) BRIDDLER WIRE**

Bridle 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 conductor's 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 Engineer.

**(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 galvanized 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 Engineer 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, bridle 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 35°C.

**(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 Engineer. 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 Engineer and submitted to the Engineer for approval.

**TENSIONS: 2.1.16**

**(a) REGULATED**

- (i) In regulated equipment the tension in 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 Engineer 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 Engineer. 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 Engineer.

**(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 Engineer.

**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 Engineer 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 Engineer 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 Engineer (see Para 2.1.10 g). In special locations, pull-off arrangements may be used with the approval of the Engineer (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 meters.

**(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 over line structures with the approval of the Engineer. 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 overhead 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 up to 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.



### **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 Engineer. 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 alongside 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.

**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 off the ground to the extent necessary, but exclude the supply of booster transformers and other equipment's 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 Engineer.

**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 galvanized 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 Engineer will furnish the actual numbers to be allocated to the various equipment's as per specification No. ETI/OHE/53 (Latest version as indicated in Annexure-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 Annexure-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 galvanized 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 connection 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 Annexure-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 Annexure-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 Annexure-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 Engineer 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 galvanized 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 Annexure-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 Annexure-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 cannot 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 Annexure-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 Annexure-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 Engineer.

**(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.



**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 Engineer), 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 STATION

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 STATION**

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 Engineer or his agent at the cost of the Engineer.

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 Engineer 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 along with 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 meters 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.

Note: - All the clearances shall be as per latest guideline issued by CEA authority.

### **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 Engineer 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 up to 160000 MVA 36mm dia and above 16000 up to 20000 MVA, 40 dia MS rod respectively.

e) **Earth Electrodes.**

The earth electrodes shall normally be of mild steel galvanized 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 degrees 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 substation 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 buried 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 buried 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 up to 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 galvanized steel wire.

**j) Earthing of lightning 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 degrees 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.



**PART - II**

**SECTION-5**

**DETAILS OF SERVICE CONDITIONS, TRACTION SYSTEM, EQUIPMENTS, DESIGN, TECHNICAL DATA, TECHNICAL DEVIATION, SPARES, ERECTION, TESTING AND COMMISSIONING BASED ON LATEST STANDARD SCADA SPECIFICATION OF RDSO.**

**RDSO TECHNICAL SPECIFICATION No. TI/SPC/RCC/SCADA/0130 (Rev-2) with A&C slip no. 1 and latest amendments**

The above specification shall be available at RDSO Lucknow. tenderers shall be required to purchase the above specification from RDSO on payment basis.



# **PART-II**

## **CHAPTER -II**

### **FOUNDATIONS**

**PART-II**  
**CHAPTER -II**  
**FOUNDATIONS**

<b>PARA NO</b>	<b>SUBJECT</b>
2.2.1	SCOPE.
2.2.2	DESIGN OF FOUNDATION
2.2.3	BEARING PRESSURE
2.2.4	CONCRETE.
2.2.5	SIZE AND GRADING OF AGGREGATES
2.2.6	SAND CORED FOUNDATIONS
2.2.7	SINKING OF CONCRETE SHELLS.
2.2.8	TYPES OF FOUNDATION IN BLACK COTTON SOIL.
2.2.9	CEMENT

□□□

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 Engineer. Soil bearing pressure, using SPT (falling weight equipment) should be determined generally for every 2 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 Engineer.

**(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 and OHE arrangement for traction structure on bridges to suit different locations and local conditions will be preparing or designed by contractor and also to be got proof checked from NIT/IIT by the contractor.**

**(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 Engineer.

**(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 Engineer, 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 Engineer 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 Engineer 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 to an upper limit of 1 : 1.5 and a lower limit of 1 : 2.5	60
M 7.5	625		45
M 10	480		34
M 15	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 Engineer 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 <sup>2</sup>
(b) M. 15	15 N/mm <sup>2</sup>
(c) M 20	20 N/mm <sup>2</sup>

**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 Engineer.

**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 Annexure-1) or Portland cement (fly ash based) as per IS: 1489 Pt-I (Latest version as indicated in Annexure-1).



# **PART - II**

## **CHAPTER - III**

### **STRUCTURES**

PART - II  
CHAPTER - III  
STRUCTURES

<b>Para No.</b>	<b>Subjects</b>
2.3.1	Scope.
2.3.2	Types.
2.3.3	Design.
2.3.4	Cantilever masts.
2.3.5	Anchor masts.
2.3.6	Head-Spans.
2.3.7	Portals.
2.3.8	Structures on bridges.
2.3.9	Special structures.
2.3.10	Setting of structures.
2.3.11	Numbering of structures.
2.3.12	Steel work for switching stations and gantries.
2.3.13	Steel.

□□□□

**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 Engineer.

**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 Annexure-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 galvanized after drilling and fabrication as per specification **ETI/OHE/13 (4/84)** (Latest version as indicated in Annexure-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 bus bar 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 galvanized after fabrication with a minimum value of average mass of zinc coating being not less than 610 g/m<sup>2</sup> 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 Engineer. 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 - Deleted**

e) For purposes of design of gantries, the tension in the 220 kV incoming/outgoing lines shall be taken as 200 kg. at 4-degree C (without wind) in each conductor and 150 kg. at 4 °C (without wind) in the earth wire. The tension in the 66 kV strung bus bars and earth screen wire at 66/25 kV substations shall not exceed 200 kg. at 4 °C (without wind).

f) **Uprights and fencing posts.**

Uprights carrying equipment such as potential transformers, current transformers, lightning arrestors, bus bar support insulators, shall be made from standard metric steel sections viz. channels, angles or small joists, either single or fabricated.

g) 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 Engineer'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 preparing and got proof checked by NIT/IIIT by contractor.**

**SPECIAL STRUCTURES: 2.3.9**

In the case of structures at locations not covered by the employment schedules furnished by the Engineer, 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 Engineer 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 Annexure-1) shall be used for all fabricated steel work.



# **PART-II**

## **CHAPTER -IV**

**EQUIPMENTS, COMPONENTS AND  
MATERIALS**

**PART-II**  
**CHAPTER-IV**  
**EQUIPMENTS, COMPONENTS AND MATERIALS**

<b>PARA NO.</b>	<b>SUBJECT</b>
2.4.1.	General.
2.4.2	Compliance with standard specification.
2.4.3	Quality assurance
2.4.4	Prototype test.
2.4.5	Inspection and tests.
2.4.6	Test certificates.
2.4.7	Bulk manufacture.
2.4.8	Inter-changeability.
2.4.9	Technical specifications.
2.4.10	Nomenclature and marking.
2.4.11	Steel work and protection against rust.
2.4.12	Bracket assembly components.
2.4.13	Droppers.
2.4.14	Insulators.
2.4.15	Ending fittings and splices.
2.4.16	Electrical connections for overhead equipment.
2.4.17	Terminal connection for other equipments.
2.4.18	Regulating equipment.
2.4.19	Head span construction.
2.4.20	Isolator
2.4.21	Insulation level.
2.4.22	Bus-bars(at switching stations, booster stations and Gentries.)
2.4.23	Cabling.
2.2.24	Literature for equipment.

□□□□□

**PART-II**

**CHAPTER-IV**

**EQUIPMENTS, COMPONENTS AND MATERIALS**

**GENERAL: 2.4.1**

- (a) This chapter deals with the details and specifications of the equipment, components and materials to be used for traction overhead equipment, switching stations, booster transformer stations and L.T. supply transformer stations. This chapter does not cover structures and foundations, which are dealt with in Part-II, Chapter-II and III. In general, based on the specifications issued by various bodies, such as Bureau of Indian Standards, British Standard Institution etc. Specifications have been issued by the Engineer. Such specification may be bought separately from the office of the Engineer. All these specifications are included in the set of drawings and specifications referred to in Para 1.1.10.
- (b) This chapter deals with details and specifications of the equipment's, components and materials to be used at the traction sub-station, feeding station and shunt capacitor bank. It does not cover foundations and structures which are dealt with in Chapters II and III respectively. The detailed specifications for various items of equipment and materials issued by the Engineer may be bought separately from the design office of the Engineer (See 1.1.10).

**COMPLIANCE WITH STANDARD SPECIFICATION: 2.4.2**

In the technical specifications of equipments, components and materials, references are made to the following standard specifications:

- (i) International Electro Technical Commission (abbreviated as IEC) publications.
- (ii) British Standards (abbreviated as BS)
- (iii) Bureau of Indian Standards (abbreviated as IS)

Tenderers may, however, offer equipment in accordance with the appropriate national standard specifications of the country of manufacture, but such offers will be treated as deviations and should be quoted for in the manner specified in Para 1.1.7 (d) English rendering of the text and illustrations of the national standard specifications and explanatory notes on the specific deviations from IEC, British or Bureau of Indian Standards in question, shall also be submitted in the relevant Annexures. In case of doubt, the Engineer shall decide the clause and specification applicable and the contents of the specification and standard mentioned above shall guide such decisions.

**QUALITY ASSURANCE: 2.4.3**

The provisions of Part-I for quality assurance will apply, including facilities to be provided by the manufacturer (See para 1.2.25)

**PROTO TYPE TESTS: 2.4.4**

**(a) FITTINGS, COMPONENTS AND MATERIALS**

All the fittings, components and materials to be supplied by the contractor, in terms of this contract, the requisite number of prototypes of components shall be supplied free of cost to the Engineer for tests and approval. The tests will be conducted in a laboratory selected by the Engineer.

**(b) EQUIPMENTS**

This comprises inspection and tests conducted on the first equipment of a specified manufacturer, which the Engineer considers sufficient to prove that the design is in conformity with the specification at the manufacturer's factory. The type tests shall be conducted on each equipments as indicated in the individual specifications referred to in para 2.4.1 above, in the presence of the Engineer's representative. The contractor shall arrange to get these tests conducted at his own cost.

**(c) RESPONSIBILITY**

Any testing and approval by the Engineer of prototype shall in no way absolve the contractor of his responsibility under the terms of the contract for the equipment supplied and erected.

**(d) EXEMPTION FROM PROTOTYPE TESTS**

If prototype samples of equipment's, components or fittings of any manufacturer have already been approved in connection with the electrification of other sections of Indian Railways, on the 25 KV 50 HZ single phase A.C. system prototype samples of such equipment's, components or fittings will be exempted from the tests. Supply of bulk quantities shall, however, be effected only after the Engineer's prior approval is obtained in writing.

(e) The results of prototype tests will be communicated to the Contractor as expeditiously as possible. Any delay in this respect will be ground for extension of time for completion under para 1.2.45.

**INSPECTION AND TESTS: 2.4.5**

These comprise inspection and tests conducted at the manufacturer's factory for ensuring quality of manufactured items as part of the quality Assurance Programme.

**TEST CERTIFICATES: 2.4.6**

Three copies of the test certificates of successful prototype tests carried out at the manufacturer's factory on all equipment's shall be furnished to the Engineer within a month after completion of the prototype tests. Three copies of the routine tests carried out on each equipment shall also be furnished, after the equipment is passed by the Engineer's representative for inspection (See para 1.2.25).

**BULK MANUFACTURE: 2.4.7**

Bulk manufacturer may be undertaken only after specific written approval of the Engineer or his representative has been obtained indicating that tests on the prototypes are satisfactory. Where prototypes have already been approved in connection with it manufacturer may proceed after exemption from prototype tests is received from the Engineer in writing.

**INTER CHANGEABILITY: 2.4.8**

All equipments, components and fittings shall be inter-changeable and supplies shall be in accordance with the Engineer's designs unless otherwise specifically approved by him. Components such as fuses, indication lamps etc. should be replaceable with substitutes available indigenously, as far as possible. Important components and fittings and their drawings have been listed in Schedule-3.

**TECHNICAL SPECIFICATIONS: 2.4.9**

Please see at **Anexure-1** (A, B, C, D, E, F & G). List of standard RDSO drawings, RDSO specifications and IS specifications for important materials, components and equipments [As per version available as on date of opening of tender (Packet-A)].

**NOMENCLATURE AND MARKING: 2.4.10**

(a) All components and fittings supplied by the Contractor's shall bear the respective identification number and a mark to identify the source of supply except in the case of galvanized tubes, bolts and nuts and/or any other fittings as may be agreed to by the Engineer.

(b) In case of insulators, galvanised steel tubes, stainless steel wire rope and conductors, name of manufacturer shall be specified in "As Erected" drawings for identification.

**STEEL WORK AND PROTECTION AGAINST RUST: 2.4.11**

**(a) GALVANISING**

All ferrous materials and fittings shall be hot dip galvanised according to the specification ETI/ OHE/13 (4/84) (Latest version as indicated in Anexure-1).

**(b) PAINTING**

Some components or parts may, with the approval of the Engineer, be protected only by paint and parts so protected shall be given two coats of composite Aluminium primer and two coats of Aluminium paints. The second coat of Aluminium paint shall be applied after erection.

**(c) RECTIFICATION AT SITE**

In case of modifications which would damage the protective coat, repairs to such damage would be allowed only in exceptional circumstances. The part damaged shall be protected in accordance with the method indicated in specification **ETI/OHE/13 (4/84)** (Latest version as indicated in Annexure-1) or any other method approved by the Engineer. The Contractor shall in all such cases obtain prior permission from the Engineer before carrying out repairs.

**BRACKET ASSEMBLY COMPONENTS: 2.4.12 (see para 2.1.22)**

**(a) ARRANGEMENT FOR NORMAL OHE**

The arrangement of the different fittings and structural components of bracket assemblies are shown in drawings listed in Annexure-1, Part-IV. The employment schedule of bracket will be furnished to the Contractor.

**(b) BRACKET**

Bracket tubes shall be of seamless cold drawn or electric resistance weld steel complying with **ETI/OHE/11 (5/89)** (Latest version as indicated in Annexure-1) with an insulator near the support. The length of the tubes shall be such that there is a free length of about 200 mm beyond the catenary suspension bracket. To facilitate adjustment during track maintenance [(see para 2.6.10 (b))].

**(c) TUBULAR STAY ARM**

Steel tubes with adjustable steel rods shall be used for tubular stay arm of all bracket assemblies.

**(d) REGISTER ARM**

The register arm shall also be electrical resistance weld or cold drawn steel tubes or proper dimensions duly formed. It shall be suspended by a dropper from the catenary suspension clamp/bracket tube. A hook and eye arrangement shall be used at the bracket end to permit free movement in every direction.

**(e) STEADY ARM**

Steady arm shall normally be fitted in all assemblies for overhead equipment in running. The steady arm shall be of light alloy BFB section arranged to work always in tension in accordance with **ETI/OHE/21(9/74)** (Latest version as indicated in Annexure-1). Steady arms of secondary tracks may be of solid galvanised steel rodding. The contact wire shall be fixed by a simple swivel clip without threaded parts. Steady arms shall normally be 1.0 m long» but for special locations such as turnouts, diamond crossing etc. Steady arms shall be longer as indicated in the relevant drawings listed in Annexure-1, part- IV.

Bent steady arms of aluminum alloy tube conforming to Spec.**ETI/OHE/21 (9/74)** (Latest version as indicated in Annexure-1) shall be used for neutral section overlap and in the central mast of a 4 span insulated overlap.

**(f) BRACKET FOR UNREGULATED TRAMWAY TYPE EQUIPMENT**

Brackets provided on cantilever masts for tramway type unregulated equipment shall normally span two tracks and the contact wires carried on V-type clamps suspended from a span wire. The span wire shall be provided with a turn buckle at only one end.

**DROPPERS: 2.4.13 (see para 2.1.13)****(a) GENERAL DESIGNS**

The droppers shall generally be designed as shown in standard drawings and made of copper wire about 5 mm diameter conforming to **IS:282** (Latest version as indicated in Annexure-1) and shall be attached to the catenary wire by a copper dropper clip. The contact wire shall be held by a clip of aluminum bronze as shown in the standard drawings. The distribution of dropper shall be in accordance with standard designs.

**(b) LOADING**

The droppers shall be able to withstand a vertical load of 200 kg at the point of attachment to the contact wire and the clip shall not slide under a horizontal load of 120 Kgf.

(c) The permissible tolerance in the over all length of a dropper will be  $\pm 5$  mm.

**INSULATORS: 2.4.14**

(a) All insulators except those on return conductors and earth wires shall be of the solid core type. Disc insulators shall be used on return conductors and earth wires or other locations as desired by the Engineer. All solid core insulators shall conform to TI/SPC/OHE/INS/0070 (Latest version as indicated in Annexure-1) or Specification No. TI/SPC/OHE/INSCOM/0991 (Latest version as indicated in Annexure-1) is for Composite Insulators wherever applicable.

**(b) INTER-CHANGEABILITY**

For free inter-changeability only the following types of insulators shall be used. While the shapes of the insulators may vary slightly from those shown in the drawings, the essential dimension of the galvanized malleable cast iron caps as given in standard drawings shall be adopted.

- (i) **Stay arm Insulators:** These insulators will be used in conjunction with The tubular stay arm of all bracket assemblies.
- (ii) **Bracket Insulators:** These will be used at the base of each bracket assembly in conjunction with bracket tubes.
- (iii) **9-Tonne Insulators:** These will be used at all places for cut-in and Terminal insulation including those in return conductors, but excluding those in earth wire.
- (iv) **Solid core post insulators:** These will be used at all places for supporting isolators mechanisms, -bus-bars, -jumpers etc. of 25 kV.
- (v) **Disc insulators 255 mm:** Clevis type 255 mm disc insulators will be used for return conductor suspension and for earth wire cut-in insulator.
- (vi) **11 kV post insulators:** These will be used at all places for supporting bus-bars, jumpers etc. In conjunction with return conductor/return feeders.

(c) The pedestal insulators for service voltage of 220/132/110 kV shall be of Solid Core type conforming to specification as indicated in Annexure-1. The pedestal insulators for service voltage of 25 kV shall be of the solid core type conforming to specification as indicated in Annexure-1.

**ENDING FITTINGS AND SPLICES: 2.4.15****(a) GENERAL DESIGNS**



(a) Terminating or ending fittings and splices on copper conductor shall be of the cone type clamping on both the inner and outer strands of conductor except for contact wire ending clamps which may be of wedge type. The arrangement shall be easy to install and also be such as would apply the clamping pressure gradually without shock (See **TI/SPC/OHE/Fittings/0130**) (Latest version as indicated in Annexure-1). For Aluminum Alloy/conductor, the end fittings shall be either cone type, strain clamp type or any other type as approved by the Engineer.

**(b) LOADING**

All the parts shall be capable of withstanding without damage, a load greater than the ultimate strength of the wires to which they are fitted. In the case of thread, no damage shall occur when they are subjected to a load equal to two third of the ultimate strength of the wires.

**(c) RESTRICTED USE OF SPLICES**

The use of splices shall generally be avoided and their use shall be restricted to the minimum necessary. Over main tracks, there shall be no splice in the contact wire on first erection. Elsewhere, not more than one splice be used in any tension length (i.e. anchor to anchor) for which prior approval shall be taken from the Engineer. Additional splices may, however, be provided to enable retention of conductors which are found defective during and/or after erection. Splices may also be permitted for repair of damage due to thefts or Railway accidents.

**(d) STRENGTH OF ASSEMBLED FITTINGS**

The strength of fittings assembled with appropriate conductors or wires shall be not less than that of the conductor or wire itself.

**(e) ADDITIONAL TERMINATING WIRES**

Cadmium copper stranded wire of 65 sq. mm nominal section or 37/2.1 mm (as used in head span construction). may be used as additional terminating wires for extending single and double conductors respectively, if termination at the nearest structure is not feasible.

**ELECTRICAL CONNECTIONS FOR OHE: 2.4.16**

**(a) GENERAL DESIGNS**

All electrical connections between conductors shall be made by parallel clamps. The general arrangements of connections are shown in the standard drawings, listed in Annexure-1.

**(b) JUMPERS**

Copper jumpers shall be of any of the followings:

- (i) Large jumpers of annealed copper in accordance with specification **ETI/OHE/3 (2/94)** (Latest version as indicated in Annexure-1).
- (ii) Small jumper of annealed copper in accordance with the specification **IS:9968 (PT.2)** (Latest version as indicated in Annexure-1).

. Aluminum jumpers wherever used, shall be of all Aluminum stranded conductor 19/7/ 1.4 mm bare 3/4 H generally conforming to IS:8130 (Latest version as indicated in Annexure-1).

**(c) BUSBARS**

Bus-bars or rigid jumpers of copper where used shall be of 18mm dia copper rod in accordance with RE/30/OHE/5(11/60) (Latest version as indicated in Annexure-1). Aluminium bus-bars wherever used shall be of 36/28 mm tubing (See 2.4.22). Aluminium tubular bus-bars shall be made of Al. Alloy grade 63401 (WP condition) to IS:5082 (Latest version as indicated in Annexure-1). The tolerance on diameter and thickness shall be as per class I, IS:2673 (Latest version as indicated in Annexure-1)

**(d) FEEDERS**

Feeders shall be of all Aluminum conductor 19/3.99 mm (SPIDER).

**(e) RETURN CONDUCTOR**

The return conductor shall be of all Aluminum conductor 19/3.99 mm (SPIDER). The arrangement of return conductor carried on traction structures is shown in a drawings listed in Annexure-1, Part IV.

**(f)** The general characteristics of all wires and conductors is included in a drawings listed in Annexure-1, Part IV.

**(g)** Earth wire shall be of steel reinforced Aluminium conductor 7/4.09 mm (RACCOON) conforming to **IS:398-(part-II)** (Latest version as indicated in Anexure-1).

**TERMINAL CONNECTORS FOR EQUIPMENTS: 2.4.17**

Booster Transformer along with the terminal connectors suitable for taking jumpers/ bus bar as required shall be supplied by the Engineer.

However, Power Transformer, Circuit Breaker, and L.T. supply Transformer shall be supplied by the Contractor along with the terminal connectors suitable for taking jumper/bus-bar as required including Al-Cu strips for bimetallic connections wherever required. The Al-Cu strips required for the connection of Booster Transformers shall also be provided by the Contractor if following equipment will be under the scope of Supply as per Annexure-4, otherwise Tenderer shall make its own arrangement to provide.

**REGULATING EQUIPMENT: 2.4.18**

**(a) GENERAL**

A general arrangement is shown in the standard drawings listed in Annexure-1, Part IV. The regulating equipment should have a minimum adjustment range of 950 mm. Stainless steel wire rope in accordance with TI/SPC/OHE/WR/1060 (Latest version as indicated in Anexure-1) shall be used in these equipment's and these shall be sufficiently flexible for the purpose.

**(b) COUNTER WEIGHT**

Counter weights and arrangements used shall be such that these could be accommodated within 330 mm (13 inches) measured transverse to the track under the worst conditions of wind. The vertical upward movement shall be limited with a fixed top.

**(c) REDUCTION RATIO**

Reduction ratio in the arrangement used shall be five for winch type and three in case of three pulley type.

**HEADSPAN CONSTRUCTION: 2.4.19** (See para 2.1.21.and 2.3.6.)

**(a) SIZE AND FACTOR OF SAFETY**

All span wires used in head-span construction shall be of stranded cadmium copper conductor 65 sq. mm or 130 sq. mm cross section. All the wires shall be designed with a factor of safety of not less than 4 under the most unfavorable conditions.

**(b) TURN BUCKLES**

Each span wire shall be equipped with a turn buckle at each end of the span.

**(c) ADDITIONAL INSULATORS**

Additional insulators shall be provided as necessary in head span, cross span and steady span, wires to ensure electrical independence between the equipment in different elementary electrical sections.

**ISOLATORS: 2.4.20**

25 kV Isolator switches shall comply with specifications as indicated in para 2.4.9.

**INSULATION LEVEL: 2.4.21**

- (a) Interrupters, Potential Transformers line indication type, 42kV Lightning Arrestors and other equipments shall be suitable for insulation levels indicated in the relevant specifications.
- (b) All equipment including insulators to be used at the traction sub-stations, feeding station and shunt capacitor banks shall be suitable for the insulation level specified below: -

		SERVICE VOLTAGE				
		220 kV	132 kV	110 kV	66 kV	25 kV
i)	Power frequency 1 min. wet withstand test-kV (rms)	460 kV	275 kV	230 kV	275 kV	100 kV
ii)	Impulse (1.2/50 microsecond) withstand test positive and negative polarity(crest value) -KV (peak)	1050 kV	650 kV	550 kV	650 kV	250 kV

**BUSBARS: 2.4.22**

- (i) ACSR Conductors used as bus-bar or bus-bar connections shall be of ZEBRA ACSR size 61/3.18mm (28.62 mm dia) at 220 or 132 or 110/25 kV Traction Sub-station.
- (ii) Aluminum tubes used as bus-bars or bus-bar connections shall be of dia 50X39 mm for Traction sub-station and Shunt Capacitor banks and of size 36/28 mm for Feeding Stations. Aluminum tubular bus-bars shall be made of Al. Alloy grade 63401 (WP condition) to IS:5082 and IS: 6051-1970 (Latest version as indicated in Annexure-1). The tolerance on diameter and thickness shall be as per class I, **IS: 2673** (Latest version as indicated in Annexure-1).

(iii) Bus-bar junctions and connectors shall be made with aluminum alloy Grade 4600 M to IS: 617-1994 or equivalent. The bus-bar shall be clean, smooth mechanically sound and free from surface and other defects. No splices will be allowed in the bus-bar unless the length of bus-bar exceeds 6m. The ends of the tubular bus-bar shall be covered with suitable end caps. The joints in bus-bars where unavoidable, shall be mechanically and electrically sound so that the temperature rise under normal working conditions does not exceed 40 degrees centigrade for a max. ambient temp. of 45 degrees centigrade.

**CABLING: 2.4.23**

**(a) CABLE FOR L.T. SUPPLY**

240 V A.C. supply from L.T. supply transformer at switching stations shall be brought and terminated on the L.T. A.C. distribution board in the remote control cubicles at the switching stations by 1100 Volt 25 sq.mm aluminum two-core PVC insulated PVC sheathed and steel armoured heavy duty cable conforming to IS:1554(Part-I) (Latest version as indicated in Annexure-1).

**(b) CONTROL AND INDICATIONS CIRCUITS**

All other cables for control and indication at switching stations shall be 1100-V grade PVC insulated and sheathed un-armoured (heavy duty) complying with IS: 1554(Part-I) (Latest version as indicated in Annexure-1). The cables shall be provided as indicated in the Table below: -

PURPOSE	RUN	CIRCUIT VOLTAGE	CORE SIZE & MATERIAL	NO OF CORES
<b>FOR SWS:</b>				
Control & indication of interrupters	From each Interrupter to terminal board	110 V/D.C.	2.5 sq.mm copper	7
Catenary indication	From each P.T. line indication type to terminal board	110 V/A.C.	2.5 sq.mm copper	2
Heater supply for interrupters control mechanism cabinet	i) From interrupter to interrupter	240 V A.C.	4.0 sq.mm Aluminium	2
	ii) From each interrupter to fuse box.	-do-	-do-	-do-

	iii) From fuse box. to distribution board.	-do-	-do-	-do-
--	-----------------------------------------------	------	------	------

Battery supply	i) 110V battery charger to 110V battery	110 V/D.C.	2.5 sq.mm copper	-do-
	ii) 110V battery to 15A, DC fuse box.	110 V/D.C.	2.5 sq.mm copper	-do-
	ii) 15A, DC fuse box to terminal board.	-do-	-do-	-do-
<b>FOR TSS:</b>				
Control and indication of circuit breakers	From each circuit breaker to control board.	110 V DC	7x2.5	Three cables to be used.
Transformer alarm/trip circuits & tap changer control	From each transformer to control board.	110 V DC	10x2.5	Five cables to be used.
Transformer protection (bushing transformer to current transformer connections)	From each transformer to control board.	110 V DC	4x4.0	One cable for each bushing CT to be used.
Current transformer & neutral connections	From each current transformer to control board.	110 V DC	2x4.0	One cable for each core of CT/Neutral CT
Potential transformer connections	From each potential transformer to control board.	110 V DC	2x2.5	One cable to be used
110V DC supply	(i) Connection between battery chargers & DC distribution board.	110 V DC	4x4.0	One cable to be used with two core connected in parallel
	(ii) Connection between batteries & DC distribution board.	110 V DC	4x4.0	One cable to be used with two core connected in parallel
	(iii) Connection from DC distribution board to control board.	110 V DC	4x4.0	Two cables to be used with each circuit breaker and one cable for DC supply to control boards.
Control & indication of bus coupler interrupter	From interrupter to control board.	110 V DC	7x2.5	Two cables to be used.
240V AC supply	Connection from AC distribution board to control board.	240 V AC	2x2.5	One cable to be used

c) **Cables for heater circuits.**

The 240 V AC supply to space heaters provided in control cabinets of various equipments shall be provided by means of 4 sq.mm. 2-core aluminum PVC insulated (heavy duty) cables complying with IS: 1554 (Part-I)-1988. Three circuits shall be provided on the LT A.C. distribution board for this purposes, one for the heaters in the control cabinets of 220/132/110 KV circuit breakers, the second for the heaters in the control cabinets of 25 KV circuit breakers and bridging Interrupters and the third for heaters in marshalling box of traction transformers. Each circuit shall be provided with a fuse of approved type and suitable rating in the LT A.C. distribution Board.

d) **Cables for battery charger.**

240 V A.C. supply to each of the battery chargers in the Control Room shall be provided by means of 4 sq.mm. 2 core PVC insulated, PVC sheathed (heavy duty) copper cables complying with IS: 1554 (Part-I)-1988. Two circuits each with a fuse of approved type and suitable rating in the LT A.C. distribution board shall be provided for the two battery chargers in the Control Room. The 240 V A.C. supply to Control Board from A.C. distribution board shall be provided by means of 2.5 sq.mm. 2- core PVC insulated PVC sheathed (heavy duty) copper cable complying with IS:1554(Part-I)-1988.

e) **Cables for blower fans.**

240 V A.C. supply to blower fans fixed on the traction transformer shall be provided by means of 2 core 25 sq.mm. aluminum conductor cables. The cables shall be PVC insulated, PVC sheathed and armored cables of 1100 V grade complying with IS:1554(Part-I)-1988. Separate cables shall be laid from the L.T. A.C. distribution board in the control room to marshalling box of each traction

transformer. Individual circuits from the LT A.C. distribution board shall be provided for this purpose with each circuit protected by a fuse of suitable rating.

f) The cable shall be resistant to decay, mechanical abrasion, acids, alkaline and other corrosive materials.

---

**NOTE:** (i) In case of feeding stations which are located within the traction sub-station premises, the cables shall be run from individual equipment and terminated inside the sub-station control room.

(ii) Notwithstanding the sizes of cables given above, the Tenderer shall assure himself that various cables would suit the ratings of equipments offered by him.

**(g) SPECIFICATION**

The cables shall be resistant to decay, abrasion, acids, alkalies and other corrosive materials. All indoor wiring on walls shall be clamped neatly on teak wood battens fixed to the wall by means of wall plugs/wooden pegs. The cable run layout at typical switching stations is shown in the relevant drawing already included in Annexure-1.

**LITERATURE FOR EQUIPMENT: 2.4.24**

The Contractor shall, within six months of issue of Letter of Acceptance of Tender, supply 5 copies of booklets containing manufacturer's instructions for operation and maintenance of each of the items of equipment's the supply of which is, Herded by the contract. In addition, 25 copies of detailed schedule of components, catalogues and drawing of all parts of the equipment shall also be supplied.



# **PART-II**

## **CHAPTER -V**

### **DESIGNS AND DRAWINGS**

**PART-II**

**CHAPTER -V**

**DESIGNS AND DRAWINGS**

<b>PARA NO.</b>	<b>SUBJECT</b>
2.5.1	General
2.5.2	Contractor's Drawings
2.5.3	Standards for Drawings
2.5.4	Basic Designs
2.5.5	Special Designs
2.5.6	Particular Designs and working drawings for OHE
2.5.7	Particular Designs and working drawings for SWS & BT Stations
2.5.8	Booster and L.T. supply Transformer Stations drawing.
2.5.9	Schedule of Quantities
2.5.10	Submission of Drawings and schedules.
2.5.11	Completion drawings and schedules.
2.5.12	Addresses.





## PART - II

### DESIGNS AND DRAWINGS

#### GENERAL: 2.5.1

- (a) This chapter deals with the procedure for approval of designs and drawings.
- (b) The type designs shall be as few as possible to cover the largest field of application consistent with economic consideration.
- (c) In all drawings as far as possible only such symbols as are in international use, shall be used.

#### CONTRACTOR'S DRAWINGS: 2.5.2

(a) The Contractor shall submit to the Engineer for approval except where otherwise specified below, all detailed designs and drawings which are necessary to ensure correct supply of equipment's, components and materials and to enable correct and complete erection of overhead equipment, switching stations, booster transformer stations and L.T. Supply transformer stations and complete supply and erection of Traction Sub-Stations in an expeditious and economic manner.

#### (b) RESPONSIBILITY

It is to be clearly understood that all original designs and drawings shall be based on a thorough study. General designs and dimensions shall be such that the Contractor is satisfied about the suitability of the designs for the purpose. The Engineer 's approval will be based on these considerations and notwithstanding the Engineer 's acceptance; the ultimate responsibility for the correct design and execution of the work shall rest with the Contractor in terms of the conditions of Contract.

#### STANDARDS FOR DRAWINGS: 2.5.3

All designs, legends note on drawings and schedules of materials shall be in English and shall be prepared in the metric system. All designs and drawings shall conform to specification RE/OHE/ 25 and ETI/PSI/31(5/76) (Latest version as indicated in Anexure-1).

#### BASIC DESIGNS: 2.5.4

#### (a) STANDARD DESIGNS

Where the Contractor adopts designs and drawings conforming to the standard designs, drawings, and specifications of the Research, Designs and Standards Organisation. Manaknagar, Lucknow-226 011 (RDSO) for basic arrangements, equipment's, components and fittings of traction overhead equipment, switching stations booster transformer stations and LT supply transformer stations and TSS adopts employment schedules furnished by the Engineer, he shall verify such designs, drawings and employment schedules and satisfy himself that these are correct before use. Within two months of the issue of letter of Acceptance of Tender the contractor shall indicate to the Engineer, the list of standard basic arrangements, components and fittings drawings and employment schedules, which he will adopt for the purpose of the work. The procedure outlined in para 1.2.23 shall be followed for approval of basic designs.

#### (b) DEVIATIONS

Normally deviations from the standard drawings of the Engineer will not be accepted. However, in exceptional cases where the Contractor desires to suggest improvements as a results of his experience or other development, he shall justify his proposals with supporting explanatory notes.

#### (c) DELETED.

**SPECIAL DESIGNS: 2.5.5**

(a) In cases where standard designs, drawings or employment schedules do not cover requirement of special locations or site conditions, the Contractor shall submit his own designs or drawings alongwith supporting calculations and notes for scrutiny and approval of the Engineer.

(b) Such special designs shall generally be in conformity with basic designs furnished by the Engineer and in accordance with the specifications. If the Contractor wishes to adopt special designs which do not conform to the general basic designs of the Engineer, he shall submit alternative designs and drawings justifying his proposals.

**PARTICULAR DESIGNS & WORKING DRAWINGS: 2.5.6**

**FOR OHE: 2.5.6.1**

(a) Deleted

(b) **CONTRACTOR'S PEGGING PLANS**

The pegging plans for sections to be equipped indicating the type of overhead equipment, locations of masts and other general particulars prepared on the basis of the latest survey will be furnished by the contractor

(c) **PRINCIPLES OF LAYOUT**

The Contractor shall in all cases ensure that the final pegging plans are in conformity with the latest 'Principles of preparation and checking of OHE layout plans and sectioning diagram' issued by RDSO.

(d) **PROVISIONAL LAYOUT PLANS**

The Contractor shall prepare and submit overhead equipment layout plans incorporating the following in formations: -

- (i) The run of wires in different thickness or colour in special cases and termination.
- (ii) The run of wires for future wiring indicated to the Contractor, in dotted lines.
- (iii) Exact position of all cut-in-insulators, including section insulators.
- (iv) Direction and value of stagger at each traction structure location.
- (v) Clearance of live conductors to Structures in the vicinity including bridges, signals gantries etc.
- (vi) Layout of feeders.
- (vii) Jumper connections and connection to switches and switching stations.
- (viii) List of infringements.
- (ix) Kilometer numbers and type of Structures.
- (x) Location and numbers of switches.
- (xi) Schematic sectioning diagram drawn to convenient scale showing section insulator, number of switches, elementary sections and connections to switches and switching stations.
- (xii) Table giving references of approved profile drawings, feeder layout plans and other relevant drawings.

**(e) OHE PROFILE DRAWINGS**

After completion of the overhead equipment layout plans, the Contractor shall prepare an overhead equipment profile drawing showing the actual height of the contact wire under each overline Structure the gradient and height of the contact wire on either side of the Structure and the encumbrances at Structures until normal height of contact wire and encumbrances are restored.

**(f) CROSS SECTION DRAWINGS**

While the layout plans are being finalized, the Contractor shall submit for approval, in-so-far as yards between outer most points and crossing are concerned, cross-section drawings for each Structure showing guy rods, if any, indicating the cross-section of the formation, height and nature of soil, type of foundation block, structure proposed, reverse deflection of the Structure and all necessary particulars for erection of the foundation and the Structures. In the preparation of drawings, care shall be taken to show all obstructions such as signal wires, points rods and their correct location in references to track/tracks as well as underground obstructions like pipes cables, etc. after collecting such information from the site.

In open line sections, cross-sections shall be submitted in the following preformat, separately for each HRIDC/ Railway line for special foundation drawings with all necessary details shall be submitted to the Engineer. In case of side bearing foundation with extra depth, formation details at such location and necessary details of anchor foundation will be submitted.

CROSS SECTION FOR THE OPEN ROUTE SECTION -----Km. ----- to -----

Sl. No.	1	2	3	4	5	6	7	8	10	11	12	13	14	15
LOCATION No.														
CHAINAGE														
DETAILS	SETTING DISTANCE IN 'm'													
	STEP DISTANCE IN 'm'													
	F.B.M. CODE													
	SOIL TYPE & PRESSURE													
	FOUNDATION TYPE AND SIZE													
	MAST SIZE & LENGTH IN 'm'													
	MAST EMBEDDED LENGTH 'M'													
	REVERSE DEFLECTION in cm													
	SUPER MAST LENGTH (m)													
	CROSS ARM LENGTH (m)													
	ANY OBSTRUCTION													

**(g) FINAL LAYOUT PLANS**

After all the cross section drawings in a section covered by the layout plan are finalised and foundations are cast, the Contractor shall revise the layout plans to take into account any modifications to the locations of Structures during the process of casting of foundations.

**(h) STRUCTURE ERECTION DRAWINGS**

The Contractors shall then submit Structure erection drawings for each structure incorporating all the details included in the cross section drawing for the structure and as erected at site and the details or

the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder or return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure. For structure with isolators, the details of electrical connections shall also be incorporated. In open line sections the Contractor shall submit structure erection particulars in the typical proforma as given below separately for each main line track in addition to particular details as indicated in the proforma for cross-section drawings. Modification to this proforma is found necessary will be finalised at time of structure erection drawings.

Sino.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LOCATION No.															
CHAINAGE															
1. ENCUMBRANCE															
2. CONTACT WIRE HEIGHT.															
3. STAGGER i) CATENARY ii) CONTACT															
4. STAY ARM i) (a) ii) CODE															
5. BRACKET i) (b) M ii) CODE															
6. REGISTER: i) C/D (M) ii) CODE															
7. STD/BENT CODE															
8. IDENTIFICATION MARK (SEE PARA 2.5.11)															
OTHER REFERENCES/CODES FOR MISC. ITEMS LIKE STEEL WORK FOR STAY/BRACKET ATTACHMENT MISC. SINGLE/DOUBLE CAT. ETC. WILL BE INDICATED. ITEMS :-															

**Tolerances to be adopted while Erection of Bracket Assembly, conducting SED checking & Tower Wagon checking:**

Sl. No.	Item	Limits/Tolerances
(i)	Register Arm Tube Projection	150 - 200 mm in case of Push off locations. For Pull off locations, it shall project over Contact Wire Plane.
(ii)	Bracket Tube Projection	150 - 200 mm
(iii)	Dip between Register Arm Tube & Steady Arm	200 - 250 mm on Tangent Track. (BFB Steady Arm). 250 - 320 mm on Curves. (BFB Steady Arm & Bend Tubular Steady Arm).
(iv)	Encumbrance	± 50 mm
(v)	Length of 'A' Dropper (1 <sup>st</sup> Dropper from Support)	± 5 mm
(vi)	Spacing of 'A' Dropper (1 <sup>st</sup> Dropper from Support)	± 30 mm
(vii)	Length of Other Droppers	± 5 mm
(viii)	Spacing of Other Droppers	± 50 mm
(ix)	Stagger of Catenary Wire	± 30 mm
(x)	Height of Catenary Wire	± 50 mm
(xi)	Stagger of Contact Wire	± 10 mm
(xii)	Position of Compensation Plate	It shall be in vertical plane.
(xiii)	Difference between mainline Contact wire and the Crossover	50 mm (minimum)

Contact Wire at Support.
--------------------------

**(j) SUB-STATION FEEDER DRAWINGS - Deleted.**

**NOTE:** *The proforma for SED at individual locations shall be as per standard proforma already circulated and to be adopted in consultation with Engineer s.*

**FOR TSS: 2.5.6.2 ----- DELETED**

**PARTICULAR DESIGNS & WORKING DRAWINGS FOR SWITCHING STATIONS & BOOSTER STATIONS: 2.5.7**

**(a) DELETED**

**(b) DETAILED**

**(A) OHE WORKS:**

The Contractor shall submit for approval of the Engineer the following drawings: -

(I) Cross-section drawings for each switching stations indicating the cross section of the formation transverse to the track at each location of main mast and longitudinal section parallel to the track along the center line of the interrupters. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, transverse section of the parent soil. In the preparation of the drawings care shall be taken to show all obstructions to be removes, such as signal wires, rods and their correct location with reference to the track/s as well as under-ground constructions like pipes, cables etc. after collections such information from the site.

**(ii) GENERAL ARRANGEMENT DRAWINGS**

General arrangement drawings for switching stations indicating the general arrangement of all equipments run of bus bars, position of pedestal insulators, steel frame work and fencing. The drawings shall also give a schematic connection/diagram and an isometric view of busbars and connections. The drawings shall include an elevation view of the switching stations from behind a transverse cross section and plan sectional views at the level of feeder anchors insulator beams, potential transformer beams and ground. Each drawing shall have a schedule of all equipments required at the switching station along with drawing references of details of these equipments.

**(iii) STRUCTURAL DRAWINGS**

Structural assembly drawing for switching stations indicating the steel frame work assembly. The drawings shall include one elevation view of the steel frame work assembly from behind, a transverse cross-section and plan views at various levels such as at the level of feeder anchors, insulator beams/and ground. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of component members alongwith drawing reference various members. The weight of the component members shall be indicated in a separate weight schedule. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawings. Unit isolator beams, potential transformer beams weight of the component shall also be given in the drawings.

**(iv) FOUNDATION LAYOUT AND CROSS-SECTION DRAWINGS**

Foundation layout & cross-section drawings for each switching station indicating layout of all foundations in plan, transverse cross-section of various foundations through center line of main masts, interrupters, fencing uprights and L.T. supply transformers, if any, and longitudinal sections parallel to tracks through the center line of the cable trench. All foundations shall be marked serially on

the drawing and listed in a schedule on the drawing indicating the volume of concrete for each foundation block.

**(v) FENCING LAYOUT DRAWINGS**

Fencing layout drawings for each switching station indicating the layout of the entire fencing and anti-climbing device in plan. Each upright, fencing panel and fixture on the upright shall be indicated on the drawing by its reference number. A schedule of components viz. Uprights, panel's fixer, and barbed wire shall be included in the drawings indicating the drawing references of components. An individual drawing shall be made for each type panel, fencing post and fixture for mounting the anti-climbing device. The drawing of each fencing post shall indicate the unit weight of the fencing post.

**(vi) EARTHING LAYOUT DRAWINGS**

Earthing layout drawing for each switching station indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing strips and connections to each equipment, mast, fencing post and fencing panel. All components shall be marked with their reference numbers, for further details of the run of conductors and connections, separate drawings which may be common to all switching stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components.

**(vii) CABLE RUN LAYOUT.**

Cable run layout of each switching station indicating inter-connection between various equipment's, indoor and outdoor, along with schematic arrangements and physical disposition of equipment's, colour coding or code number and the index scheme adopted for terminals. The drawings shall also indicate the cable size and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

**(viii) EQUIPMENT DRAWINGS**

Equipment drawings applicable to all switching station except the ones for the equipments to be supplied by the Engineer. Drawings should be dimensioned and should indicate: -

1. Fixing or mounting hole dimensions and arrangement:
2. Net weight of the equipment.
  
3. Characteristic and rating of equipment
  
4. Circuit diagrams;
  
5. Overall dimensions and other important dimensions;
  
6. Height and vertical and horizontal dimensions of all exposed live parts; and
  
7. Notes explaining the operation of the equipment

**(ix) MISCELLANEOUS DRAWINGS**

Miscellaneous drawings applicable to all switching stations. These drawings shall include drawings or sketches made for study of clearances, isolator alignment details, scheme of interlocks, number plates of various equipment's and "U" bolts for cable mounting, caution or instruction boards, outriggers for bus bar supports and non-standard busbar connectors.

**(x) EMPLOYMENT SCHEDULES AND CHARTS**

Employment schedules and charts applicable to all switching stations. These will include:

1. Employment schedule for pure gravity type of foundations for main masts for various direct loads and bending moments;

2. Employment schedule for all other foundations for various depths of parent soil from the datum level.
3. Sag tension charts for cross feeders for various spans and tensions.

**(B) FOR TSS WORKS:**

Contractor shall submit for approval the following drawings.

a) **Cross section drawings.**

Cross section drawings for each traction sub-station, indicating the transverse and longitudinal cross-section of the soil along the center line of the equipments, busbar supports and cable trenches. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, cross-section of the parent soil. In the preparation of the drawings, care shall be taken to show all obstructions to be removed, such as telegraph posts, underground pipes, cables etc. after collection of such information from the site.

b) **General arrangement drawings.**

General arrangement drawings for each traction sub-station shall indicate the general arrangement of all equipment's, run of bus bars, position of pedestal insulators and steel frame work. The drawings shall also give a schematic connection diagram and an isometric view of bus bars and connections wherever required. The drawings shall include an elevation view of the traction sub-station, transverse cross section and plan views. The drawings shall have a schedule of all equipments required at the traction sub-station alongwith drawing references of the details of these equipments.

c) **Structural drawings**

Structural drawings for each supporting steel frame work of pedestal. The drawing shall include one elevation view of the steel frame work assembly from behind, a transverse cross section and plan view. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of components members along with drawing references of various members. The weight of the component members shall also be indicated. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawing. Unit weight of the components shall also be given in the drawing.

d) **Foundation layout and cross section drawings.**

Foundation layout and cross section drawings for each traction sub-station indicating layout of all foundations in plan, longitudinal and transverse cross-sections of various foundations through centre line of gantry/portal legs, various equipment busbar supports, fencing uprights and cable trenches. All foundations shall be marked serially on the drawing indicating the volume of concrete for each foundation block.

e) **Earthing layout drawings.**

Earthing layout drawing for each traction sub-station indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing leads and connections to equipment, gantry/portal columns, fencing uprights, structural supports etc. All components shall be marked with their reference numbers. For further details, of the run of conductors and connections, separate drawings which may be common to all traction sub-stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components. These drawings shall be prepared duly taking into account the actual soil resistivity of the respective traction sub-station area, measured in the presence of the Engineer's representative in accordance with the procedure laid down in IS:3043 -1966. The necessary design calculations for the proposed earthing system of the traction sub-station shall also be submitted by the Contractor for Engineer's approval.

f) **Cabling & Wiring drawings.**

Cabling and wiring diagrams for each traction sub-station indicating the schematic arrangement and physical disposition of equipment, run of cables and wires for inter-connections between various equipments indoor and outdoor, colour coding and the index scheme adopted for terminals. The drawings shall also indicate the sizes of wires and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

g) **Fencing layout drawings.**

Fencing layout drawings for each traction sub-station indicating the layout of entire fencing and anticlimbing device in plan. Each upright, fencing panel and fixture on the upright shall be indicated on the drawing by its reference number. A schedule of components viz. uprights, gates, panels fixtures and barbed wires shall be included in the drawing indicating the drawing reference of the components. Type drawings shall be prepared for the various fencing components. An individual drawing shall be made for each type of panel, fencing post, gate and fixture for mounting the anticlimbing device. The drawing of each fencing post shall indicate the unit weight of the fencing post.

h) Equipment drawings applicable to all traction sub-stations complete with drawings of components parts except the ones for the equipment to be supplied by the Engineer. The Contractor shall submit 5 copies for distribution to field office and one transparent print for the equipment's to be supplied by Contractor. Drawings should be dimensioned and should indicate.

- 1) Fixing or mounting hole dimensions & arrangement.
- 2) Net weight of the equipment.
- 3) Characteristics and ratings including those of motors and resistors etc.
- 4) Schematic and detailed circuit diagrams.
- 5) Overall dimensions and other important dimensions.
- 6) Height and disposition of all exposed live parts, height of the bottom most point of all bushings and insulators.
- 7) Notes explaining the operation of the equipment.

For equipment to be supplied by the Engineer, drawings showing the above particulars will be furnished to the Contractor to enable him to carry out the installation, wiring and commissioning of such equipment.

i) **General Drawings.**

General drawings applicable to all traction sub-station. These drawings shall include the drawings or sketches made for study of clearances, Isolator alignment details, number plates of various equipment's, caution or instruction boards, non-standard bus bar connectors, clamps and U-bolts for cable mounting etc.

j) **Schedule of quantities.**

On receipt of approval of relevant drawings for each traction sub-station, the following schedules of quantities relating to each traction sub-station shall be submitted within a fortnight of receipt of approval.

- i) Schedule of foundations, showing volume of each type and total volume.
- ii) Schedule of steel work, types, weights of each member and total weight.
- iii) Schedule of quantities of various items of work of Schedule-1, Section-8 & 9 not included in item (i) & (ii) above.

**(C) FOR FEEDING STATIONS**

The Contractor shall submit for approval of the Engineer the following drawings: -

a) **CROSS SECTION DRAWINGS**

Cross-section drawings for each feeding stations indicating the cross section of the formation transverse to the track at each location of main mast and longitudinal section parallel to the track along the center line of the interrupters. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, transverse section of the parent soil. In the preparation of the drawings care shall be taken to show all obstructions to be removed, such as signal wires, rods and their correct location with reference to the



track/s as well as under-ground constructions like pipes, cables etc. after collections such information from the site.

(b) **GENERAL ARRANGEMENT DRAWINGS**

General arrangement drawings for feeding stations indicating the general arrangement of all equipment's, run of bus bars, position of pedestal insulators, steel frame work and fencing. The drawings shall also give a schematic connection/diagram and an isometric view of bus bars and connections. The drawings shall include an elevation view of the feeding stations from behind a transverse cross section and plan sectional views at the level of feeder anchors insulator beams, potential transformer beams and ground. Each drawing shall have a schedule of all equipment's required at the feeding station along with drawing references of details of these equipments.

(c) **STRUCTURAL DRAWINGS**

Structural assembly drawing for feeding stations indicating the steel frame work assembly. The drawings shall include one elevation view of the steel frame work assembly from behind, a transverse cross-section and plan views at various levels such as at the level of feeder anchors, insulator beams/and ground. In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of component members alongwith drawing reference various members. The weight of the component members shall be indicated in a separate weight schedule. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawings. Unit isolator beams, potential transformer beams weight of the component shall also be given in the drawings.

(d) **FOUNDATION LAYOUT AND CROSS-SECTION DRAWINGS**

Foundation layout & cross-section drawings for each feeding station indicating layout of all foundations in plan, transverse cross-section of various foundations through center line of main masts, interrupters, fencing uprights and L.T. supply transformers, if any, and longitudinal sections parallel to tracks through the center line of the cable trench. All foundations shall be marked serially on the drawing and listed in a schedule on the drawing indicating the volume of concrete for each foundation block.

(e) **EARTHING LAYOUT DRAWINGS**

Earthing layout drawing for each feeding station indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing strips and connections to each equipment, mast, fencing post and fencing panel. All components shall be marked with their reference numbers, for further details of the run of conductors and connections, separate drawings which may be common to all feeding stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components.

(f) **CABLE RUN LAYOUT**

Cable run layout of each feeding station indicating inter-connection between various equipment's, indoor and outdoor, along with schematic arrangements and physical disposition of equipment's, colour coding or code number and the index scheme adopted for terminals. The drawings shall also indicate the cable size and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

(g) **EQUIPMENT DRAWINGS**

Equipment drawings applicable to all feeding station except the ones for the equipment's to be supplied by the Engineer. Drawings should be dimensioned and should indicate: -

1. Fixing or mounting hole dimensions and arrangement
2. Net weight of the equipment.
3. Characteristic and rating of equipment
4. Circuit diagrams

5. Overall dimensions and other important dimensions
6. Height and vertical and horizontal dimensions of all exposed live parts
7. Notes explaining the operation of the equipment

(h) **MISCELLANEOUS DRAWINGS**

Miscellaneous drawings applicable to all feeding stations. These drawings shall include drawings or sketches made for study of clearances, isolator alignment details, scheme of interlocks, number plates of various equipment's and "U" bolts for cable mounting, caution or instruction boards, outriggers for bus bar supports and non-standard bus bar connectors.

(i) **EMPLOYMENT SCHEDULES AND CHARTS**

Employment schedules and charts applicable to all feeding stations. These will include:

1. Employment schedule for pure gravity type of foundations for main masts for various direct loads and bending moments;
2. Employment schedule for all other foundations for various depths of parent soil from the datum level. 3. Sag tension charts for cross feeders for various spans and tensions.

(j) **SCHEDULE OF QUANTITIES**

Within a fortnight of receipt of approval of relevant drawings for each feeding station, the following schedules of quantities shall be submitted.

- i) Schedule of number of foundations, types, volume of different foundation and total volume. foundations will be treated as one foundation;
- ii) Schedule of number of masts, types, weight of different masts, and the total weight of masts of each gantry.
- iii) Schedule of steel work, types, weight of each member and total weight; and
- iv) Schedule of quantities of various items of work of schedule 1, Section-8 & 9 not included in Item (i), (ii), and (iii) above.

(D) **FOR SHUNT CAPACITOR BANK**

Contractor shall submit for approval of the following drawings: -

a) **Cross section drawings**

Cross section drawings for each capacitor bank installation indicating the transverse and longitudinal cross-section of the soil along the center line of the equipment's, bus bar supports and cable trenches. These drawings shall be prepared after an accurate survey at site and shall indicate the nature of the soil, its bearing capacity, compactness and in case of loose soil, cross section of the parent soil. In the preparation of the drawings, case shall be taken to show all obstructions to be removed, such as telegraph posts, underground pipes, cables etc. after collection of such information from the site.

b) **General arrangement drawings**

General arrangement drawings for each capacitor bank installation indicating the general arrangement of all equipments run of busbars, position of pedestal insulators and steel framework. The drawings shall also give a schematic connection diagram and an isometric view of busbars and connections wherever required. The drawings shall include an elevation view of the capacitor bank installation transverse cross section and plan views. The drawings shall have a schedule of all equipments required at the sub-station along with drawing references of the details of these equipments.

c) **Structural drawings**

Structural drawings for each supporting steel framework of pedestal. The drawing shall include one elevation view of the steel framework assembly from behind, a transverse cross section and plan view.

In the assembly each component member shall be marked with its reference number. The drawing shall also have a schedule of components members along with drawing references of various members. The weight of the component shall also be indicated. The drawings shall be prepared for the various structural components. An individual drawing shall be made for each component and this shall include all fixing bolts, nuts and washers whose sizes will be mentioned on the drawing. Unit weight of the components shall also be given in the drawing.

d) **Foundation layout and cross-section Drawings**

Foundation layout and cross section drawings for each capacitor bank installation indicating layout of all foundations in plan, longitudinal and transverse cross-sections of various foundations through centre line of various equipment busbar supports, and cable trenches. All foundations shall be marked serially on the drawing indicating the volume of concrete for each foundation block.

e) **Earthing layout drawings**

Earthing layout drawing for each capacitor bank installation indicating the layout of full earthing system in plan. The drawing shall show the location of earth electrodes and mark the runs of earthing leads and connections to equipment, structural supports etc. All components shall be marked with their reference numbers. For further details of the run of conductors and connections, separate drawings which may be common to all traction sub-stations may be made and references to these drawings marked on the layout. A schedule of components shall be made out in the drawing giving drawing references of components. These drawings shall be prepared duly taking into account the actual soil resistivity of the respective traction sub-station area, measured in the presence of the Engineer 's representative in accordance with the procedure laid down in IS:3043 -1966. The necessary design calculations for the proposed earthing system of the traction sub-station shall also be submitted by the Contractor for Engineer 's approval.

f) **Cabling and Wiring drawings**

Cabling and Wiring diagrams for each traction sub-station indicating the schematic arrangement and physical disposition of equipment, run of cables and wires for inter connections between various equipments indoor and outdoor, colour coding and the index scheme adopted for terminals. The drawings shall also indicate the sizes of wires and grades of insulation. The quantity of various cables required shall be indicated on the drawings.

g) Equipment drawings applicable to all traction sub-stations complete with drawings of components parts except the ones for the equipment to be supplied by the Engineer . Drawings should be dimensioned and should indicate:

- i) Fixing or mounting hole dimensions and arrangement
- ii) Net weight of the equipment.
- iii) Characteristics and ratings including those of motors and resistors, etc.
- iv) Schematic and detailed circuit diagrams.
- v) Overall dimensions and other important dimensions.
- vi) Height and disposition of all exposed live parts, height of the bottom most point of all bushings and insulators.
- vii) Notes explaining the operation of the equipment.

For equipment to be supplied by the Engineer , drawings showing the above particulars will be furnished to the Contractor to enable him to carry out the installation, wiring and commissioning of such equipment.

h) **General drawings**

General drawings shall be applicable to all capacitor bank installation. These drawings shall include the drawings of sketches made for study of clearances, isolator alignment details, number plates of various equipment's, caution or instruction boards, nonstandard bus bar connectors, clamps and U-bolts for cable mounting etc.

**BOOSTER & L.T. SUPPLY TRANSFORMER STATIONS DRAWINGS: 2.5.8**

The Contractor shall submit for approval to the Engineer drawings for booster transformer stations and L.T. Supply transformer stations, similar to those detailed for switching stations in 2.5.7(b). The following drawings may, however, be combined together:

- (i) Cross-section and foundation layout drawings;
- (ii) General arrangement, structural and earthing layout drawings.

**SCHEDULE OF QUANTITIES: 2.5.9 DELETED**

**SUBMISSION OF DRAWINGS & SCHEDULES: 2.5.10**

(a) The submission of designs and drawings for approval shall be done in the manner indicated (See also para 1.2.23). In case Contractor wish to deviate from standard drawings he should submit to the Engineer revised drawings with full details of deviation sought explaining the necessity of deviation, calculations and other supporting documents. The Engineer, if satisfy about the necessity and adequacy of deviations, shall refer the matter to RDSO for necessary approval. In case of deviations on working drawings, decision shall be communicated by the Engineer to the Contractor. The numbers of copies of drawings which shall be submitted are indicated in the following sub-paras. The Engineer will return one copy of the drawings either with approval subject to modification where necessary or with comments. The Engineer shall endeavor to return this copy within a period of fifteen days from the date of receipt and shall normally return the copy within a month. Where drawings are returned with comments or approval subject to modifications, the Contractor shall submit to the Engineer within fifteen days of receipt of such advice revised drawings for approval taking into account the comments or modifications. Also the Contractor shall as far as possible avoid correspondence on such comments and shall endeavor to settle any difference of opinion on the comments by discussions with the Engineer 's Engineers. No drawings shall be resubmitted without incorporating the modifications required by the comments of the Engineer, unless the Engineer has agreed to the deletion of such comments.

**(b) DEVIATION FROM STANDARD DESIGN**

In case of deviation from standard designs and drawings, copies of correspondence and drawings shall be sent in duplicate to the CPM/HRIDC or his successor/nominee (whose address will be intimated in due course). In the particular case of deviations in the design of fittings the drawings submitted by the Contractor shall be actual manufacturing drawings complete with tolerances and full specifications of the materials used. In addition, four samples of the modified fittings shall also be submitted, after the drawings are approved (see para 1.2.23).

**(c) SPECIAL DESIGNS**

Special designs to meet the requirement of particular locations and local conditions shall be submitted in due time in duplicate for approval.

**(d) DELETED**

**(e) CONTRACTOR'S PEGGING PLANS**

**When the Contractor is called upon to survey and prepare pegging Plans, he shall send three copies of such plans, while submitting them for approval.**

**(f) CROSS-SECTION DRAWINGS**

Cross-section drawings shall be submitted for approval in two copies for a convenient section at a time separately for sections within station limits and section outside station limits. Such drawings shall be submitted progressively and as far as possible without gaps (see para 2.5.6).

**(g) OHE LAYOUT PLANS AND PROFILE DRAWINGS**

Overhead equipment layout plans, provisional and final and profile drawings shall be submitted for approval in three copies (See para 2.5.6).

**(h) STRUCTURE ERECTION DRAWINGS**

Structure erection drawings shall be submitted for approval in two copies for a section at a time separately for sections within station limits and sections outside station limits, progressively and without gaps.

**(j) SCHEDULE OF QUANTITIES**

Schedules of quantities for each approved layout plan/switching station shall be submitted for approval in two copies.

**(k) SUB-SECTION FEEDER DRAWINGS -Deleted.**

**(l)** All drawings for switching stations, booster transformer stations and L. T. supply transformer stations shall be submitted for approval in three copies.

**(m) DISTRIBUTION COPIES**

On receipt of Engineer 's unqualified approval to the Contractor's Drawings, Schedule of quantities, the Contractor shall submit original tracings of those drawings and schedules for the signature of the Engineer in token of approval within seven days of the receipt of approval and the Engineer shall as far as possible return the same to the Contractor within 10 working days thereafter. On receipt of these tracings from the Engineer , the Contractor shall submit copies for distribution to field officers and other departments as indicated below within 7 days of receipt of approved tracings:

i) Standard designs including fittings drawings as per para 2.5.10(b)	8 copies
ii) Special designs	8 copies
iii) Final pegging's plans	8 copies
iv) Structure Cross-section drawings	6 copies
v) OHE layout plans	14 copies
vi) OHE profile drawings	8 copies
vii) Structure erection drawings	8 copies
viii) Deleted	
ix) Schedule of quantities	6 copies
x) Drawings for switching stations, booster transformer stations & L.T. transformer stations.	9 copies

In all the above cases, the Contractor has the option to supply only six copies of the approved drawings provided one of them is a transparent paper print.

**COMPLETION DRAWINGS & SCHEDULES: 2.5.11**

After completion of works, all drawings and designs submitted by the Contractor for OHE, TSS & SCADA works and approved by the Engineer shall be made up to date incorporation actual supply and erection particulars including the name and make of insulators, galvanized steel tubes, stainless steel wire rope, Transformers, Circuit Breakers, ATs, CTs, PTs, Interrupters, RTUs etc. The mark of conductors shall be specified in the "As erected" OHE layout plans, SED and other relevant drawings for identification. Such drawings and schedules shall then be verified and corrected, if necessary, by the Contractor jointly with the Engineer 's representatives. The verified and corrected drawings shall be supplied in four sets, one of which shall be transparencies of linen or film reproduction or any other durable material approved by the Engineer . In addition, the contractor shall also supply the soft copy of approved drawings. The soft copy shall be in Auto Cad, Coral draw or any other similar format as mutually agreed between the contractor and the Engineer .

**ADDRESSES: 2.5.12**

Addresses to which designs and drawings should be submitted are indicated in part-III.



# **PART - II**

## **CHAPTER - VI**

ERECTION AND INSTALLATION OF  
EQUIPMENT

**PART - II**

**CHAPTER - VI**

**ERECTION AND INSTALLATION OF EQUIPMENT**

**Section-1: PRINCIPLES**

<b>PARA No.</b>	<b>SUBJECT</b>
2.6.1	Scope
2.6.2	Method of erection
2.6.3	Sectioning
2.6.4	Inspection
2.6.5	Measurements
2.6.6	Bolts, nuts etc.
2.6.7	Damage to galvanizing, painting
2.6.8	Foundations
2.6.9	Masts and Structures
2.6.10	Overhead equipments
2.6.11	Isolators
2.6.12	Busbars and connections
2.6.13	Earthing
2.6.14	Tolerances
2.6.15	Supplementary Instructions
2.6.16	Equipment
2.6.17	Cabling

**Section - 2: WIRING PROCEDURE**

<b>PARA No.</b>	<b>SUBJECT</b>
2.6.20	Wiring procedure
2.6.21	General
2.6.22	Erection of brackets
2.6.23	Anti-creep
2.6.24	Locking the regulating equipment.
2.6.25	Temporary arrangement
2.6.26	Stringing catenary
2.6.27	Tensioning of catenary
2.6.28	Clamping the catenary
2.6.29	Droppering
2.6.30	Stringing contact wire
2.6.31	Tensioning of contact wire
2.6.32	Regulating equipment in action.
2.6.33	Final adjustment
2.6.34	Concluding remarks
	Notes

□□□□□



## **PART - II**

### **CHAPTER - VI**

#### **ERECTION AND INSTALLATION OF EQUIPMENT**

##### **SECTION - 1 : PRINCIPLES**

###### **SCOPE : 2.6.1**

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

###### **METHODS OF ERECTION: 2.6.2**

All work shall be done in accordance with methods of erection and installation of equipment approved by the Engineer. In the case of switching station, booster transformer stations, L.T. supply transformer stations and Traction Sub-Stations, standard methods adopted for erection and installation of electrical equipment shall be adopted.

###### **SECTIONING: 2.6.3**

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

###### **INSPECTION: 2.6.4**

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

###### **MEASUREMENTS: 2.6.5**

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

###### **BOLTS, NUTS ETC. : 2.6.6**

All bolts, nuts, locknuts, screws, locking plates & split cotter pins etc. shall be properly tightened and secured. Contractor shall carry out systematic inspection of this aspect of work after all adjustments to overhead equipment/installation are completed and prior to offering completed sections of equipment/Sub-Station to the Engineer for inspection and testing. No bolts may project more than 10mm beyond the nut/locknut after full tightening.

###### **DAMAGE TO GALVANISING PAINTING: 2.6.7**

In loading, transport and erection, all galvanized/ painted materials shall be handled with care to avoid damage to galvanizing/painting. If galvanizing/painting is damaged in spite of all care taken, the damaged part of component shall be put up for inspection, to obtain permission from the Engineer to carry out repairs as per para 2.4.11(c).

###### **FOUNDATIONS: 2.6.8**

(a) The Contractor shall carry out soil pressure tests in accordance with methods approved by the Engineer to determine permissible bearing pressure of various representative types of soils in the presence of the Engineer's representative during the pegging out of site inspection. He shall adopt only those values as accepted by the Engineer for the design of foundations.

**(b) LOCATION**

The location of each foundation or anchor block shall be set out correctly in accordance with approved structure cross-section drawings or foundations layout drawings, as the case may be, in the presence of the Engineer's representative.

**(c) METHOD OF INSTALLATION**

As per provision in Clause 10.3 of IS: 456/2000, only mechanical mixers are to be used for mixing of concrete required anywhere in HORC works including concrete for OHE foundation.

In exceptional circumstances, such as mechanical breakdown of mixer, work in remote areas or power breakdown and when the quantity of concrete work is very small, hand mixing may be done with the specific prior permission of the Engineer in writing subject to adding 10% extra cement. When hand mixing is permitted, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in color and consistency.

He may erect traction masts or structures in the same operation as casting of foundations or erect them subsequently in cored holes left in foundation blocks and grout them separately. In any case, the method of casting of foundation blocks and erection of masts or structures shall be subject to the approval of the Engineer.

**(d) EXCAVATION**

Normally, excavation of soil for foundations or anchor blocks alongside the tracks may be done upto length of 1 to 1.2 m and depth of 0.8 to 1 m without shoring, provided the excavated hole is concreted immediately and not left overnight. Shoring shall otherwise be done unless the hole is re-filled with soil and temped. In case the length of excavation is 1 to 1.2 m and depth of excavation for foundations and anchor blocks alongside the tracks is more than 0.8 to 1 m, the excavation may be undertaken only after certification by the Engineer's representative to be safe and concrete is cast on the same day. Shoring shall be done to the satisfaction of the Engineer's representative, if the excavated hole is left overnight. All water logged locations will come under the purview of this para. In poor soil or ash banks, no excavation shall be done without adequate shoring and piling. For large foundations and water logged locations shoring shall be done in accordance with drawings submitted by the Contractor and approved by the Engineer. Shoring/ shuttering of the pits should be provided effectively to the satisfaction of the Engineer. Core hole covers should be provided promptly on casting of foundation (within 48 hours) and their edges cemented to the foundation blocks. Prior to doing so, water should be filled in the core hole so as to assist in curing. The date of casting should be inscribed on the foundation block. In case of platform areas and Level crossings, the core holes should be filled with sand before provision of core hole covers so as to prevent any injury to rail users even if the core hole cover gets damaged or is displaced. The track ballast should be restored to its original from promptly after casting of the foundation block. The excavated earth should be removed well clear of the area so as to avoid any mixing up with the track ballast or any obstruction to the track drains. In case of cuttings, the earth should be thrown well away from the shoulders so that there is no risk of its flowing back to the drain during the rains.

**(e) CONCRETING**

All concreting or grouting shall be done in accordance with para 2.2.4 with ballast graded for the purpose specified in para 2.2.5. The concrete shall be poured and temped properly in accordance with the method approved by the Engineer. The Contractor shall arrange to provide concrete testing samples for tests once every week or as and when required by the Engineer, to determine crushing strength after 7 days or 28 days curing as required. Testing shall be arranged by the Engineer at his own cost.

**(f) MUFFS**

**(i) FOR OHE:**

All anchor blocks and foundations of structures carrying overhead equipment shall be provided with concrete muffs. The top of these muffs shall be above the level of ground of the track formation and of

adequate height of not less than 15 cm to afford reasonable protection during rainy weather. Muffs may be installed at the same time masts are grouted or after the mast/structure is loaded with equipment. The foundations of structures for switching stations need not, however, be provided with muffs. The top of such foundations shall be given a slope of 1 in 50 towards the edge to ensure that water does not collect at the base of the structure of the frame work of the equipment.

**(ii) FOR Foundation Level of TSS:**

The top of all foundations and anchor blocks shall always be above the level of the ground and of adequate height, not less than 15 cm. to afford reasonable protection during rainy season. The top of foundation shall be finished to make a smooth surface sloping 1/20 outwards to drain rain water.

(g) Suitable grooves or niches shall be provided in the foundation blocks, wherever required, at the time of casting, to enable embedment of earth strips etc. to avoid the necessity of chipping of concrete.

(h) Conduits for cables should be embedded in the foundation blocks, wherever required, to avoid subsequent chipping off and breaking of the foundation blocks.

(i) All foundations will be cast in the presence of the Engineer's representative with regard to fixed datum level.

**MASTS AND STRUCTURES: 2.6.9**

**(a) ERECTION**

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

---

**NOTE:** Mast/uprights should be grouted on the same day they are dropped in the foundations.

**(b) REVERSE DEFLECTION**

All traction masts and structures shall be erected with the correct reverse deflection so that they become reasonably vertical after they are loaded. The method of erection of masts with the correct reverse deflection shall be submitted to the Engineer for approval.

**(c) INFRINGEMENT TO STANDARD DIMENSIONS**

In erection, care shall be taken to ensure that no part of the traction mast, structure or any fitting located on such mast or structure infringe the Schedule of Dimensions mentioned in Para - 2.1.1 (c) "Indian Railways Schedule of Dimensions".

**(d) ALINGMENT OF MAST AT GANTRIES**

The main masts of gantries shall be carefully aligned to enable easy and good assembly of fabricated steel work.

**OVERHEAD EQUIPMENT: 2.6.10**

(a) A suggested method for erection of traction overhead equipment which would ensure good speed and quality erection is included in section 2 of this chapter. The Contractor may, however, follow other methods which they consider would speed up and ensure good quality work, subject to the approval of the Engineer. Any wiring method should take into consideration appreciable stretch of the catenary and contact wires in the initial days after they are strung and put under tension.

**(b) BRACKET TUBES**

In the erection of bracket assemblies, it shall be ensured that the free length of the bracket tube beyond the catenary suspension bracket is at least 200mm to facilitate adjustment during maintenance.

**(c) STAY ARMS**

The choice of stay arms shall be such that their adjuster is capable of adjustments of minimum of 90 mm in either direction except as otherwise relaxed.

**(d) INSULATORS**

Before insulators are used in bracket assemblies or dispatched to work site for erection from Contractor's Stores Depot, they shall be tested as specified for routine mechanical test. NO chipped or cracked insulators shall be installed. All insulators shall be cleaned before offering complete sections of equipment for inspection and testing.

For testing of all types of Insulators, RDSO's Guidelines No. TI/MI/0011 (05/01) Rev.1 & TI/MI/ 0042 (12/2008) Rev. 0 or latest are to be followed.

**(e) STRINGING CATENARY**

Care shall be taken to avoid kinking or bird caging of the catenary wire in stringing and subsequent operations. While stringing the wire shall be suspended from pulley blocks hung from the suspension clamp eye of bracket assemblies. The pulleys shall be fitted with ball bearing and shall be of the swivelling type to permit free movement in all directions to prevent damage to the strands of the wire. The design shall also be such that it will prevent slipping off of the wire during stringing operations. The designs of the pulley shall be submitted to the Engineer for approval. After initial stringing of the catenary, it shall be maintained at the 'no load tension' (see section 2 of this chapter) for a minimum duration of 48 hours before the pulley blocks are removed and the catenary is clamped to suspension clamps of bracket assemblies. Shorter periods may, however, be allowed by the Engineer.

**(f) STRINGING CONTACT WIRE**

Care shall be taken to avoid formation of kinks, twists and damage to contact wire in stringing and subsequent operations. While stringing the contact wire, it shall be suspended from pulleys hung from droppers fitted to the catenary in their final position. In curves, the contact wire shall be run in pulleys located at traction masts or supports, corresponding to the approximate final position of the wire.

**(g) LOCATION OF DROPPERS**

Droppers shall be correctly positioned in each span to ensure correct level of contact wire as per dropper chart applicable to the span.

**(h) CLIPPING DROPPERS**

The dropper shall be clipped on the contact wire only after a minimum duration of 48 hours from the time the automatic tensioning device is brought into action. Shorter periods may, however, be allowed by the Engineer.

(i) -NIL-

**(j) AUTO TENSIONING DEVICE**

The auto-tensioning device shall be erected with the correct height of the counter-weight above rail level with corresponding distance between the pulleys of the device for a temperature of 35° C before it is connected to the overhead equipment and put into action. The installation of the device shall be such as to permit free, easy and unobstructed movement of counter-weight. RDSO's Guidelines No. TI/MI/0035 (09/01) Rev. 1 shall be followed at crossovers and short tension length ATDs.

**(k) CUT-IN-INSULATORS**

All insulators in out of run shall be so positioned that they are away from the swept zone of the pantographs and will not foul with them. The live parts of these insulators shall also be so located that they are at least 2 m away from Structures other than those supporting traction overhead equipment.

**(l) SECTION INSULATORS**

All section, insulators shall be so located that they are beyond the swept zone of the pantograph running on adjacent tracks and there is no unusual sag due to the same. Where section insulators are installed, the contact plane of the runners of the insulators as well as those of overhead equipment connected to it shall be parallel to the track plane.

**(m) ANTI -WIND CLAMP**

Anti-wind clamp shall be provided as shown in drawing (Annexure-1).

**(n) CONNECTIONS**

All jumper connections including anti-theft jumpers shall be made properly with parallel clamps and finished neatly without any loose wire or cables. The length of flexible jumpers shall be adequate to avoid any disturbance to overhead equipment or restraint in the relative movement of conductors, but the jumpers should not be excessively long. The ends of jumpers shall be tinned, including the portion inside the first parallel clamp.

**(o) SEPARATION BETWEEN OHE**

In erection, the physical separation required between overhead equipments and bracket assemblies on the same Structure at insulated overlaps shall be ensured.

**(p) GRADIENT OF CONTACT WIRE**

The gradient of the contact wire on either side of overline Structures with restricted clearances shall be correctly adjusted and adequate clearance maintained between the overline Structure and live equipment.

**(q) ADJUSTMENT AT TURNOUTS ETC**

Careful adjustment of equipment shall be made on equipment's at Turnouts, cross overs, diamond crossings, overlaps and special Locations, for position of bracket assemblies, stay arms and height of contact wire to ensure that pantographs of electric rolling stock on the run will not foul with any parts of the bracket assemblies and change over of the contact wire is effected smoothly.

(r) For wiring in large Yards, the Contractor shall, prior to the execution of works, submit to the Engineer for the approval the sequence of stringing of catenary and contact wires to arrange for proper crossing of wires. Endeavor will be made to arrange for traffic blocks to suit approved sequence of wiring.

**ISOLATORS: 2.6.11**

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

**BUS BARS AND CONNECTIONS: 2.6.12**

a) The busbar connections on the incoming side, shall be as tight as possible, all similar connections in adjacent bays being uniformly shaped and bent to give a good appearance. The tubular Aluminum bus bars shall be supported at a uniform height throughout. Wherever tubular busbars are required to be bent, the radius of the bend shall not be less than 375 mm.

b) All Aluminium busbar joints shall be made carefully. The contact surfaces of the bus bars and the connectors shall be cleaned vigorously either by hand with a dry coarse emery cloth or by power driven wire wheel brush. The surfaces shall be smeared with a suitable corrosion inhibiting joint compound approved by the Engineer. The joint closed-up as soon as possible thereafter and a final light application of joint compound shall be made. Similar procedure shall be followed while connecting the equipment terminals to be busbar by means of bi-metallic connectors.

**EARTHING: 2.6.13**

**FOR OHE:**

The copper earth strips or MS flats used for earthing shall be bent and shaped neatly before connection to the structure or frame work of equipment. The connection of MS flats to steel work shall be made at a height not exceeding 15 cm from the datum level of a switching station. Before making earth connections the ends shall be cleaned thoroughly and tinned for copper strips. All junctions shall be properly secured to avoid loose contact. Portions of copper earth strips which remain visible above the ground level should be painted with suitable paint to make them inconspicuous.

**FOR TSS:**

Typical clamping arrangement of M.S Flat inside Control Room is shown in the relevant drawing in Annexure-1. The joints on mild steel flats shall be welded type. The welds shall be treated with barium chromate before painting the welded surfaces. The connections to the various items of equipment's shall be made with galvanized steel bolts (16mm dia), nuts with locknuts or spring washers as required. The earth connections to the structural members shall be made at height not exceeding 150 mm from the ground level. The steel flats shall be bent and shaped neatly before connection to the structures or frame work of equipment. The earth flats to run along the structures for connections of equipments to earth mat shall be properly supported on the structures with galvanized steel bolts (12mm dia), nuts with lock-nuts or spring washers, as required, at suitable intervals.

**TOLERANCE: 2.6.14**

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

**(a) MEASUREMENTS**

The span length shall not vary more than  $\pm 50$  mm as measured along the appropriate rail (see para 2.6.5).

The cumulative error of measurement of all spans in a kilometer shall be not more than 1000 mm.

**(b) SETTING OF STRUCTURES**

The setting of structures shall be not less than that included in the appropriate cross section drawings, especially those with the minimum setting of 2.36m. A tolerance of  $\pm 20$  mm will be permitted subject to minimum specified value, if the structure is not located in between tracks.

**(c) HEIGHT OF CONTACT WIRE**

$\pm 20$  mm will be permitted on the height of contact wire at points of supports as shown in the relevant structure erection drawings, except under over line structures where no tolerance will be permitted.

**(d) STAGGER** : Generally  $\pm 150$  mm will be permitted for stagger.

**(e) DROPPER LENGTHS** :  $\pm 5$ mm will be permitted for dropper lengths.

**(f) DROPPER LOCATION** :  $\pm 100$  mm will be permitted for dropper locations.

**SUPPLEMENTARY INSTRUCTIONS: 2.6.15**

Further working instructions will be issued if considered necessary by the Engineer should be considered that the standard of work of the Contractor requires to be improved.

**EQUIPMENT: 2.6.16**

The installation of the equipment shall be carried out strictly in accordance with the instructions issued by the Manufacturer. The equipment shall be leveled carefully before being fixed finally in position. The bushings of insulators shall be protected adequately during erection of equipment to avoid chipping or damage to the porcelain. The following methods shall be adopted for mounting the various equipments.

	Equipment	Method of mounting.
i)	Main Power transformer	On two 90 lb./yd. flat-footed rails laid on concrete foundations with a spacing of 1676 mm between the inner face of the rails
ii)	220/132/110 kV Circuit breaker	On steel supports mounted on concrete foundation with operating mechanism kiosk on concrete pedestal where necessary
iii)	25kV Circuit breakers and interrupters	On fabricated steel supports erected on concrete foundations
iv)	Isolators, potential transformers, Current transformer L.T supply transformers, 25 kV fuse Switches & Lightning arrestors.	On steel supports mounted on concrete foundations
The Circuit breakers, interrupters and Isolators shall be mounted in such a way that they can be manually operated conveniently by a person standing on the ground or on a concrete pedestal of suitable height.		
v)	Shunt capacitor bank & series reactor	On steel racks which in turn shall be mounted on a concrete plinth with suitable base frame.

**CABLING: 2.6.17**

a) Laying of cables.

All PVC cables provided out-door shall be either laid in trenches or neatly clamped to the structures as approved by the Engineer. If it becomes necessary to take the cable connections along the steel supports for the equipment, the cables shall be laid through bent or shaped G.I. pipes embedded in concrete while the foundations are being cast. All cables in the cable trenches and along the structures shall be neatly secured with proper clamping arrangement at suitable intervals. Each cable in the cable trench/on the structure shall also be provided at suitable intervals with identification labels of durable material bearing indelible engraved or punched markings to facilitate easy identification.

b) Termination of cables.

The cables shall be terminated neatly and the cores arranged and dressed properly. Suitable terminal strips and ferrules made of PVC or other durable materials shall be provided on terminals and wire ends respectively to facilitate identification. The marking on the terminals strips and ferrules shall be either engraved or punched so as to be indelible.

c) Indoor wiring.

As far as possible all cables shall be laid in the trenches/ pipes provided for the purpose in the Control Room. Wherever necessary indoor wiring on walls shall be clamped neatly on teak wood battens/M. S flats fixed to the wall by means of rag bolts grouted in the wall. The typical clamping arrangement is shown in the relevant drawing in Annexure-1.

□□□□

## SECTION2: WIRING PROCEDURE

### WIRING PROCEDURE: 2.6.20

This sections deals with wiring procedure which may be adopted for erections of normal overhead equipment.

The following procedure for erection of overhead equipment has been formulated with a view to ensure that

- (i) Bracket assemblies (brackets) and regulating equipment are correctly installed in their final position.
- (ii) The conductors are correctly tensioned, and
- (iii) The need for final adjustments of overhead equipment immediately before energization and commissioning is virtually eliminated.

### GENERAL: 2.6.21

In the case of regulated overhead equipment when the regulating equipment's are in action, the tension in the conductors should remain constant, irrespective of variations in the ambient temperature. As the regulating equipments are brought into action a few days after the stringing of conductors the equipments is unregulated in the intervening period. Any of the following two procedures may be followed for tensioning and clamping of conductors of regulated overhead equipment during stringing operations, i.e. before the regulating equipments are brought into action.

- (i) The catenary is tensioned to 1,000 kef, the stipulated tension at the mean temperature of 35° C, whatever may be the ambient temperature during the stringing operations. In this case, at the time of clamping the catenary to the bracket, the brackets should be placed at angular positions corresponding to temperature at the time of clamping, and proportionate to their distance from the anti-creep.
- (ii) The aluminum alloy catenary is tensioned at the calculated tension to correspond to 1000 kef, the stipulated tension at the mean temperature of 35°C whatever may be the ambient temperature during the stringing operations.
- iii) The catenary is strained to a stringing tension corresponding to the ambient temperature for the equipment span of the tension length. In this case, the brackets are placed in the mean position, i.e. at right angles to the track, when the catenary is clamped or the regulating equipment commissioned.

The advantage of the second method is that once the catenary is strung at the proper tension, there would be no necessity to adjust each bracket separately at the time of clamping the catenary or commissioning the regulating equipment. The erection work is, thus considerably simplified and the possibility of errors greatly reduced. This is also applicable to erection of unregulated overhead equipment.

### ERECTION OF BRACKETS: 2.6.22

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

### ANTICREEP: 2.6.23

The anti-creep of the tension length is then installed in its final positions.

### LOCKING THE REGULATING EQUIPMENT: 2.6.24



In the case of regulated overhead equipment, the regulating equipment's are erected on the terminal masts or structures and their movement locked by suitable means in the middle position, with the distance between the pulleys of the regulating equipment corresponding to 35 degrees centigrade.

**TEMPORARY ARRANGEMENT: 2.6.25**

A pulley approximately 30 cm. dia. is attached to the overhead equipment and of the regulating equipment by means of temporary accommodation fittings at both ends of the tension length to be wired. Over this pulley a flexible stranded wire is passed over. At each end of the wire two ending clamps, one for catenary and one contact wire, are attached. The wire is also clipped in the middle by 'U' clamps. The length of this temporary arrangement from the regulating equipment to the extremities of the stranded wire passing over the temporary pulley shall be a little longer than the distance between the regulating equipment and the ends of the catenary and contact wires in their final position, to permit easy clamping of terminal fittings during the final termination of the wire.

**STRINGING CATENARY: 2.6.26**

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

**TENSIONING OF CATENARY: 2.6.27**

The catenary is strained up to the 'Stringing tension' corresponding to the 'equivalent' span of the tension length and the ambient temperature at the time of stringing with the aid of a dynamometer, and terminated at the tension. For this purpose, the ambient temperature shall be deemed to be the temperature registered by a thermometer tied to a length of catenary wire 3 to 4 meters long, laid flat on the top platform, on one of the wagons of the wiring train. Subsequently, the tension in the wire is checked by measurement of sag with the help of leveling the attached to suspension points and to the catenary at midspan by a ladder working party. The sag shall be measured in two spans, each preferably greater than 54 meters and situated on either side of anti-creep approximately midway between the anti-creep and the termination points. The value of sag measured by this method should be within  $\pm 5\%$  of the theoretical value for the corresponding stringing tension, and the temperature at the time of this measurement. In case the discrepancy is more, the tension should be adjusted again and sag re-checked as above (see note 1). After the sag is checked the catenary is terminated at the ending fitting of the temporary arrangement at the terminating point.

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

**CLAMPING THE CATENARY: 2.6.28**

The catenary is clamped on the brackets placed at right angles to the track (See Note 2 under Para 2.6.34).

**DROPPERING: 2.6.29**

Droppers are fitted to the catenary at the correct locations. At the contact wire ends these droppers may be provided with small pulleys or hooks to act as temporary supports when the contact wire is strung.

Hooks made of scrap contact wire, suspended from the catenary Wire, may also be used as temporary supports.

**STRINGING CONTACT WIRE: 2.6.30**

The contact wire is initially terminated in the contact wire ending clamp of the temporary arrangement at one end of the tension length. The wire is then paid out from the reel wagon of the wiring train and supported on the pulleys hung from droppers or on hooks until the terminating point at the other end of the tension length is reached (See Note 3). In curves, the contact wire shall be registered on pulleys

located at traction masts or supports corresponding to the approximate final position of the wire. The axes of these pulleys should be more or less vertical.

**TENSIONING OF CONTACT WIRE: 2.6.31**

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

**REGULATING EQUIPMENT IN ACTION: 2.6.32**

The regulating equipment is put into action with the counter weight at the correct height above rail level and with distance between pulleys or the regulating equipment corresponding to a temperature of 35°C. The regulating equipment is then released and brought into action. The 'U' clamp connecting the flexible stranded wire passing round the temporary pulley is also removed.

**FINAL ADJUSTMENT: 2.6.33**

The entire installation is left in this condition as long as it is possible, preferably for a period not less than 15 days (See Note 4). The temporary pulleys are removed and the conductors terminated in the permanent ending fittings, compensating plates, insulators and turn buckles (See Note 5). The equalizer plate is kept vertical or at a slightly inclined position (by 2 or 3 cm the contact wire being shorter than the catenary) and the position of the regulating equipment is checked in relation to, the temperature at the time. The contact wire is clipped on to the droppers (in the vertical position) and on the steady arms. Contact wire height at the bracket is adjusted as also the stagger and register arm clearance.

**CONCLUDING REMARKS: 2.6.34**

If the above method is followed with care no further adjustment may be needed.

---

**NOTE:**

*(1) It should be ensured that sagging is done carefully and accurately. The adjustment of tension in the catenary after checking of sag, if required, would be easy if a temporary, turn buckle is inserted in the temporary termination.*

*The use of leveling lathes is recommended for the following reasons:*

- (i) The accuracy of adjustment is greater than that with a dynamometer.*
- (ii) No traffic block is required for this operation.*
- (iii) It obviates the necessity initial tensioning of the catenary accurately thus permitting a deduction in the period of traffic block required for the wiring train.*

*(2) If feasible, without any hindrance to progress of works, the catenary may be maintained at stringing tension for a period of 48 hours before checking sag and clamping it to the brackets. This would ensure equalisation of tension in the different spans.*

*Before clamping the catenary to the brackets, the sag should however, be checked in two spans as indicated in Para 2.6.27.*

*(3) If it is difficult to obtain a separate traffic block for stringing contact wire, the wire may be paid out at the same time, as the catenary, with the following precaution.*

- (i) The contact wire is run and suspended from independent pulleys hooked on to the brackets, separately from the catenary pulleys, to avoid twisting together of the two conductors a special hook designed for this purpose.*

- (ii) *The contact wire should not be suspended from the catenary until the latter is clamped on to the brackets.*
- (iii) *The tension in the contact wire before termination should be about 1,500 kef. This will ensure that sag is not excessive.*
- (iv) *The adjustment of tension and checking of sag of the catenary wire is carried out as if the contact wire had not been strung. Only after adjustment of tension and checking of sag is completed, the contact wire is transferred to the pulleys attached to the droppers or to hooks suspended from the catenary and the tension is adjusted as indicated in Para 2.6.31.*

*(4) When the contact wire is under tension, creep takes place which results in an increase in the length of wire and, consequently, the droppers and the equalizer plates would become oblique.*

*Though creep may continue for a long time, about a year, the bulk of it would occur during the days following stringing. If sufficient period of time is allowed the contact wire may be clipped to the droppers and the equalizer plates, all in the vertical position, and the necessity for any further adjustments before energization and commissioning of the OHE may be reduced to a great extent. If this precaution is not taken, at the time of energization of the OHE, the droppers may not all be vertical and staff would have to be detailed for shifting the dropper clips which is attendant with risk of damage to the contact wire.*

*(5) Before the temporary arrangement is removed a reference mark should be made on each conductor. After final termination of the conductors, it should be ensuring that two marks are in the same relative longitudinal position as they were before the removal of the temporary arrangement.*

---



# **PART - II**

# **CHAPTER-VII**

## **INSPECTION AND TESTING**

**PART - II**

**CHAPTER - VII**

**INSPECTION AND TESTING**

<b>PARA NO.</b>	<b>Subject</b>
2.7.1	Scope
2.7.2	Overall performance.
2.7.3	Responsibility.
2.7.4	Tests on overhead equipment.
2.7.5	Inspection and testing of switching stations etc.
2.7.6	Earthing.
2.7.7	Detailed procedure for tests.



**PART - II**

**CHAPTER - VII**

**INSPECTIONS AND TESTING**

**SCOPE: 2.7.1**

This chapter deals with the inspection and testing of completely erected overhead equipment, switching stations, booster transformer stations, L.T. supply transformer stations and Traction Sub-Station as provided in Part -I.

**OVERALL PERFORMANCE: 2.7.2**

The overall performance of the overhead equipment should be such as would permit collection of current by electric rolling stock with full load at speeds, upto and including the maximum specified for the design of overhead equipment, smoothly, without mechanical shocks or prejudicial sparks (See para 2.1.10) and without undue heating in the case of other equipments.

**RESPONSIBILITY: 2.7.3**

The general tests of overall performance stipulated below are only supplementary to other tests on structures, foundations, equipment, components and fittings as specified in Part II, Chapter - II, III and IV. Any testing and acceptance by the Engineer of overall performance shall be subject to the general terms of guarantee which shall continue to be valid as provided for in Part - I, Chapter - II.

**TESTS OF OHE: 2.7.4**

**(a) GENERAL**

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

**(b) INSULATION**

The strength of the insulation and the dielectric strength of the entire equipment as installed shall be tested with a 2500V Megger.

**(c) CONTINUITY**

The electrical continuity of the line and the existence of bad Contacts, if any, will be tested with a Megger.

**(d) ELECTRICAL INDEPENDENCE**

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

**(e) SWITCHES**

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

**(f) TENSION DEVICES**

All automatic Tensioning devices installed shall be tested for sensitive functioning and adjustment.

**(g) STAGGER AND HEIGHT**

The stagger and height of contact wire over the entire section of completed overhead equipment and the clearances available shall be measured and the measurement shall be checked against approved drawings. These measurements shall be carried out at low speed with a vehicle or device to be arranged by the Engineer, the movement of which will follow the track levels as closely as possible. Tolerance that will be permitted on the dimensions indicated in the approved drawings are shown in Part - II, Chapter - VI.

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

**(h) MECHANICAL BEHAVIOR**

The mechanical behavior of the entire equipment shall be tested at various speeds under normal pantographs pressure without energizing the overhead equipment.

**(i) ENERGISING**

If the overhead equipment, after being subjected to the above tests in an un-energized condition, is found to be satisfactory, it will be energized with the normal 25 KV A.C. supply.

(j) Tests shall then be conducted to check if the power collection performance of the overhead equipment is satisfactory after ensuring that the contact wire is adequately clean. For this purpose, an observation car shall be attached next to the electric locomotive. The behavior of the overhead equipment will be watched at various speeds. Power collection shall be considered unsatisfactory if a long blue flash is observed, indicating that the contact between the contact wire and the pantograph is not continuous.

**INSPECTION AND TESTING OF SWITCHING STATIONS ETC.: 2.7.5**

**(a) GENERAL**

As soon as a switching station, booster transformer station or LT supply transformer station and Traction Sub-Station is ready for inspection and testing, the Contractor shall advise the Engineer in writing. Testing will be carried out by the Engineer at his cost jointly with the Contractor. These shall include the tests which the Engineer may like to conduct with a view to assure himself of the soundness of the equipments and their erection in compliance with these specifications. However, testing equipments such as those indicated below and staff required for the tests shall be provided by the Contractor free of charge.

- (i) Oil testing equipment.
- (ii) 5000V/2500 V & 500 V meggers.
- (iii) Earth megger and accessories.
- (iv) Continuity test apparatus.
- (v) Avometer
- (vi) Relay testing kit.
- (vii) Primary injection test set.

The Contractor shall take full responsibility for these tests inter-alia his other responsibilities.

**(b) VISUAL INSPECTION**

Visual inspection which shall include check for satisfactory workmanship shall cover all connections, Painting, Plastering, Cleanliness of all insulators etc. and compliance with Indian Electricity Rules.

**(c) OPERATIONS TEST**

This tests will be conducted on every individual items of equipment such as interrupters, isolators, relays etc. to ensure that the equipment as a whole is functioning properly and is mechanically sound, i.e. in the particular case of isolators the fixed contact and knife blade have been correctly aligned and operations does not cause undue strain on the equipment. The operation tests will be carried out with the high tension installation dis-connected from the supply, but by actuating power devices where such are provided. Continuity test of high tension connections after setting such interrupter and isolator in their respective positions shall also be conducted as part of the operation test.

**(d) INSULATION**

The strength of insulation of the various items of equipment and of the entire installation as a whole shall be tested with a 5000V/2500 V/500 V megger, as required.

**(e) DI-ELECTRIC STRENGTH OF OIL**

The di-electric strength of the oil of the Instrument Transformers (except if they are of sealed construction), Booster transformer Circuit Breaker & LT supply transformer, at each station shall be tested before commissioning in accordance with IS:335 (Latest version as indicated in Anexure-1) should this be found not correct, the Contractor shall arrange at his own expenses to have it rectified.

**(f) ISOLATORS**

All isolators will be tested for smooth and trouble free operation. Correct function-in of interlocking device shall be checked.

**(g) INTERRUPTORS**

Operation of trip and close coils for interrupters shall be tested for satisfactory performance with the respective equipments de-energized.

**(h) Instrument transformer**

Tests shall be conducted to check the polarity of current and potential transformers.

**(i) Ammeter and Voltmeter**

The Calibration of ammeters and voltmeters provided on the control board shall be checked.

**(j) Protective relays**

The Contractor, shall arrange for all protective relays to be tested and calibrated in a recognized test laboratory at his own cost, just prior to installation on the control board, and shall submit six copies of the test certificates to the Engineer.

**(k) Primary & secondary injection tests**

Operation of all protective relays, auxiliary relays and trip and close coils for circuit breakers shall be tested for satisfactory performance with the respective equipments de-energized. Correct functioning of all electrical interlocks inter- tripping etc. shall also be checked during these tests.

**(l) Performance tests**

To verify the performance of the complete capacitor bank, tests as specified in respective clause of RDSO specification No. TI/SPC/PSI/FC & SR/0100 (01/2010) shall be carried out at site after installation.

**EARTHING: 2.7.6**

(a) Earth wires will be checked for continuity and electrical isolation every 1000 m approx.

(b) Clearances between earth wires and out-of-run wires of overhead equipment and signals shall be checked.

(c) Earth resistance shall be measured separately for each earth electrode. In the case of interconnected earth electrodes, the nett resistance of the inter-connected electrodes shall also be measured.

(d) Earth resistance will be measured separately for each earth electrode and when they are connected together and to the equipment at each sub-station, feeding station and shunt capacitor bank.

**DETAILS PROCEDURE FOR TESTS: 2.7.7**

The detailed procedure for inspection and testing will be furnished to the contractor. The contractor shall submit the results of tests in the proforma which will be furnished by the Engineer, in quadruplicate.





# **PART - II**

## **CHAPTER - VIII**

### **SWITCHING STATION BUILDING**

**PART - II**

**CHAPTER - VIII**

**SWITCHING STATION BUILDING**

<b>PARA NO.</b>	<b>SUBJECT</b>
2.8.1	General
2.8.2	Earth work
2.8.3	Foundations
2.8.4	Reinforced Cement concrete work
2.8.5	Super structure
2.8.6	Flooring
2.8.7	Roofing
2.8.8	Doors, windows, ventilators
2.8.9	Building material
2.8.10	Wiring
2.8.11	Main Switchgear and Switch Board
2.8.12	Earthing
2.8.13	Electrical Fittings and Appliances
2.8.14	Testing and Commissioning



**PART - II**

**CHAPTER - VIII**

**SWITCHING STATION BUILDING**

**GENERAL: 2.8.1**

This chapter deals with details and specifications for design and construction of switching station buildings and associated electrical works. This chapter also gives reference to technical specifications of materials and components and procedure of designs and drawings for above works. A list of standard drawings is included in Annexure-I, Part IV.

**EARTH WORK: 2.8.2**

(a) Earth work in cutting or embankment in the premises of switching station buildings is included in the scope of construction of building. The buildings will be adequately levelled with earth duly consolidated in the premises or as directed by the Engineer.

**(b) Mechanical Compaction:**

Depending upon the height of the embankment, the type of soil, time available for completing the embankment and other relevant factors, Engineer shall decide whether mechanical compaction is to be done for the full or part height of embankment. Suitable method for compaction as decided by Engineer, shall be adopted.

**(c) Excavation:**

All cuttings shall be taken down carefully to the precise level and section as shown in the drawings or as ordered by the Engineer. In case, the bottom of the cutting is taken down deeper than is necessary by oversight or neglect of the contractor, the hollow must be filled up to true depth with selected material and rammed, if approved by Engineer. Cuttings with the formation in rock will be excavated to 15 cm below the true formation and filled upto true level with cutting spoil to ensure that no lumps of solid rock project above formation level.

**(d) Drainage of cuttings:**

In excavating cuttings, special precautions are to be taken to ensure that the excavations drain themselves automatically. To ensure this, the central block of earth or gullet is to be excavated first. This will be done in such a manner that the bottom of the excavation shall where possible, slop downwards from the center of the cutting towards the ends. It will be made in such cuts or steps as may from time to time, be directed. Generally, in deep cuttings the first cut or step will approximately follow the surface of the ground where this will secure the necessary slope for drainage, and will be excavated to such depth not exceeding 3 m as may be ordered, with perpendicular sides leaving pathways for workmen along the sides of the cut parallel to the central line about every 15m. In shallow cuttings, not exceeding 2m in the deepest part, the gullet may be cut out at once to formation level.

**(e) Catch water drains:**

Where required, catch water drains shall be constructed on the up hill side leaving a berm of one metre from the boundary of the HRIDC/railway land. The cross sectional area of the catch water drain shall normally not exceed 0.75 sq.m. The spoil from the catch water drain will be thrown up on the side towards the cutting.

**(f) Berms and spoil banks:**

No spoil shall be deposited within a distance of 6 m from the top edge of the slope of any cutting.

(g) The spoil heap shall be roughly but neatly dressed off to a slope of 1-1/2:1 and shall form a continuous bund along the top of the cutting. In country where there is any cross fall sufficient spoil shall be thrown on the uphill side of the cutting to supplement the catch water drains and assist in keeping drainage out. This work must be done first.

(h) All material excavated from cutting suitable for pitching, ballast, masonry or any other purpose whatever, shall be the property of the HRIDC, and shall be stacked, as also disposed of, as directed by the Engineer.

**(i) Springs or Inflow:**

Should springs or inflow of water appear in cuttings, or should they be flooded the contractor must arrange for bailing, pumping or drainage of water, without obstruction to adjacent works.

(j) **Blasting:**

If any blasting operations are necessary, they shall be carried out in accordance with para 1.2.43 of Chapter II, Part-I of this tender document.

**FOUNDATIONS: 2.8.3**

(a) Foundations shall be designed by the contractor in accordance with Chapter II, Part II of this tender document. The contractor shall get the relevant drawings approved by the Engineer. The foundation work may involve wet excavation also, for which all due precautions by way of pumping and other operations, preventing blowing are to be adopted.

(b) **Plinth filling:**

Plinth filling shall be done with earth in 15 cm layers, duly consolidated, watered & rammed unless otherwise specified. In black cotton soil, the soil shall be removed for a depth of 60 cm and top 30 cm filling shall be done with sand.

(c) Wherever it is necessary in case of deep trenches, shoring or timbering for such trenches shall have to be provided to avoid collapsing of earth.

(d) **Apron:**

For protection of plinth, an apron as specified in drawing No.RE/Civil/BS-11/95 (Latest version) shall be provided.

**REINFORCED CEMENT CONCRETE WORK: 2.8.4**

(a) R.C.C. of the switching station shall be cast on the controlled concrete technology for M-20 grade conforming to IS:456 (Latest version as indicated in Annexure-1). The design of all R.C.C. work shall be prepared by the contractor and got approved from Engineer well in time.

Test concrete specimen shall be casted at the site of work and tested in accordance with the relevant specification.

(b) If unavoidable due to site conditions, concrete may have to be laid in water as per laid down procedure.

(c) All RCC works shall be finished smooth.

**SUPER STRUCTURES: 2.8.5**

(a) Brick work

Besides following relevant specification, well burnt bricks shall only be used. The brick work shall be laid in ENGLISH BOND. The brick work below plinth shall be done in Cement mortar of ratio 1:4 (1 cement, 4 sand). The brick work above plinth shall be done in cement mortar of ratio 1:6. Curing of the brick work shall be done for a minimum period of fourteen days.

(b) Plastering on inside and outside surface shall be done in Cement mortar of ratio 1:3 and shall have a thickness of 10 mm.

(c) All external surface shall be treated with snowcap over two coats of cement primer of approved quality and all internal surfaces of wall and ceiling shall be white washed with three coats.

**FLOORING: 2.8.6**

(a) Following pattern of the flooring shall be adopted:

(i) **Base concrete** - 100 mm thick cement concrete of ratio 1:4:8 with under layer of 100 mm thick sand filling over well compacted earth.

(ii) **Top layer** - 40 mm thick cement concrete of ratio 1:2:4, laid in panels with glass dividing strips of 25 mm x 3 mm.

Top surface of the flooring shall be finished smooth.

(b) Suitable anti termite treatment, pre and post treatment as approved by the Engineer, shall be provided.

**ROOFING: 2.8.7**

R.C.C. roof, complete in all respects in accordance with RDSO drawing No. ETI/C/0067 (Latest version as indicated in Annexure-1) shall be provided. Water proofing of roof shall be responsibility of the contractor. Type of water proofing treatment if required, will be got approved from the Engineer. The contractor shall ensure at the time of handing over of the building that roofs are leak proof and water tight. The contractor shall also provide C.I. rain water pipes of specified size.

**DOORS, WINDOWS, VENTILATORS: 2.8.8**

Pressed steel doors, windows, ventilators and grills etc. shall be provided in accordance with the drawing No.RE/Civil/S-129/2001(Latest Mod). All steel work shall be painted with two coats of ready mixed paint of approved quality and shade with Red Oxide primer coat.

**BUILDING MATERIALS: 2.8.9**

Building materials if not already specified above, shall be used in accordance with Chapter II, Part-II of this tender document.

**WIRING: 2.8.10**

(a) The contractor shall follow recessed conduit wiring system for internal wiring of the switching station buildings. Stove enameled, jet black, steel seamless conduit pipes of standard diameter, conforming to IS:9537(Part-2)/ (Latest version as indicated in Annexure-1) with latest amendments shall be used. No conduit pipes having a diameter of less than 19 mm shall be used. All conduit accessories like bends, inspection boxes, elbows, draw boxes, junction boxes shall be of threaded type and shall conform to **IS:3837** (Latest version as indicated in Annexure-1) with latest amendments. The conduits shall be recessed in the wall/ceiling.

The conduit of each circuit or section shall be complete before conductors are drawn in. The entire system of conduit after erection shall be tested for mechanical and electrical continuity throughout and permanently connected to earth by means of a special approved type of earthing clamp efficiently fastened to conduit pipe. A G.I. wire of 6/8 SWG and conforming to IS:4826 (Latest version as indicated in Annexure-1) shall be provided along with laying of recessed conduit to facilitate drawing of wires in the conduit.

(b) The wiring shall include circuit wiring and point wiring. The circuit wiring shall include wiring from distribution board upto first switch board along the run of wiring. The point wiring shall include complete wiring of a switch circuit from tapping point on the distribution circuit to the following via the switch.

- (a) Connector in case of exhaust fan point.
- (b) Ceiling rose.
- (c) Socket outlet.
- (d) Lamp holder.

Looping system shall be used for the wiring. Phase or live conductors shall be looped at switch box and neutral conductor can be looped from the light, fan or socket outlet. All switches shall be placed in the live conductor of the circuit. Power/heating wiring shall be kept separate and distinct from lighting and fan wiring. Light and fan circuit shall not have more than ten points of light, fan & 5 Amp socket outlets or a load of 800 watts which ever is less. A power circuit shall be designed for a maximum of two outlets of a load of 1000 watts each. The contractor shall prepare a wiring diagram, indicating clearly in plan, main & distribution board, position of all points with their classification and controls and get it approved from the Engineer.

(c) PVC insulated, single core, multi stranded Aluminium conductor, 660/1100 Volt grade cables conforming to IS:694 (Latest version as indicated in Annexure-1) shall be used for the wiring. The standard sizes shall be as follows.

- (i) 2.5 sq.mm for light/fan point wiring.

- (ii) 4 sq.mm for Power point wiring.
- (iii) 6 sq.mm for connection between main switch and distribution board.

(d) Electrical fittings, plug points and appliances as indicated in following table shall be provided in a switching station. The contractor shall get the locations of the electrical fittings/ appliances approved from Engineer.

**TABLE**

SNO	DESCRIPTION OF ITEM	QUANTITY
1.	5 Amp. 3 pin flush type socket outlet with switch	1 No.
2.	15 Amp. 3 pin flush type socket outlet with switch	2 No.
3.	Fluorescent fitting complete with choke, starter, PF improving capacitor inside the reflector cover and a fluorescent tube	1 No inside the building
4.	Outdoor luminaire fitting suitable for 150 Watt HPSV lamp with all accessories including a 150 Watt HPSV lamp	1 No outside the building
5.	230 AC, 300 mm, 940 RPM exhaust fan.	1 No. in battery room

**MAIN SWITCHGEAR AND SWITCH BOARD: 2.8.11 Main Board**

(a) Main board consisting of main switch and distribution board shall be situated as near as practicable to the termination of service line and shall be easily accessible without use of external aid. Switch boards of adequate sizes as approved by the Engineer shall be made of mild steel and recessed in the wall. Front of the boards shall be fitted with 3 mm thick phenolic-laminated sheet similar to Hyles one. All the metal switchgears and switch boards shall be painted, prior to erection with two coats of approved enamel paint, as required on all sides accessible.

**(b) Main Switch**

Main switch shall be 230 Volt, 32 Amp, metal clad, composite switch fuse unit, single pole with rewirable type fuses and neutral link. It shall conform to IS: 13947 (Part.3) (Latest version as indicated in Annexure-1). It shall have cable entry holes, cover handle interlocking, sealing arrangements and weather proof enclosures.

**(c) Distribution Board**

Distribution board shall be 230 V, 16 Amp. metal clad boards conforming to IS:2675 (Latest version as indicated in Annexure-1) with latest amendments with hinged type metallic cover, cable entry holes and weather proof enclosures. It shall have reusable type fuse units.

(d) Switches shall be 230 V, 5/15 Amp, one-way flush type, piano type switches, conforming to **IS:3854** (Latest version as indicated in Annexure-1) with latest amendments and shall be ISI marked.

Three pin socket outlets shall be 230 Volt, 5/15 Amp, flush type, conforming to **IS:1293** (Latest version as indicated in Annexure-1) with latest amendments and shall be ISI marked.

Ceiling roses shall be 230 V, 5 Amp, 2 pole bakelite ceiling roses, conforming to **IS:371** (Latest version as indicated in Annexure-1) and shall be ISI marked.

**EARTHING: 2.8.12**

Earthing systems including earth electrode in accordance with **IS:3043** (Latest version as indicated in Annexure-1) shall be provided. Loop earthing with G.I. wire of not less than 8 SWG shall be provided for all mountings of the main board and other metal clad switches and distribution boards.

**ELECTRICAL FITTINGS AND APPLIANCES: 2.8.13**

(a) Fluorescent lamp fittings conforming to IS:1777 (Latest version as indicated in Annexure-1) with latest amendments and suitable for 1x40 Watt fluorescent tube shall be provided. The fittings shall be complete with copper wound choke, lamp holders, starter with base, power factor improving capacitor, 40 Watt fluorescent tube etc. The fittings shall be mounted on the walls with suitable mounting arrangements.

**(b) EXHAUST FAN**

The contractor shall provide single phase, 230V, 50 Hz, 6 pole, 940 RPM propeller type exhaust/ventilating fans having a size of 300 mm and with a mounting ring but without regulator and louver shutters. The fan shall conform to **IS:2312** (Latest version as indicated in Anexure-1) and shall be ISI marked.

(c) **OUTDOOR LUMINAIRES**

(i) The contractor shall provide weather proof street light/outdoor luminaire fittings of two piece construction, comprising of cast Aluminium control gear housing and deep drawn stove enameled lamp housing with anodized Aluminium side reflectors, clear acrylic bowl, held by antirust, robust toggle.

The luminaire fitting shall be suitable for a 150 watt HPSV lamp and shall be complete with control gear box with ballast, PF improving capacitor, connector block, fuse cutout, earthing terminal and a 150 watt HPSV lamp.

(ii) **INSTALLATION**

The control gear box, mounted on a teakwood board of appropriate size and shall be installed on wall inside the building at an accessible height and connected to the switch board through a ceiling rose.

The luminaire fitting shall be installed on a pre-erected 3-meter-long medium class G.I. pipe of 50 mm diameter.

The pipe shall be grouted on the outside wall of the building with the help of M.S. clamps such that height of G.I. pipe above the roof of the buildings is not less than 2.5 meters. The fitting shall be mounted with the help of a 25 mm dia G.I. pipe, given a bend of 120 deg. from horizontal plane and MS clamps. Flexible copper wire of suitable size shall be provided to connect the control gear & the fitting. The control gear box and the fitting shall be properly earthed.

**TESTING AND COMMISSIONING: 2.8.14**

On completion, all works including wiring, electrical fittings and appliances shall be tested jointly with the representative of the Engineer in accordance with **IS:732** (Latest version as indicated in Anexure-1) and commissioned.



# **PART – III**

## **PARTICULAR SPECIFICATIONS**



**PART - III**

**PARTICULAR SPECIFICATIONS**

<b>Para No.</b>	<b>Subject</b>
3.1	Introduction
3.2	Location
3.3	Tracks to be wired
3.4	General particulars
3.5	Climatic Conditions
3.6	Rolling stock
3.7	Over dimensional consignments
3.8	Power supply
3.9	L.T. Supply Transformer Stations
3.10	Type of OHE
3.11	Return Conductors
3.12	Pegging plans
3.13	Traction Sub-Stations feeders
3.14	Track circuits
3.15	Labour and materials
3.16	Contractor's office
3.17	Contractor's depot and work trains
3.18	Duration of traffic blocks
3.19	Remote Control Centre
3.20	Addresses
3.21	Quantities
3.22	Technical Data for Design of Protection Scheme



**PART - III**

**PARTICULAR SPECIFICATIONS**

**INTRODUCTION: 3.1**

- (a) This part of the specification is complementary to Part-II of tender papers.
- (b) The section is MANESAR- PATLI – MSIL Yard section of HORC in the states of Haryana.

**LOCATION: 3.2**

**TRACKS TO BE WIRED: 3.3**

- (a) The route and track lengths of the section to be equipped with overhead equipment (High Rise OHE) are as under: -

Section	HRIDC / Division	RKM	TKM
MANESAR -PATLI SECTION	MARUTI YARD	1.82	7.20
MANESAR -PATLI SECTION	HORC Connectivity Line	9.4	10.30

- (b) The tentative schematic electrical sectioning of the tracks to be wired is indicated in the sectioning diagram, which will be furnished by contractor itself and same will be duly approved by HRIDC authorities.

- (b) General Power Supply Diagram shall be supply/prepared by contractor itself.

**GENERAL PARTICULARS: 3.4**

- (a) The soil characteristics of the sections are generally consists of Hard and Normal/Sandy soil. The bearing capacity of soil is likely to be 8000 to 11000 kgf/sqm. The actual bearing capacity shall however, be determined in accordance with Part-II.

**(b) ACCESS TO ROAD**

Road approach available in the section.

**(c) FOOT OVER BRIDGES AND ROAD OVER BRIDGES**

The number of FOBs/ROBs etc in the section is given below: -

FOBs/	-	Nil
ROBs/ Flyovers	-	Nil

**(d) STATIONS**

There are 02 stations & NIL- Halt Stations are in the section.

**(e)**

- (i) Bridges/RUB: 08 +02 =10 Nos
- (ii) Tunnels: Nil

Remodeling works affecting the tracks to be wired will be intimated as and when work is planned /commenced at various stations.

**CLIMATIC CONDITIONS: 3.5**

**(a) TEMPERATURE**

For the overhead equipment, which will be in open space, a minimum temperature of 4°C and a maximum temperature of 45°C are to be considered. The mean temperature will be taken as 35°C.

**(b) RAINFALL**

Rains occur generally from June to October. The average rainfall during the monsoon season June to September is approximately 75 cm annually.

(c) **HUMIDITY**

The maximum relative humidity is nearly 40% to 65%.

(d) **THUNDER STORMS**

The region is under thunder storm during the monsoon season June to October.

(e) **WIND PRESSURE**

In terms of IS: 875-1987. Amendment I, Wind pressure applicable is **155 Kgf/sq.m**. This conforms with the wind pressure adopted by State Electricity Boards for the design of their EHT transmission lines.

**ROLLING STOCK: 3.6**

Electric locomotives with height not exceeding 4.165 m with their pantographs in the locked down position and diesel locomotives 4.42 m (14 Ft & 6 inches) high would run on this section.

**OVER DIMENSIONAL CONSIGNMENTS: 3.7**

The maximum height of over dimensional consignment, which will pass on this section, is 7.1 m with movement restricted specified lines.

**POWER SUPPLY: 3.8**

(a) Electric power will be supplied to the Overhead Equipment through Feed extension from Existing Patli station of NR railway for this section.

(b) **SWITCHING STATIONS -**

Tentative number of sectioning and sub - sectioning stations are as under:

- |                             |   |                                              |
|-----------------------------|---|----------------------------------------------|
| (i) Feeding Post/TSS        | - | NIL                                          |
| (ii) Sectioning post        | - | 01 No (with CB arrangement) at Patti station |
| (iii) Sub - sectioning post | - | NIL                                          |

**L.T. SUPPLY TRANSFORMER STATIONS: 3.9**

Auxiliary Transformers will be installed for giving power supply to color light signaling, stations & switching station. In single line sections 2 No auxiliary transformer will be provided in this section, whereas 02 CLS Panel will be provided at station.

**TYPE OF OHE: 3.10**

The overhead equipment used will normally be of regulated type **HIGH RISE OHE** with a maximum span of 54 meters and pre-sag of 50mm.

**RETURN CONDUCTORS: 3.11**

No return conductor and Booster Transformer will be provided in the section. However, if any change in the plan takes place, particular of the section and actual numbers of Booster Transformer stations would be informed as soon as possible.

**PEGGING PLANS: 3.12**

The pegging plan will be furnished by the contractor.

**TRACTION SUB-STATION FEEDERS: 3.13**

It may be required to provide 25 KV feeders from sub-station to the feeding point which will be finalized at design approval stage.

**TRACK CIRCUITS: 3.14**

No double rail track circuits are envisaged at present. The station area will be single rail track circuited.

**LABOUR & MATERIALS: 3.15**

Unskilled labor is available almost all over the section while skilled labor would be available generally at the main towns in the section.

**CONTRACTOR'S OFFICE: 3.16**

It is obligatory on the part of the contractor shall establish an office near to the Head Quarters of Chief Project Manager, HRIDC Gurugram for planning, design and for expeditious finalisation of particular designs and working drawings at his own cost. The office should be headed by a qualified Engineer, whose credentials shall be approved by the Engineer. In addition, the contractor will have to establish field construction office at convenient locations for co-ordination and progressing of field works.

**CONTRACTOR'S DEPOT & WORK TRAINS: 3.17**

The contractor should arrange suitable space at his cost to set up one main depot in the Group. The location will also to be finalized by contractor. Work train (if required) should be arranged by contractor at his own cost.

**DURATION OF TRAFFIC BLOCKS: 3.18**

(a) Track occupation may be granted at any time during day or night to suit convenience of traffic operations and will ordinarily be granted on one track at a time over a distance covered by one or two consecutive block sections. Work trains will normally be allowed to take advantage of block shadows. Normally, the total durations of block on any section will be max of 3 to 4 hours in a day for all the tracks in the section taken together, the total of blocks on any track being limited to 2 or 3 hours in a day. Block provided may be utilized for one or more work trains or track lorries or ladder trolleys to suit convenience of work.

**REMOTE CONTROL CENTRE : 3.19**

The traction Sub-station and SP/SSP proposed shall remotely control from the Remote Control Centre at TPC control of Delhi area.

**ADDRESSES: 3.20**

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 Project Manager  
HRIDC  
Chandigarh- 160017

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

(b) After award of contract.  
The Chief Project Manager  
HRIDC,  
Gurugram -122003

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

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

The DGM/Electrical  
HRIDC,  
Gurugram- 122003

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

(iv) 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 226001.

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

The DGM/Electrical  
HRIDC  
Gurugram- 122003

OR officers nominated by him.

**QUANTITIES APPROXIMATE: 3.21**

Schedule-1, Section-1 to Section-12 in Form-5 gives the approximate quantities of various items of OHE work.

**TECHNICAL DATA FOR DESIGN OF PROTECTION SCHEME: 3.22**

The technical data required for the design of the protection scheme is given as below:

- (a) The short circuit level on the **66 kV** side of Traction sub-station will be intimated later after it is obtained from SEB authorities. The maximum short circuit current for a fault on the 25 kV Bus at TSS will also be intimated later.
- (b) The approximate value of the impedance of Traction overhead equipment is indicated below: -

	Excluding return Conductor and BT (Ohms/km)	Including return conductor and BT (Ohms/Km)
Single Track	5.16 / 70	.75 / 70
Double Track	-----	-----

(c) **Phase angle.**

The normal phase angle of the load would be about 40 deg.

(d) **General supply diagram.**

The general supply diagram showing the arrangements for feeding the traction overhead equipment with 25 kV single phases AC supply shall be supply/prepared by contractor.



# **PART- IV**

## **ANNEXURES**

**PART IV****ANNEXURES**

<b>ANNEXURE No.</b>	<b>SUBJECT</b>	<b>Page No</b>	
		<b>From</b>	<b>To</b>
1	(a) List of Standard Drawings for OHE, TSS & SCADA.	4002	4015
	(b) List of Standard Specifications for OHE, TSS & SCADA.	4016	4018
	(c) List of IS Specifications for OHE, TSS & SCADA.	4019	4020
2	Schedule of Quantities.	4021	--
3	Requirement of spares.(Deleted)	4021	--
4	List of materials to be supplied by the Engineer to the Contractor	4022	--
5A	List of tools and plant for Maintenance For OHE (Deleted).	4023	--
5B	Technical Data for Equipment, Components & Materials to be supplied by the tenderer for TSS.	4024	4026
5C	List of Tools and Plants required for Maintenance of SCADA.	4027	--
6	Unit quantities of finished wires and conductors for various items of work if the said items Under Railway Scope of Supply.	4028	4030
7	List of bridges on which traction structures will be located.	4031	--
8	List of TSS, SP, SSP & RTUs.	4032	--



**ANNEXURE - 1****LIST OF STANDARD DRAWINGS AND SPECIFICATIONS**

This Annexure contains reference to drawing numbers, charts, Schedules, Specifications and other data referred to in various paragraphs of this Tender Paper.

All references to drawings, charts, schedules, specifications, IS etc. given in this Annexure or elsewhere in the tender document shall be taken to be the latest versions including all amendments. All other items not covered under the Drawing/Specification shall be referred to as per relevant IS and Railway practice in force.

The Drawing and RDSO specification can be purchased from the office of CAO/CORE, Allahabad or TI Directorate of RDSO, Lucknow on payment basis.

For drawings of fittings/equipments See Form-7: Part V.

**(A) LIST OF STANDARD DRAWINGS FOR "OHE"**

Sl. No	Brief Description	Drawing		Mod. No.
		Series	Number	
1	2	3	4	5
1.	Extra allowance for setting of structures on curves (1676 mm Broad gauge)	ETI/OHE/G	00111 Sh-1	C
2.	Standard setting of structures in the vicinity of signals (broad gauge)	-do-	00112	D
3.	Typical design of side bearing foundation.	-do-	00131	-
4.	Typical design of cantilever mast.	RE/33/G	00141 Sh.3	-
5.	Standard drilling schedule of OHE masts 9.5 m long RSJ and BFB	ETI/OHE/G	00144 Sh.3	C
6.	Span and stagger chart for (conventional OHE, Cad. Cu catenary & Cu cont. wire) wind pressure 75, 112.5 & 150kgf/m <sup>2</sup> .	ETI/OHE/G	00202	-
7.	Employment schedule for Cantilever mast Regulated OHE without return conductor and without Earth wire (WP- 112.5 kef/m <sup>2</sup> (Cd- 65/Cu, Cont. 107/Cu)	ETI/OHE/G	00153 Sh.1	F
8.	Employment schedule for Cantilever mast Regulated OHE without return conductor and with Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu, Cont. 107/Cu)	ETI/OHE/G	00153 Sh.2	F
9.	Employment schedule for Cantilever masts Regulated OHE with return conductor and without Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu Cont. 107/Cu)	-do-	00153 Sh.3	F
10.	Employment schedule for Cantilever masts Regulated OHE with return conductor and with Earth wire (WP- 112.5 kgf/m <sup>2</sup> (Cd- 65/Cu, Cont. 107/Cu)	-do-	00153 Sh.4	E
11.	Employment schedule for Cantilever masts unregulated OHE without return conductor and without Earth wire (WP- 112.5 kgf/m <sup>2</sup> at 35°C and 28kgf/m <sup>2</sup> at 4°C (Cat- 65/Cu, Cont. 107/Cu)	-do-	00154	D
12.	Employment schedule of bracket tubes Conventional OHE (Cad Cu Caty & Cu contact wire 1000 kgf tension each) WP-75 Kg/ m <sup>2</sup>	ETI/OHE/G	00158 sh.1 of 3	-



1	2	3	4	5
13.	Employment schedule of bracket tubes Regulated Conventional OHE (Cad. Cu Cat & Cu contact wire 1000 kgf tension in each) WP-112.5 Kg/ m <sup>2</sup>	ETI/OHE/G	00158 sh.2 of 3	-
14.	Employment schedule of bracket tubes Regulated Conventional OHE (Cad Cu Caty & Cu contact wire 1000 kgf tension in each) WP-150 Kg/ m <sup>2</sup>	ETI/OHE/G	00158 sh.3 of 3	-
15.	Dropper schedule for uninsulated Overlap spans	-do	00169	A
16.	Dropper schedule for insulated Overlap spans	-do	00170	A
17.	Dropper schedule for conventional regulated OHE. With Zero presag (1400/1400)	-do	00177	A
18.	Adjustment chart of Regulating equipment 3 Pulley Type (3:1 ratio)	-do	00195	A
19.	Schematic arrangement of regulated OHE	-do	02101	A
20.	Schematic arrangement of uninsulated overlap (3 & 4 span overlaps)	-do	02121 Sh.4	A
21.	Schematic arrangement of insulated overlap	ETI/OHE/G	02131 Sh.3	A
22.	Standard termination of tramway type OHE (Regulated) with Pulley type regulating equipment (3:1 ratio).	ETI/OHE/G	04212	B
23.	General distribution of droppers	ETI/OHE/G	00161	-
24.	Outline of Pantograph (Broad gauge and metre gauge).	RE/33/G	00181	A
25.	General formation of single track in Embankments and cutting (Broad gauge.)	RE/33/G	01101 Sh.1	A
26.	General formation of double track in embankments and cutting (Broad gauge).	-do-	01102 Sh.1	A
27.	General formation of multiple tracks (1676 mm gauge).	-do-	01103 Sh.1	A
28.	Standard anchor arrangement	-do-	01401	E
29.	Anchor arrangement with dwarf mast.	ETI/OHE/G	01402	B
30.	Schedule of anchor block for B.G. track.	-do-	01403 Sh.1	E
31.	Schedule of anchor block for B.G. track.	-do-	01403 Sh.2	D
32.	Schedule of anchor block for B.G. track (Black cotton soil)	-do-	01403 Sh.3	D
33.	Standard guide tube arrangement on a mast and structures.	ETI/OHE/G	01505	-
34.	Trapezoidal counter weight arrangement on OHE structures.	ETI/OHE/G	01502	-
35.	Arrangement of 3KV & 25 KV Pedestal Insulator supports on OHE masts and portals.	-do-	01601	-
36.	Standard arrangements for mounting of number plate on OHE Structures.	ETI/OHE/G	01701	A
37.	Schematic arrangement of regulated overhead equipment.	-do-	02101	A
38.	Typical arrangements of OHE on cantilever masts for double track section.	-do-	02102	-
39.	Typical arrangement for fixing of bracket assembly on 9.5 m mast and Structure to suit raising of tracks (in future)	-do	02102 Sh.3	-
40.	Mast on platforms (Metre Gauge)	RE/33/G	02104 Sh.2	A
41.	Details of bracket arrangement on tangent and	ETI/OHE/G	02106 Sh.1	A

	curved tracks			
--	---------------	--	--	--

1	2	3	4	5
42.	Details of bracket arrangement for OHE	-do-	02106 Sh.3	C
43.	Single bracket assembly on Structures and dropped arms.	RE/33/G	02107	D
44.	Box type cantilever Arrangement.	ETI/OHE/G	02108	A
45.	Arrangement at anticreep.	TI/DRG/OHE/ GENL/RDSO/	00001/12/0	0
46.	Standard cantilever arrangement for boom anchor anticreep location.	ETI/OHE/G	02113	-
47.	Schematic arrangement of uninsulated over Lap (type-I) (3 & 4 Span overlaps)	RE/33/G	02121 Sh.1	F
48.	Schematic arrangement of insulated overlap.	ETI/OHE/G	02131 Sh.1	
49.	General arrangement of regulated OHE at turn-outs (overlap & crossed type).	ETI/OHE/G	02141	C
50.	General arrangement of regulated OHE at cross over(overlap & crossed type).	-do	02151	-
51.	Arrangement of neutral section	-do-	02161 Sh.1	C
52.	Arrangement of neutral section assembly (PTFE Type) at SWS.	-do	02162	-
53.	Arrangement of short neutral section.	-do	02161 Sh.2	-
54.	Schematic arrangement of unregulated overhead equipment.	-do	03101	-
55.	Standard termination of OHE (Regulated & un-regulated).	ETI/OHE/G	03121 Pt 1 of 3	E
56.	-do-	-do	03121 Pt 2 of 3	E
57.	-do-	-do	03121 Pt 3 of 3	E
58.	General arrangement of Unregulated OHE at turnouts (crossed & overlap type).	-do	03151	-
59.	General arrangement of unregulated OHE at crossovers and diamond crossings (overlap and crossed type).	-do	03152 Sh.1	-
60.	General arrangement of unregulated OHE at diamond crossing.	-do	03152 Sh.2	-
61.	General arrangement of pull off	-do-	03301	A
62.	General arrangement of Head span	-do	03201	-
63.	In span jumper connection between catenary & contact wire.	-do-	05101	-
64.	Continuity jumper connection at un-insulated overlap turnouts and cross overs	-do	05102	C
65.	Anti- theft jumper	-do	05107	A
66.	Connections at turnouts	-do	05103	B
67.	Potential equalizer connection at insulated overlap and neutral section	-do-	05104	-
68.	Connections at diamond crossing.	-do-	05106	A
69.	General arrangement of connections to OHE by copper cross feeder (150).	-do	05121 Sh.1	C
70.	General arrangement of connections at switching station on double track section by copper cross feeder	ETI/OHE/G	05122 Sh.1	C
71.	General arrangement of connections at switching station on multiple track section by copper cross feeder	-do-	05123 Sh.1	C
72.	Suspension of 25kV feeder(Spider)on 25KV OHE masts	ETI/OHE/G	05143	B

1	2	3	4	5
73.	Termination of feeder, return conductor & return feeder(copper & aluminum).	ETI/OHE/G	05145-1	A
74.	Arrangement of suspension of double spider 25 KV feeder and return feeder between sub-station and feeding station	RE/33/G	05152	C
75.	Assembly of section insulators	RE/33/G	05181	C
76.	General arrangement of earth wire on OHE mast	ETI/OHE/G	05201	A
77.	General arrangement of earth wire on OHE mast	ETI/OHE/G	05201-1	-
78.	Arrangement of transverse bonds	ETI/OHE/G	05251	A
79.	Connection of return conductor to track	-do-	05306	F
80.	Suspension arrangement of aluminum return conductor (spider) on traction Structures	-do-	05307	B
81.	Suspension of return conductor (spider) from boom of Structures (with clevis type disc insulators)	-do-	05312	A
82.	Connections between OHE and aluminum return conductor at booster stations	ETI/OHE/G	05413	B
83.	Mounting of 25kv Isolators on OHE Structures (General arrangement)	ETI/OHE/G	05513 Sh.1	A
84.	Details of small part steel work for supporting 25kv Isolator on new T.T.C. boom	-do-	05513 Sh.2	A
85.	Connection from Isolator to OHE	-do-	05516	A
86.	Characteristics of conductors/ bus-bar for 25kv AC traction	-do-	05600	A
87.	Mounting arrangement of Auxiliary Transformer on OHE masts	ETI/OHE/G	05522	-
88.	Employment Schedule for Cantilever Mast regulated OHE without return conductor & without earthwire (WP- 75 kgf/ m <sup>2</sup> .) (Cat. 65/Cu & Cont. 107/Cu)	ETI/C	0702 (Sh.1)	B
89.	Employment Schedule for Cantilever Mast regulated OHE with earth wire but without return conductor (WP- 75 kgf/ m <sup>2</sup> ) (Caty. 65/Cu & Cont. 107/Cu)	-do-	0702 (Sh.2)	B
90.	Employment Schedule for Cantilever Mast regulated OHE with return conductor but without earth wire (WP- 75 kgf/ m <sup>2</sup> ) (Caty. 65/Cu & Cont. 107/Cu)	-do-	0702 (Sh.3)	B
91.	Employment Schedule for Cantilever Mast regulated OHE with return conductor with earth wire (WP- 75 kgf/ m <sup>2</sup> ) (Caty. 65/Cu & Cont. 107/Cu)	-do-	0702 (Sh.4)	B
92.	Employment Schedule for Tramway type regulated OHE RC & EW (WP- 75 kgf/m <sup>2</sup> )	-do-	0704	B
93.	Employment Schedule for 8"x 8"x35 lbs BFB (9.5 M. long)(WP-112.5 kgf/m <sup>2</sup> Caty. 65/Cu & Cont. 107/Cu.	-do-	0708	B
94.	Employment Schedule for OHE mast (9.5m) overlap central location with 3.0 m implantation WP-75 kgf/m <sup>2</sup> Caty. 65/Cu & Cont. 107/Cu.	-do-	0709	A
95.	Employment schedule for OHE mast (9.5M) overlap central with 3.0 M implantation WP- 112.5 kgf/m <sup>2</sup> (Caty 65/cu and Cont.107/Cu)	ETI/C	0710	A



1	2	3	4	5
96	Employment Schedule for OHE mast (9.5m) overlap inter with 3.0 m implantation. WP-75 kgf/ m <sup>2</sup> Caty. 65/Cu & Cont. 107/Cu.	-do-	0711	A
97	Employment schedule for OHE mast (9.5M) overlap inter with 3.0 M implantations. WP-112.5kgf/m <sup>2</sup> Caty.65/Cu and cont.107/Cu	-do-	0712	A
98	Employment Schedule for 9.5 m 200x200x49.9 kg mast WP-75 kgf/m <sup>2</sup> (Caty. 65/Cu & Cont. 107/Cu.)	-do-	0713	B
99.	Employment schedule for 9.5 m long 200x200x49.9 kg mast WP-112.5 Kgf/ m <sup>2</sup> (Caty. 65/Cu and Cont.107/Cu)	-do-	0714	B
100	Employment Schedule for OHE mast (9.5m) WP-75 kgf/ m <sup>2</sup> overlap Anchor location with 3.0 m implantation (Copper OHE)	-do-	0715	A
101	Employment schedule for OHE mast (9.5M) WP 112.5 kgf/ m <sup>2</sup> overlap anchor location with 3.0 M implantations. (Copper OHE)	-do-	0716	A
102	Employment Schedule for pre-stressed span concrete mast (PC 42) - 9.5 M long conventional OHE, normal location (WP-150),112.5 &75kgf/ m <sup>2</sup> )	ETI/C	0725	A
103	STD portals (N,O,P,R,G & Double BFB types)	-do-	0064	-
104	Volume chart and equivalent chart of foundations (Side bearing, Side gravity and W.B.C.)	TI/DRG/CIV/ FND/RDSO	00001/04/0 SH-1	B
105	Volume chart and equivalent chart of foundations (Side bearing, Side gravity and W.B.C.)	TI/CIV/FND/ RDSO	00001/12/0 SH-1	A
106	Volume chart and equivalent chart of foundations (NG type)	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-2	B
107	Volume chart and equivalent chart of foundations (NG type)	TI/CIV/FND/ RDSO	00001/12/0 SH-2	A
108	Volume and equivalent chart of foundations for Dry black cotton soil (NBC type) (For 16500 & 11000kgf/ m <sup>2</sup> )	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-3	B
109	Volume and equivalent chart of foundations for Dry black cotton soil (NBC type) (For 16500 & 11000kgf/ m <sup>2</sup> )	TI/CIV/FND/ RDSO	00001/12/0 SH-3	A
110	Volume chart and equivalent chart of New pure gravity foundations (500 mm exposed)	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-4	B
111	Volume chart and equivalent chart of New pure gravity foundations (500 mm exposed)	TI/CIV/FND/ RDSO	00001/12/0 SH-4	A
112	Volume and equivalent chart of New foundations for Dry black cotton soil only (8000 kg/m <sup>2</sup> )(NBC type) 2.5 M depth	TI/DRG/CIV/ FND/RDSO/	00001/04/0 SH-5	B
113	Volume and equivalent chart of foundations for Dry black cotton soil only (8000 kg/m <sup>2</sup> ) NBC type 2.5 m depth	TI/CIV/FND/ RDSO	00001/12/0 SH-5	A
114	Volume and equivalent chart of foundations (For 8000 kg/m <sup>2</sup> Direct load )	ETI/C	0058 Sh.6	B
115	Special BFB portal for 5 tracks (General arrangement)	-do-	0026 Sh.1	C
116	Protective screen of foot-over bridge and road over-bridge.	-do-	0068	H



1	2	3	4	5
117	Chart for portal foundation	-do-	0005/68	
118	Muff for OHE structures	-do-	0007/68	E
119	Structures muff for sand cored foundations	-do-	0012/69	E
120	9.5 m Standard traction mast (fabricated 'K' series)	-do-	0018-2	D
121	Remote Control Cubicle at Stn, Foundation, RCC slab, Building plant & Steel door	-do-	0067	B
122	9.5 m long standard traction mast (fabricated with bottom plates 'B' series)	ETI/C	0071	E
123	Details of OHE foundation in soft rock (Bearing capacity 45,000 Kgf/m <sup>2</sup> ).	ETI/C	0059	C
123	Details of OHE foundation in Hard rock (Bearing capacity 90,000 Kgf/m <sup>2</sup> ).	ETI/C	0060	D
124	Details of foundation for fencing upright	-do-	0032	B
125	Employment schedule for switching and booster station main masts	ETI/C	0185	B
126	Drilling schedule for S-1 mast	ETI/C	0030	F
127	Drilling schedule for S-2 mast	-do-	0031	D
128	Drilling schedule for S-3 mast (length 11.4 m)	-do-	0180	C
129	Drilling schedule for 8" x 6" x 35 lbs. RSJ mast 8.0 m long for booster transformer station Type S-4	-do-	0036	E
130	Drilling schedule for S-5 mast (11.4m long)	-do-	0042	E
131	Drilling schedule for S-6 mast (length 12.4m)	-do-	0181	C
132	Drilling schedule for S-7 mast (length 12.4m)	-do-	0182	C
133	Drilling schedule for S-8 mast (length 12.4m)	-do-	0183	C
134	Drilling schedule for S-9 mast (length 12.4m)	-do-	0184	C
135	General arrangement & details of fencing panels & gate for switching station	-do-	0186 Sh.1	E
136	Details of fencing uprights and anti-climbing device for switching station	-do-	0186 Sh.2	E
137	S-100 fabricated mast for mounting LT supply transformer and drop out fuse switch at switching station	-do-	0043	B
138	S-101 details of mast for supporting Isolator inside switching station	ETI/C	0044	A
139	Details of anchor beam or SP, SSP, & FP	-do-	0033	D
140	Details of small part steel for switching station	ETI/C	0034 Sh.1	K
141	Details of bracing for switching & B.T. masts	ETI/C	0034 Sh.2	B
142	Details of small parts steel of out rigger for switching stations and booster transformer stations	ETI/C	0037	C
143	Details of small parts steel for booster transformer stations	ETI/C	0040	E
144	Details of pre-cast cable trench for switching station	-do-	0038	E
145	Standard 'R' type portal rod laced general arrangement	-do-	0011/69 Sh.1	C
146	'G' type portal special upright and end piece	-do-	0056	C
147	Short bored pile foundation for traction mast (permissible BM & volume)	-do-	0062	B
148	Chart for portal foundations in dry black cotton	-do-	0063	B



	soil safe bearing capacity 16500 Kg/ M <sup>2</sup>			
--	-----------------------------------------------------	--	--	--

1	2	3	4	5
149	Dwarf mast foundation on wet & dry black cotton soil	CORE/ALD/OHE/SK/C	02	-
150	Typical design of new pure gravity foundation.	ETI/SK/C	131	A
151	Typical design of side gravity foundation (Soil pressure=8,000 Kg/ M <sup>2</sup> )	-do-	142	A
152	Rock Anchor for B.G. Track. –	ETI/SK/C	208	-
153	Bracket fitting for PSC Mast (cap 4200 Kgm) general arrangement and SPS details	ETI/SK/C	214 Sh.1of 2	E
154	SPS details for Earth wire clamp on PSC mast	ETI/SK/C	214 Sh. 2 of 2	A
155	Special arrangement of OHE under over line structure	ETI/OHE/SK	529	--
156	Earthing and bonding of PSC mast.	ETI/OHE/SK	537 Sh.1 of 2	D
157	Typical Earthing arrangement in SPUN PSC Mast with 18mm dia rod.	-do-	537 Sh.2 of 2	B
158	Arrangement of overlap	ETI/OHE/SK	566	-
159	Catenary dropper assembly	ETI/OHE/P	1190	B
160	Parallel clamp (20/20)	ETI/OHE/P	1550	E
161	Standard guide tube assembly.	ETI/OHE/P	5060-2	C
161 A	Counter weight assembly for Regulating Equipment (3:1 Ratio)	ETI/OHE/P	5090-5	E
161 B	Trapezoidal weight assembly for Regulating Equipment (3:1 Ratio)	TI/DRG/OHE/ATD/RDSO/	00004/00/2	-
161 C	Trapezoidal weight assembly	ETI/OHE/P/	5090-1	G
161 D	Counter weight assembly	ETI/OHE/P/	5090	F
162	Standard anti-wind clamp	-do-	2550-1/2	L
163	Multiple cantilever cross arm assembly.	RE/33/P	3120	H
164	Anchor fitting assembly on rolled sections	ETI/OHE/P	3230	C
165	Anchor fitting assembly on 'K' series, TCC masts and 'P' type portal upright.	-do-	3240	D
166	Anchor assembly on 'N' and 'O' type portal upright	-do-	3250	D
167	Structure bonds	-do-	7000	F
168	Earthing station	-do-	7020	B
169	Longitudinal rail bond	-do-	7030	F
170	Short super mast assembly	ETI/C/P	8010	G
171	Long super mast assembly	-do-	8020	C
172	Bracket attachment assembly on portal upright (N,O,R,P,G &BFB Type)	-do-	8030	B
173	Super mast assembly on portals	-do-	8050	C
174	Medium super mast assembly	ETI/OHE/P	8060	C
175	Compensating plate	-do-	5191-1/2	D
176	Suspension clamp	RE/33/P	1160	J
177	Double suspension clamp	-do-	1170	K
178	Double suspension lock plate.	-do-	1172	C
179	Catenary splice (65)	ETI/OHE/P	1090	-
180	Typical location & schematic connection diagram for a three interrupter switching station	ETI/PSI	003	C
181	Typical general arrangement of a three interrupter switching station	-do-	004	F
182	Typical location plan & general arrangement for sectioning & paralleling station	-do-	005	F

183	Typical location plan and general arrangement for a feeding station	-do	006	E
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
184	Typical general arrangement at a Booster transformer station (with 4 cross feeder) Type III	-do-	013	B
185	General arrangement of 280 KVA Booster Transformer station Type III (with 4 cross feeder)	-do-	018	A
186	Typical general arrangement at a booster transformer station (without cross feeder) Type-I	ETI/PSI	011	C
187	Typical number plate for Auxiliary Transformer	ETI/PSI/P	7525	-
188	Typical fencing and anti-climbing arrangement at switching stations	ETI/PSI	104	E
189	Typical earthing layout of sub-sectioning and paralleling station	-do-	201	B
190	Typical earthing layout of a sectioning and paralleling station	-do-	202	B
191	Typical earthing layout of a feeding station	-do-	203	B
192	Earthing details for interrupter L.T. supply transformer 25 KV Lightning Arrestors P.T. Type-I (S-100 masts, S-101 mast, fencing upright and main mast)	-do-	204	C
193	Typical earthing layout at a booster transformer stations	-do-	211-1	A
194	Typical cable run layout of a sub-sectioning & paralleling station	-do-	301	C
195	Typical cable run layout of a sectioning and paralleling station	-do-	302	C
196	Typical cable run layout of a feeding station	-do-	303	B
197	Typical earthing layout at a booster transformer station (with 4 cross feeder for Type III,IV and V	ETI/PSI	212	B
198	Typical drawing for a terminal board	-do-	501	C
199	36 mm Aluminum Bus terminal for 25kv Isolator (Rigid type)	ETI/PSI/P	6480	C
200	36 mm Aluminum Bus splices	-do-	6490	B
201	36 mm Aluminum Bus Tee connector	-do-	6500	C
202	36 mm Aluminum Bus Tee terminal	-do-	6510	D
203	36/15 mm Top connector	-do-	6520	B
204	36mm Aluminum flexible bus splice	-do-	6550	B
205	36 mm Aluminum bus splice cum tee connector	-do-	6560	B
206	Typical number plate for interrupter and double pole isolator	-do-	7520	B
207	Typical number plate for potential transformer Type	-do-	7521	B
208	Typical number plate for booster transformer	-do-	7522	B
209	Caution plate 25 KV AC	ETI/OHE/P	7531	C
210	General Caution notice at entrance to railway Station (Hindi & English)	RE/33/P	7551	C
211	Typical details of pressed steel door, window and ventilator	RE/Civil/S	129/ 2001	R2
212	Bolted base connection for portals located in drains	ETI/C	0010	C
213	Details of base plate for mast on drains in station yards	-do-	0002/68	A
214	Height gauge for level crossings (for clear span upto 7.3 mtr) details of structure and foundation	TI/DRG/CIV/HGAUGE/RD SO	00001/05/0	--

215	Height gauge for level crossings (for clear span above 7.3 mtr up to 12.2 mtr) details of structure and foundation	TI/DRG/CIV/ HGAUGE/RD SO	00002/05/0	--
216	Standard plan details of Height gauge for span 7.3 M to 10.0 M with rail Type	RE/CIVIL/S	146/2008	R3

1	2	3	4	5
217	Arrangement for false catenary under over line structure	ETI/OHE/SK	446	--
218	Typical arrangement of OHE with insulated copper catenary under over line structure	ETI/OHE/SK	570	--
218A	Anti Climbing Arrangement	TI/SK/OHE/AN TIMON/RDSO	00001/08/0	--
218B	Anti Climbing Arrangement	TI/SK/OHE/AN TIMON/RDSO	00001/09/0	--
218C	GSSW Assembly	TI/DRG/OHE/G SSW	0002/09/0	--
218D	18 mm Lug (Forged) (Compression type)	TI/DRG/OHE/G TBLUG/RDSO	00001/04/0	--

**(B) LIST OF STANDARD DRAWINGS FOR TRAMWAY TYPE OHE (REGULATED)**

1	2	3	4	5
219	Span and stagger chart for Tramway type OHE (Regulated)	ETI/OHE/G	04201	-
220	Drilling schedule of OHE mast 8.5m & 9m ling RSJ and BFB for Tramway OHE (Regulated) respectively.	ETI/OHE/G	04202 Sh.1 Sh.2	C C
221	Schematic arrangement of tramway type OHE (regulated).	-do-	04203	C
222	Arrangement of bracket assembly for Tramway Type OHE (regulated)	-do-	04204	B
223	Arrangement of anti-creep for Tramway Type OHE (Regulated)	ETI/OHE/G	04205	B
224	Arrangement of anticreep (alternative arrangement) for Tramway OHE (Regulated)	-do-	04206	B
225	Arrangement of section Insulator for Tramway Type OHE (Regulated)	-do-	04207 Sh.1	B
226	Small parts steel for supporting section insulator assembly for (regulated Tramway Type OHE)	-do-	04207 Sh.2	B
227	General arrangement of turnouts for Tramway type OHE (Regulated)	ETI/OHE/G	04208	-
228	Adjustment chart for Tramway type OHE (Regulated)	ETI/OHE/G	04209	-
229	Bridle wire clamp (6 mm) with two bolts	ETI/OHE/P	1070-1	B
230	Large suspension clamp 20mm (with Armour rod)	ETI/OHE/P	1580 Sh-2	-
231	Hook Bracket	ETI/OHE/P	2380	C
232	BFB Steady arm assembly for Tramway OHE (Regulated)	ETI/OHE/P	2540-1	-
233	Anti wind clamp for tramway OHE (Regulated)	-do-	2550-3	E
234	Counter weight assembly (light)	ETI/OHE/P	5090-3	I
235	Counter weight assembly	-do-	5090-6	D
236	Employment schedule for tramway type regulated OHE without R.C. and E.W. (W.P.112.5 kgf/sq.m)	ETI/C	0705	B
237	Protective screen at FOB/ROBs	ETI/C	0068	H

**(C) STANDARD TYPICAL AND PARTICULAR DRAWINGS FOR TSS AND SHUNT CAPACITOR BANKS.**

1	2	3	4	5
238	Typical layout of Remote Control cubicle at a switching station	ETI/PSI	0010	E
239	Typical layout of 132 /27kv Traction sub-station (Type-I)	TI/DRG/PSI/TSSLO/R DSO/	00001/01	0
240	Typical layout of 132 /27kv Traction sub-station (Type-II)	TI/DRG/PSI/TSSLO/R DSO/	00002/01/0	-
241	Typical layout of 132 /27kv Traction sub-station (Type-III)	TI/DRG/PSI/TSSLO/R DSO/	00003/02	0
242	Typical layout of 132/27kv Traction Sub-station (Type IV) (with outgoing feeders and metering Facilities)	TI/DRG/PSI/TSSLO/R DSO/	00004/02	0
243	Typical layout of 132/27kv Traction Sub-station (Type V)	TI/DRG/PSI/TSSLO/R DSO/	00005/02	0
244	Typical layout of 132/27kV traction sub-station (Type VI)	TI/DRG/PSI/TSSLO/R DSO/	00006/02	0
245	Typical layout of 132/27kV traction sub-station (Type VII)	TI/DRG/PSI/TSSLO/R DSO/	00007/02	0
246	Typical layout of 132/27kV traction sub-station (Type-VIII)	TI/DRG/PSI/TSSLO/R DSO/	000008/02	-
247	Typical layout of 132/27kV traction sub station with single transformer (Type -IX)	TI/DRG/PSI/TSSLO/R DSO/	00009/02	0
248	Typical layout of 132/27kv Traction Sub-station with 132kv Switching Station (Type x)	TI/DRG/PSI/TSSLO/R DSO/	00010/02	0
249	Typical layout of Control Room at traction sub-station.	TI/DRG/PSI/CPROOM /RDSO/	00001/01	0
250	Standard plan of control room at traction sub-station (General arrangement and RCC details)	RE/Civil/	S-144/06	0
251	Typical return current connection to buried rail at 132/25kv Traction sub-station	ETI/PSI	0212-1	Nil
252	Typical general arrangement of earth screen wire termination at Traction substation	ETI/PSI	0225	C
253	Typical termination arrangement for strung bus "Spider" (AAC) conductor at TSS.	ETI/PSI	0226	B
254	General arrangement & terminal connection for 25kV PT Type-II at TSS	ETI/PSI	0227	A
255	General arrangement and terminal connection for 25kV Potential Transformer at TSS (220kV)	ETI/PSI	0227-1	Nil
256	Typical layout of 220/27kV traction sub station (Type -I)	ETI/PSI	0240-1	Nil
257	Typical return current connection to buried rail at 220/25kV TSS.	ETI/PSI	0242	A
258	Typical termination arrangement for strung bus (ZEBRA ACSR) conductor at TSS (220kV)	ETI/PSI	0243	A
259	Typical general arrangement of earth screen wire termination at 220/25kV traction sub-station.	ETI/PSI	0244	Nil
260	Mounting arrangement of 100KVA 25kv/240V LT supply transformer at TSS	ETI/PSI	0312	B
261	25kv D.O. Fuse switch assembly	ETI/PSI	032	D
262	Typical fencing layout at traction Sub-station (Details of fencing panel, door, anticlimbing device etc.)	ETI/PSI	121	F
263	Typical arrangement of an earth electrode	ETI/PSI	222-1	Nil

264	Typical earthing, cable trench & foundation layout of 132/25kv TSS	ETI/PSI	224	E
265	Typical earthing arrangement for equipment/ structure at TSS	ETI/PSI	228	A

1	2	3	4	5
266	Typical earthing cable trench and foundation layout of 132/25kV traction sub-station with Shunt Capacitor bay	ETI/PSI	229	Nil
267	Typical details of cable run at a two transformer TSS	ETI/PSI	323	E
268	Part Plan for Details of position of feeder Bus coupling interrupter at TSS	ETI/PSI/SK	272	Nil
269	Terminal connector for 220kV equipments (Typical drawing)	ETI/PSI/SK	324	Nil
270	Typical schematic diagram of protection for double Transformer traction sub station	ETI/PSI	024-1	Nil
271	Typical layout for 25kv Shunt capacitor with series reactor to be installed at 132/25kv TSS	ETI/PSI	0223	E
272	High speed auto reclosing scheme for feeder circuit breaker at 25kV A.C TSS	ETI/PSI	0231-1	A
273	Typical details of cable run at a two transformer TSS with Shunt Capacitor	ETI/PSI	325	Nil
274	Typical details of cable run at two transformers Traction Sub-station with Shunt capacitor (220kV)	ETI/PSI	326	Nil
275	General Scheme of supply for 25kV, 50 Hz single phase traction system	ETI/PSI	702-1	D
276	Standard Post Insulator for clean area (Creepage path 850mm min)	ETI/OHE/P	6090-1	C
277	Typical number plate for circuit breaker	ETI/PSI/P	7523	Nil
278	Typical number plate for Auxiliary Transformer	ETI/PSI/P	7525	Nil
279	Typical number plate for Power transformer at TSS	ETI/PSI/P	7526	Nil
280	Typical number plate for PT at TSS	ETI/PSI/P	7527	A
281	Typical number plate for CT at TSS	ETI/PSI/P	7528	A
282	Typical number plate for Isolators at TSS	ETI/PSI/P	7529	A
283	Bimetallic terminal connector to suit 'ZEBRA' ACSR conductor and 30 dia Cu stud of CT/CB/traction power transformer.	ETI/PSI/P	11010	C
284	220kV system bimetallic terminal connector to suit 'ZEBRA' (28.58 Dia ) ACSR conductor & Al./Cu. pad of Isolator /CT/CB.	ETI/PSI/P	11030	C
285	220kV system tee connector to suit 'ZEBRA' (28.58 dia) ACSR conductor on both ways.	ETI/PSI/P	11040	C
286	220kV system rigid connector on SI to suit ZEBRA (28.58 dia) ACSR conductor	ETI/PSI/P	11050	C
287	Details of expansion type terminal connector to suit 50 dia Al. tubular busbar to terminal pad of 25kv CT/ Isolator/ CB and Interrupter	ETI/PSI/P	11060 Sh.2 of 2	E
288	Detail of rigid type bimetallic terminal connector suitable for 50 dia Al. tubular busbar to 30 dia Cu. Stud of 25kV CT.	ETI/PSI/P	11070	B
289	Rigid bimetallic terminal connector suitable for 50 dia Al. tubular busbar to terminal pad of 25kv Isolator/ CT	ETI/PSI/P	11090	C
290	Rigid through connector to suit 50 dia Al. Tubular bus bar and 'SPIDER' AAC conductor	ETI/PSI/P	11110	C

	for 25kv PT Type-II			
291	Details of Rigid terminal connector suitable for 20 dia Al. Conductor to terminal pad of 25kv PT Type I & II	ETI/PSI/P	11120	C



1	2	3	4	5
292	25kv system tee connector to suit 50 O/D Al. Tube and 'SPIDER' 'AAC' conductor	ETI/PSI/P	11140	B
293	25 K.V system Tee connector to suit 50. O/D AL. tubular busbar to 50. O/D AL. tubular busbar	ETI/PSI/P	11150	B
294	25Kv System Rigid bus splice connector to suit 50 O/D Al. tube on both ways	ETI/PSI/P	11180	B
295	25 kV System Sliding clamp for 50mm O/D Aluminium Bus bar	ETI/PSI/P	11190	C
296	25Kv System Rigid connector on S.I to suit 50 mm O/D Al. Bus bar	ETI/PSI/P	11200	C
297	25kv system expansion bus coupler on SI to suit 50 O/D Al. tube.	ETI/PSI/P	11210	D
298	Typical fencing , door and anticlimbing device details of traction sub-station	CORE/ALD/PSI	01	D
299	Structural layout of 132/25 KV traction sub-stations	ETI/C	0200, SH.No.-1	H
300	Structural layouts of 132/25kv traction sub-stations	ETI/C	0200, SH.No.-2	D
301	Details of Beam B/1 for 132/25 KV TSS	ETI/C	0201	D
302	Details of Tower T 1 for 132/25 KV TSS	ETI/C	0202	H
303	Details of Tower T 2 for 132/25 KV TSS	ETI/C	0203	G
304	Details of beam B/2 and column C/1 for 132/25kv traction sub-station.	ETI/C	0208	E
305	Typical cable trench and foundation lay out of 132/25kv TSS	ETI/C	0210	F
306	Details of baffle wall at TSS(WP-112.5kg/sq.m) and WP (75kg/sq.m)	ETI/C	0213	D
307	Details of RCC baffle Wall at TSS(WP-150kg/sq.m)	ETI/C	0214	B
308	Transformer oil drainage arrangement at sub-stations	ETI/C	0216	B
309	Line Diagram of Structural layouts of 220/25kV Traction sub-station	ETI/C	0222	Nil
310	Structural layout of 220/27kV traction sub-station (Type-I)	ETI/C	0222-1	Nil
311	Control Room for Traction substation	ETI/C	0225 Sheet-1	Nil
312	Control Room for Traction Sub-station(RCC details)	ETI/C	0225 Sheet-2	Nil
313	Details of structure for 132kv double pole Isolator	ETI/C	0310	G
314	Details of structure for 132kv support insulators	ETI/C	0320	E
315	Details of structure for 132kv Current transformer	ETI/C	0330	F
316	Details of structure for 120kv Lightning Arrestor	ETI/C	0340	F
317	Details of structure for 25kv Current transformer	ETI/C	0360	F
318	Details of structure for 42kv ,10KA LA & 25kv support insulator	ETI/C	0370 Sheet-1	J
319	Black Weight of Structure for 42kv,10KA LA & 25kv support insulator.	ETI/C	0370 Sheet-2	Nil
320	Details of structure for 25kv Single Pole isolator	ETI/C	0380	F

1	2	3	4	5
321	Details of structure for 25kv Potential transformer	ETI/C	0390	E
322	S-100 Fabricated Mast for mounting LT supply transformer and DO fuse switch at switching station	ETI/C	0043	B
323	Details of structure and foundation for 25kV DP Isolator at TSS	ETI/SK/C	0180	C
324	Gillsans Letters and Figures	RE/33	527	A
325	Typical schematic diagram of protection for single transformer traction sub-station	ETI/PSI	0228-1	Nil
326	25 kV drop out fuse switch details	ETI/PSI	038	C
327	Operating pole for 25kV drop out fuse switch	ETI/PSI	039	B
328	Typical schematic diagram for TSS, FP, SSP and SP with 21.6 MVA or 30 MVA transformer for three lines.	TI/DRG/PSI/3L-TSS/RDSO	00001/07	1
329	Scheme of locking /Interlocking arrangement of 132 kV Isolator at Traction Sub-Station.	ETI/PSI	5212	B
330	Typical return current connection to buried rail at 132 kV/25 kV Traction Sub-Station.	ETI/PSI	0212-1	Nil
331	Typical arrangement of an earth electrode.	ETI/PSI	222-1	Nil
332	Flexible connector for 25 kV circuit breaker 25kV Interrupter & 25 kV side of 13.5/20 MVA traction transformer.	ETI/PSI/P	6570	F
333	Scheme of Interlocking arrangement for 25kV circuit breakers at Traction Sub-Station	ETI/PSI	5214	B
334	Expansion type terminal connector for 25 kV, 60mm dia terminal for traction power transformer.	ETI/PSI/P	11220	D

**(D) STANDARD TYPICAL AND PARTICULAR DRAWINGS FOR SCADA WORKS**

The annexure contains reference to standard, typical and particular drawings & specification referred to in various paragraph of tender specification (Pt. II) and particular specification.

1	2	3	4	5
335	General scheme of supply for 25 kV 50 Hz Single Phase AC	ETI/PSI	702-1	D
336	Typical layout of control room at TSS	TI/DRG/PSI/CPROOM/RDSO	00001/01	0
337	Typical layout of remote control cubicle at switching stations.	ETI/PSI	0010	E
338	Schematic inter connection diagram for remote control of power gear & supervision equipments at TSS.	ETI/PSI	644	C
339	Schematic inter connection diagram for remote control of power gear and supervision equipments at controlled station (SP & SSP)	ETI/PSI	645	C
340	High speed Auto reclosing Scheme for feeder Circuit Breaker at 25 kV A.C. Traction Sub-station.	ETI/PSI	0231-I	A
341	Control desk arrangement for 2 work stations of SCADA system.	ETI/PSI/SK	337	Nil
342	Setting up earthing station at switching posts (SSP & SP) with conventional earthing as per Special Maintenance No. TI/SMI/0032 Rev-1	-	-	-

**(E) (a) LIST OF STANDARD DRAWING FOR HIGH RISE OHE**

S.N.	Brief Description	Drawing		Mod No.
		Series	Number	
343	Design handout for Overhead equipment for running double stack containers under electrified routes (High Rise OHE) with speed potential of 140 Kmph based on revised wind zone.	TI/DESIGNS/OHE/2013/00001 (July'13)	-	-
344	Terms of reference for consultancy contract for high speed OHE and high rise OHE.	RDSO Letter No. TI/Traction policy/2013 dated 25.04.2013	-	-
345	OHE span in view of changes in wind zones in country.	RDSO Letter No. TI/OHE/GA/2013 dated 25/30.04.2013	-	-
346	SPECIAL BFB PORTAL FOR 5 TRACKS (GENERAL ARRANGEMENT)	TI/DRG/CIV/BFB-POTAL	00001/13/0	Sh No. 1
347	SPECIAL BFB PORTAL DETAILS OF UPRIGHT	TI/DRG/CIV/BFB-PORTAL	00001/13/0	Sh No. 2
348	G-TYPE PORTAL DETAILS SPECIAL UPRIGHT AND END PIECE	TI/DRG/CIV/G-PORTAL	00001/13/0	-
349	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 178 kgf/m <sup>2</sup> ) (Basic Wind Speed 50 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 1
350	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Basic Wind Speed 47 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 2
351	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Basic Wind Speed 44 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 3
352	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Basic Wind Speed 39 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 4
353	HIGH RISE OHE Employment Schedule Mast (11.4 m) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Basic Wind Speed 33 m/s) (Without Return Conductor and Without Earth Wire)	TI/DRG/CIV/ES/	00001/13/0	SHEET- 5
354	TWO TRACK CANTILEVER STRUCTURE (TTC) GENERAL ARRANGEMENT	TI/DRG/CIV/TTC/	00001/13/0	SHEET- 1
355	TWO TRACK CANTILEVER STRUCTURE (TTC) DETAILS OF UPRIGHT	TI/DRG/CIV/TTC/	00001/13/0	SHEET- 2
356	11.4 M Long Standard Traction Mast "B" Series (B-150, B-175, B-200, B-225 & B-250 type Fabricated with Batten Plates)	TI/DRG/CIV/B- Mast/	00001/13/0	-
357	Volume Charts & Equivalent Charts of Foundations (Side Bearing, Side Gravity & WBC)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 1
358	Volume Charts & Equivalent Charts of Foundations (NG Type)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 2
359	Volume Charts & Equivalent Charts of Foundations for Dry Black Cotton Soil (NBC Type, 3.0 metre Depth)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 3

360	Volume Charts & Equivalent Charts of New Pure Gravity Foundations (500 mm exposed)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 4
361	Volume Charts & Equivalent Charts of Foundations for Dry Black Cotton Soil (NBC Type, 2.5 metre Depth)	TI/DRG/CIV/FND/	00001/13/0	Sheet- 5
362	Employment Schedule OHE Mast (11.4 metre) Wind Pressure 155 kgf/m <sup>2</sup>	TI/DRG/CIV/ES/	00001/13/0	Sheet- 1
363	Employment Schedule OHE Mast (11.4 metre) Wind Pressure 136 kgf/m <sup>2</sup>	TI/DRG/CIV/ES/	00001/13/0	Sheet- 2
364	Employment Schedule OHE Mast (11.4 metre) Wind Pressure 105 kgf/m <sup>2</sup>	TI/DRG/CIV/ES/	00001/13/0	Sheet- 3
365	Schedule Anchor Blocks for BG Tracks	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 1
366	Double Guy Rod Arrangement with Anchor Block for BG Tracks	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 2
367	Schedule Anchor Blocks for BG Track Black Cotton Soil	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 3
368	Guy Rod Ø 25 mm	TI/DRG/OHE/GUYHR/	00001/13/0	Sheet- 4
368 A	Dropper Schedule Encumbrance 1.4m/1.4m (For 25 kV AC Regulated OHE) (65 and 107 SQ. MM)	TI/DRG/OHE/DROP/	00001/10/1	Rev-1
368 B	Dropper Schedule Encumbrance 1.4m/0.9m (For 25 kV AC Regulated OHE) (65 and 107 SQ. MM)	TI/DRG/OHE/DROP/	00002/10/1	Rev-1
368 C	Dropper Schedule Encumbrance 1.4m/0.75m (For 25 kV AC Regulated OHE) (65 and 107 SQ. MM)	TI/DRG/OHE/DROP/	00003/10/1	Rev-1
368 D	Arrangement of mounting of 25kV/240V, 50kVA LT Supply Transformer for High Rise OHE (On separate mast)	ETI/OHE/HR/AT/G/	05522 Sheet-2	-
368 E	Mounting Arrangement of Auxiliary Transformer on High Rise OHE mast	ETI/OHE/HR/AT/G/	05522 Sheet-1	-
368 F	Anchor Arrangement with Dwarf Mast for conventional and High Rise OHE	ETI/OHE/HR/ G/	01402	-
368 G	Standard Arrangement of Drop Arm for supporting Cantilevers on the Booms of Portals and TTC (For Normal as well as High Rise OHE)	ETI/C/HR/	0076	-
368 H	Drilling schedule for S-6H mast (length 13.0 m) (for High Rise OHE)	ETI/C/HR/	0181	-
368 J	Drilling schedule for S-7H mast (length 13.0 m) (for High Rise OHE)	ETI/C/HR/	0182	-
368 K	Drilling schedule for S-8H mast (length 13.0 m) (for High Rise OHE)	ETI/C/HR/	0183	-
368 L	'P' Type Portal General Arrangement and details of upright & End Pieces (High Rise OHE)	TI/DRG/CIV/P-Portal/	00001/13/0	-

**(E) (b) LIST OF STANDARD DRAWING AS PER NEW WIND ZONES**

369	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 178 kgf/m <sup>2</sup> ) (Basic Wind Speed 50 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-1	A
370	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Basic Wind Speed 47 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-2	A
371	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Basic Wind Speed 44 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-3	A
372	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Basic Wind Speed 39 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-4	B
373	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Basic Wind Speed 33 m/s) (Without Return Conductor and Without Earth Wire)	ETI/C/	0758 Sheet-5	A
374	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 178 kgf/m <sup>2</sup> ) (Basic Wind Speed 50 m/s) (Without Return Conductor and Without Earth Wire)(1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-1	-
375	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Basic Wind Speed 47 m/s) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-2	-
376	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Basic Wind Speed 44 m/s) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-3	-
377	Normal OHE Employment Schedule Mast (9.5 m) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Basic Wind Speed 39 m/s) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-4	-
378	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) (1100+1100) kgf tension CAT-65 mm <sup>2</sup> , CONT-107 mm <sup>2</sup> .	ETI/C/	0759 Sheet-5	-
379	Normal OHE Employment Schedule Mast (9.5 m) Basic Wind Speed 50 m/s Wind Pressure 178 kgf/m <sup>2</sup> (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/0	Sheet-1/5	-
380	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 47 m/s) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/0	Sheet-2/5	-

381	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 44 m/s) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/ 0 Sheet-3/5	-
382	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 39 m/s) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension CAT-65 mm <sup>2</sup> , 1000 kgf tension in CONT-107 mm <sup>2</sup> .	TI/DRG/CIV/ES/RDSO/00001/18/ 0 Sheet-4/5	-
383	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup>	TI/DRG/CIV/ES/RDSO/00001/18/ 0 Sheet-5/5	-
384	Normal OHE Employment Schedule Mast (9.5 m) Basic Wind Speed 50 m/s Wind Pressure 178 kgf/m <sup>2</sup> (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/ 0 Sheet-5/5	-
385	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 47 m/s) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/ 0 Sheet-4/5	-
386	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 44 m/s) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/ 0 Sheet-3/5	-
387	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 39 m/s) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension CAT-65 mm <sup>2</sup> , 1000 kgf tension in CONT-107 mm <sup>2</sup> . (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/ 0 Sheet-2/5	-
388	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 2.8 m & upto 3.8 m)	TI/DRG/CIV/ES/RDSO/00002/18/ 0 Sheet-1/5	-
389	Normal OHE Employment Schedule Mast (9.5 m) Basic Wind Speed 50 m/s Wind Pressure 178 kgf/m <sup>2</sup> (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/ 0 Sheet-5/5	-
390	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 47 m/s) (Wind Pressure 155 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/ 0 Sheet-4/5	-
391	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 44 m/s) (Wind Pressure 136 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with	TI/DRG/CIV/ES/RDSO/00003/18/ 0 Sheet-3/5	-

	implantation more than 3.8 m & upto 4.85 m)		
392	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 39 m/s) (Wind Pressure 105 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension CAT-65 mm <sup>2</sup> , 1000 kgf tension in CONT-107 mm <sup>2</sup> . (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/ 0 Sheet-2/5	
393	Normal OHE Employment Schedule Mast (9.5 m) (Basic Wind Speed 33 m/s) (Wind Pressure 73 kgf/m <sup>2</sup> ) (Without Return Conductor and Without Earth Wire) 1000 kgf tension in CAT. 65mm <sup>2</sup> 1000 kgf tension in CONT. 107mm <sup>2</sup> (with implantation more than 3.8 m & upto 4.85 m)	TI/DRG/CIV/ES/RDSO/00003/18/ 0 Sheet-1/5	

Note: New wind pressures/speeds as per RDSO letter No TI/CIV/MS/14 dated 14.07.2014 & IS: 875 Part-III, 1987, Reaffirmed during 1997 are:

Sl No.	Design Wind Pressure (Kg/m <sup>2</sup> )	Basic Wind Speed	
		metre / second	Km / hour
i	178	50	180.0
li	155	47	169.2
lii	136	44	158.4
lv	105	39	140.4
v	73	33	118.8

**(F) LIST OF STANDARD RDSO's SPECIFICATIONS FOR OHE, TSS AND SCADA**

<b>SI.NO.</b>	<b>TITLE OF SPECIFICATION</b>	<b>SPECIFICATION NO</b>
<b>1</b>	<b>2</b>	<b>3</b>
1.	Annealed stranded copper conductor for jumper wire.	ETI/OHE/3(2/94) with A&C slip No.1of (4/95)
2.	Copper busbar	RE/30/OHE/5 (11/60)
3.	Structural Steel tubes.	ETI/OHE/11 (5/89)
4.	Hot dip zinc galvanisation of steel masts (Rolled and Fabricated) tube and fittings used on 25 KV AC OHE.	ETI/OHE/13(4/84) with A&C slip No. 1of (5/86),2 of (4/90) & 3 of (4/90)
5.	Stainless steel wire ropes	TI/SPC/OHE/WR/1060 with A&C slip No 1 of (11/06) & 2 of (05/07)
6.	Solid core porcelain insulators for 25 KV 50 Hz single phase over head lines	TI/SPC/OHE/INS/0070 (04/2007)
7.	25 KV single and double pole isolators.	ETI/OHE/16(1/94) with A&C slip No.1 of (06/2000) & 2 of (3/2004)
8.	Steel fasteners & Stainless Steel fasteners	TI/SPC/OHE/Fasteners/0120
9.	Aluminum alloy section and tubes	ETI/OHE/21(9/74)
10.	Standard for drawings for Traction Overhead equipment	ETI/OHE/25(3/66)
11.	Light Weight Section Insulators assembly. OR Section Insulator assembly without sectioning insulator.	TI/SPC/OHE/LWTSI/0060 (8/2006)  OR ETI/OHE/27(8/84) with A&C slip No.1 of (10/92)
12.	Enameled steel plates	ETI/OHE/33(8/85)
	Retro-reflective Structure Number Plates & Caution/Warning Boards	ETI/OHE/33A(12/97) Rev-8 (11/12)
13.	Galvanized steel wire	ETI/OHE/36(12/73) with A&C Slip No.1 of (5/98)
14.	3 pulley Type Regulating Equipment	TI/SPC/OHE/ATD/0060 (8/2006) with A&C Slip No1 of (10/2006), 2 of (5/2007) & 3 of (01/13)
15.	Fitting for 25 kv 50 Hz AC Overhead equipment.	TI/SPC/OHE/Fitting/0130(10/13) {Old ETI/OHE/49 (9/95) with A&C}
16.	Cadmium copper conductor for overhead Railway Traction	ETI/OHE/50 (6/97) with A&C slip No.1 to 3 (04/09).
17.	Principles of OHE layout plans and sectioning diagrams for 25 KV AC traction.	ETI/OHE/53(6/88) with A&C slip no.1 of (12/88), 2 of (8/89), 3 of (6/90), 4 of (8/92) & 5 of (11/2006)
18.	19/2.79mm All Aluminum alloy stranded catenary wire.	ETI/OHE/54(2/85) with A&C slip No. 1 of (11/89) &2 of (10/92)
19.	Bimetallic (Al-cu) strip	ETI/OHE/55(4/90)
20.	Short Neutral Section Assembly (Phase Break)	TI/SPC/OHE/SNS/0000 of (2/2000) with A&C slip No. 1
21.	Code for bonding and earthing for 25 KV, AC single phase, 50 Hz traction system.	ETI/OHE/71(11/90) with A&C slip no. 1 of (8/91) & 2 of (3/93)
22.	Insulated Cadmium copper catenary 19/2.10 mm dia for provision under overline structures in the 25 KV AC Electric Traction.	TI/SPC/OHE/INSCAT/0000 of (4/2000)
23.	Battery charger for 110 V battery, 40 AH.	ETI/PSI/1(6/81)
24.	Lightning arrester- 7.5 KV	ETI/PSI/3(8/75) with A&C slip No.1 of (2/91)



1	2	3
25.	220 KV or 132 KV or 110 KV or 66 KV or 25 kV Potential transformers	TI/SPC/PSI/PTs/0990 with A&C slip No.1 to 5 (01/09)
26.	25 KV Dropout fuse switch & operating pole for use with 10 KVA and 100 kVA 25 kV/ 230 V L.T. Supply transformer.	ETI/PSI/14(1/86) with A&C slip no 1 of (4/87)
27.	25 kV/240 V, 5 kVA, 10 kVA, 25 kVA & 50 kVA, 50 Hz single phase oil filled Auxilliary Transformers.	ETI/PSI/15(8/03)
28.	Low maintenance Lead Acid 40AH & 200 AH cells.	RDSO/PE/SPEC/TL/0040-2003(Rev-0) with A&C slip no 1 of (9/2005)
29.	150 KVA, 25 KV, single phase, 50 Hz. Dry type Cast resin Booster Transformers	ETI/PSI/97(6/87) with A&C slip No.1 of (9/88)
30.	100 KVA & 150 KVA, 25 KV, single phase, 50 Hz, oil filled Booster Transformers	ETI/PSI/98(8/92) with A&C slip No.1 of (9/92), 2 of (1/94) & 3 of (6/94)
31(a)	25 KV AC Single Pole, Double Pole mounted, Out Door Vacuum Circuit Breaker (VCB) and Vacuum Interrupter (BM).	TI/SPC/PSI/LVCBIN/0120 (December'2013) Revision-0)
31(b)	220 kV/132 kV/110 kV/100 kV/66 kV Double Pole, Triple Pole, Out Door SF6 Circuit Breakers.	TI/SPC/PSI/HVCB/0120 (June'2014) with A&C slip No.1(March-16)
32	Hard drawn grooved copper Contact wire	ETI/OHE/76(6/97) with A&C slip No.1 of (4/01), 3 of (03/05) , 4 of (12/06), 5 of (7/09), 6 of (5/12) & 7 of (12/13)
33	Metal Oxide Gapless Type Lightning Arrestor for use on 25kV side of Rly. traction sub stations & switching stations	TI/SPC/PSI/MOGTLA/0100(07/10)
34	Technical Specification for Silicon Composite Insulators for 25 kV A.C. 50 Hz single phase over head traction lines.	TI/SPC/OHE/INSCOM/1070 (01/07) OR TI/SPC/OHE/INSCOM/1071 (04/13)
35	Specification for solid core porcelain cylindrical post insulator for systems with nominal voltage of 66kV, 110kV, 132kV & 220kV.	TI/SPC/OHE/POST/0100(01/2010)
36	25kv/240V L.T. supply Transformer, 100 KVA	ETI/PSI/15 A (7/82) with A&C Slip No.1(9/89)
37	Battery charger for 110V Battery, 200 AH	ETI/PSI/24(6/81)
38	Low tension Distribution panels for Rly. A.C traction sub-stations	ETI/PSI/29 (12/79)With A&C Slip No.1 ( 2/93)
39	Standard for drawings for power supply Installations.	ETI/PSI/31 (5/76)
40	Low tension distribution panels.	ETI/PSI/63(7/82)
41	Technical specification for control and relay panel for 25kV ac TSS including specification for numerical type protection relays for traction transformer, 25kV shunt capacitor bank and transmission line for 25kV ac TSS on Indian Railways.	TI/SPC/PSI/PROTCT/6071
42	Technical specification for shunt capacitor & series reactor equipment for traction sub-station	TI/SPC/PSI/FC&SR/0100(01/10)
43	Technical specification for 25kV ac, 50 Hz, single phase, oil filled, current transformer with CT ratio of I-1000-500/5A (for general purpose), II-1500-750/5A (for heavy haul duties) for Railway ac traction sub station.	ETI/PSI/90 (6/95) with A&C Slip No.1, 2,3,4,5,6,7 (08/2007) & 8 (April 2009).
44	Technical specification for two zone static distance protection for 25kV ac single phase 50 Hz traction overhead equipment.	ETI/PSI/101 (8/87) with A&C Slip No.1 (09/87)

1	2	3
45	Technical specification for current transformers. I. 220kV. 200-100/5A, II. 132kV. 400-200/5A, III. 110kV. 400-200/5A, IV. 66kV. 800-400/5A for Railway A.C traction substations.	ETI/PSI/117 (7/88) with A&C Slip No.1 (11/88), 2 (3/89), 3 (12/89), 4 (4/90), 5 (6/90), 6 (9/92), 7 (8/05), 8 (08/2007) & 9 (July 2008).
46	Specification for 21.6 MVA single phase, 50 Hz. i) 220/27kV ii) 132/27kV iii) 110/27kV, iv), 66/27kV traction power transformer for Railway A.C traction sub-station.	ETI/PSI/118 (10/93) with A&C Slip No.1 to 9 & A&C slip No.10 (08/12) or latest
47	Code of practice for earthing of power supply installations for 25kV A.C., 50 Hz, single phase traction system.	ETI/PSI/120 (2/91) with A&C Slip No1 (10/93)
48	Technical specification for i) 245 kV, (ii) 145 kV, (iii) 123 kV, (iv) 72.5 kV double pole & triple pole Isolator for Railway traction sub stations.	ETI/PSI/122 (3/89) with A&C Slip No.1(4/90)
49	Specification for Metal Oxide gapless type lightning arrestors (combined) for use on 220/132/110/66 kV side of Railway A.C. traction sub station.	ETI/PSI/137 (8/89) with A&C Slip No.1,2,3 (Embodying) A&C slip No. 4(8/94) 5(04/01), 6 (9/05) & 7(07/2007)
50	Technical specification for 220 kV or 132 kV or 110 kV or 66kV or 25 kV potential transformer.	TI/SPC/PSI/PT <sub>s</sub> /0990 with A&C Slip No.1,2,3,4,& 5 (April 09)
51	Delta I type High resistive fault selective Relay for 25 kV AC Single phase 50 Hz traction system.	TI/SPC/PSI/PROTCT/1982(12/2003) with A&C slip No.1(10/13)
52	Panto flashover protection relay for 25 kV A.C. single phase 50 Hz traction system.	TI/SPC/PSI/PROTCT/2983 (09/2001)
53	Technical Specification of SCADA system for 25kV, AC Single phase Traction supply on Indian Railway.	TI/SPC/RCC/SCADA/0130(04/2014)
54	Technical Specification for Galvanized Steel Stranded Wire for Traction Masts	TI/SPC/OHE/GSSW/0090 (10/2009)
55	Technical specification for galvanized steel stranded wire for traction bonds	TI/SPC/OHE/GALSTB/0040(09/04) Rev. 1 (08/05)
56	Setting up Earthing Station at switching posts (SSP & SP) with conventional Earthing.	Special Maintenance Instruction No. TI/SMI/0032 Rev-1
57	Design handout for Overhead equipment for running double stack containers under electrified routes (High Rise OHE) with speed potential of 140 Kmph based on revised wind zone.	TI/DESIGN/OHE/2013/00001 (July'13)
58	OHE span in view of changes in wind zones in country	TI/OHE/GA/2013 DATED 25/30.04.2013
59	Technical guidelines and Standard Instruction for Railway Electrification Works including OHE, TSS, Transmission Line, SCADA, Electrical General Works, signaling Works, Telecom works & Civil Engineering Works.	CORE/RE TENDER/EPC/2014/STANDARD INSTRUCTIONS AND GUIDELINES



**(G) LIST OF IS SPECIFICATION**

S No.	IS Code No.	Descriptions
1	IS:210-1993	Grey iron castings
2	IS:269-1989	Specification for 33 grade ordinary Portland cement (4 <sup>th</sup> Rev)
3	IS:282-1982	Dropper Wire
4	IS:306-1983	Tin bronze castings
5	IS:335-1993	New Insulating oil (4 <sup>th</sup> Rev) Reaffirmed 2000
6	IS:371-1999	Ceiling rose spec.( 3 <sup>rd</sup> Rev)
7	IS: 383-1970	Specification for coarse & fine aggregates from natural sources for concrete
8	IS:398(Pt.I)-1996	All Aluminum conductor
9	IS:398 Pt.II-1996	Al. conductor for overhead transmission purposes
10	IS:398(Part-III) 1976.	Aluminum conductors galvanized steel reinforced
11	IS: 432 Pt.1-1982	Specification for mild steel & medium tensile steel bars and hard drawn steel wires for concrete reinforcement
12	IS: 456-2000	Plain & Reinforced concrete Code of practice (3 <sup>rd</sup> Rev)
13	IS: 516-1959	Method of tests for strength of concrete
14	IS:617-1994	Aluminum castings
15	IS:694:1990	Al. Jumper wire
16	IS:702-1988	Specification for industrial bitumen (2 <sup>nd</sup> Rev) reaffirmed 1999
17	IS:731-1971	Porcelain Insulator for overhead power lines with a nominal voltage greater than 1000V
18	IS:732-1989	Code of practice for electrical wiring installation (3 <sup>rd</sup> Rev)
19	IS:800-1984	Code of practice for general construction in steel (2 <sup>nd</sup> Rev)
20	IS:808-1989	Dimensions for hot rolled steel beam, column, channel & angle sections
21	IS:816-1969	Welding
22	IS:875 (Part-3) 1987 (Reaffirmed)	Code of practice for design loads (other than earthquakes) for building and structures – Part 3: Wind loads second revision.
23	IS:1293-2005	Plugs & socket outlets of rated voltage up to and including 250V and rated current up to 16 Amp(3 <sup>rd</sup> Rev)
24	IS:1387-1993	General requirements for the supply of metals and metal products
25	IS: 1489 Pt. I 1991	Specification for Portland-Pozzalana cement Pt .I Fly ash based (3 <sup>rd</sup> Rev)
26	IS:1554(Part-I) 1988	PVC insulated cables
27	IS:1608-1995	Mechanical testing of metal- tensile testing
28	IS:1731-1971	Dimensions for steel flats for structural & general engineering purpose
29	IS:1777-1978	Industrial Luminaries with metal reflectors (1 <sup>st</sup> Rev)
30	IS:1786-1985	Specification for high strength deformed steel bars and wires for concrete reinforcement
31	IS:1897-1983	Copper strip for formed fittings
32	IS:2004-1991	Carbon steel forgings for general engineering purpose
33	IS:2062-2011	Steel for general structural purpose
34	IS: 2074-1992	Ready mix Paint, air drying, Red oxide, Zinc chrome
35	IS:2121-1981	Aluminum and steel cored Aluminum conductors for (Part I & II) overhead power lines.
36	IS:2141-2000	Galvanized stay strand
37	IS:2312-1967	Propeller type AC ventilating fans (1 <sup>st</sup> Rev)
38	IS: 2386 Pt.III-1963	Method of tests for aggregates for concrete Pt. III Specific gravity, density voids, absorption & buckling
39	IS:2673-2002	Dimensions for Aluminum Tubular Busbar.
40	IS:2675-1983	Enclosed distribution fuse boards ad cut-outs for voltage not exceeding 1000V AC & 1200V DC (2 <sup>nd</sup> Rev)
41	IS:3043-1987	Code of practice for earthing (1 <sup>st</sup> Rev)
42	IS:3091-1999	Aluminum bronze castings



<b>S No.</b>	<b>IS Code No.</b>	<b>Descriptions</b>
43	IS:3188-1980	Characteristics of string insulator units
44	IS:3837-1976	Accessories for Rigid steel conduit for electrical wiring
45	IS:3854-1997	Switches for domestic & similar purposes(2 <sup>nd</sup> Rev)
46	IS:4826-1979	Specification for hot dipped for galvanized coatings on round steel wires (1 <sup>st</sup> Rev)
47	IS:5082-1998	Material for Aluminum tubular busbar.
48	IS: 6403-1981	Code of practice for determination bearing capacity of shallow foundations (1 <sup>st</sup> Rev)
49	IS:7098 (Part I) 1988	LT XLPE cables
50	IS:7098 (Part II) 1985	HT XLPE cables
51	IS: 8130-1984	Conductor for Insulated electric cables & flexible cords (1 <sup>st</sup> Rev)
52	IS:9537 Pt-I-1980	Conduits for electrical installations
53	IS:9968(Pt.2)-2002	Annealed Copper Jumper Wire
54	IS:13947 Pt. III 1993	Specification for low voltage switchgear & control gear Pt.-3, disconnectors & fuse combination unit
55	IS:14329-1995	Malleable iron castings

**ANNEXURE-2**

**SCHEDULE OF QUANTITY**

Quantities of all items mentioned in FORM-5 under Column Qty. FOR OHE & TSS

---

**ANNEXURE-3**

**REQUIREMENT OF SPARES ( T&P Items)**

Quantities of all items mentioned in section- 7

,

□□□□

**ANNEXURE 4**

LIST OF ITEMS TO BE SUPPLIED BY ENGINEER TO THE CONTRACTOR EQUIPMENTS, FITTINGS AND FINISHED MATERIAL.

NIL

**ANNEXURE-5A**

**LIST OF TOOLS AND PLANTS FOR MAINTENANCE**

**FOR OHE**

**-DELETED-**

□□□□



**Annexure-5B**

**TECHNICAL DATA FOR EQUIPMENTS, COMPONENTS & MATERIALS TO BE  
SUPPLIED BY THE TENDERER  
FOR TSS**

DELETED

**ANNEXURE-5C**

**LIST OF TOOLS AND PLANTS REQUIRED FOR MAINTENANCE  
FOR SCADA**

-DELETED-

**ANNEXURE-6****(DELETED)****UNIT QUANTITIES OF FINISHED WIRES AND CONDUCTORS FOR VARIOUS ITEMS OF WORK  
IF THE SAID ITEMS UNDER RAILWAY SCOPE OF SUPPLY**

Wire/Conductor	Applicable Linear density kg/m	Item No Sch.1	Bare unit requirement per unit of work (m)	Allowance for erection per unit of work returnable as scrap (m)	Total requirement per unit of work (col.4& 5)	REMARKS
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Contact wire (107)	0.9512	6(a)	1005.0	5	1010.0	
		6(b)	1005.0	5	1010.0	
		6(c)	1005.0	5	1010.0	
		6(d)	1005.0	5	1010.0	
		10	0.5		0.5	
		12(a)	4.0		4.0	
		31(g)	3.0		3.0	
		12(c)	4.0		4.0	
Cadmium copper wire(65)	0.5973	5(a)(ii)	1.0		1.0	
		6(a)	1005.0	5	1010.0	
		10	0.5		0.5	
		12(c)	0.65		0.65	
		15(a)	0.5		0.5	
		31(g)	3.0		3.0	
Cadmium copper wire(130)	1.1692	4(b)(iv)	4.5		4.5	
		5(a)(ii)	1.0		As required	
		6(a) <sup>a</sup>	As required		As required	
All Aluminum conductor(SPIDER)	0.6520	7(a)	1010.0	10	1020.0	
		7(b)	2020.0	20	2040.0	
Large Jumper(105)	0.982	10	4.0		4.0	
		15(a)(i)	6.0		6.0	
Cadmium copper Bridle wire	0.2187	6(c)	8.5		8.5	per bracket
Small Jumper (50)	0.4352	4(b)(i)	4.5		4.5	
		4(b)(ii) (iii) & (iv)	4.5		4.5	
		6(a)	6.0		6.0	
		10	1.6		1.6	
		15(a)	1.6		1.6	
Dropper wire (5mm)	0.1746	5(b)	1.5		1.5	
		5(c)	1.5		1.5	
		6(a) & (d)	180.0	20	200.0	
		12(a) & (d)	5.0		5.0	
		12(b)	6.0		6.0	
		31(a)	10.0	2	12.0	
		31(g)	10.0	2	12.0	
		6(c)				As required
Dropper wire (7mm)	0.341	4(a)(i)	1.8	0.2	2.0	
		4(a)(v)	1.8	0.2	2.0	
		12(c)	0.80		0.80	

(1)	(2)	(3)	(4)	(5)	(6)	(7)
9/2.29 mm Al. Alloy catenary		6(d)	1005	10	1015	
37/2.25(150 sq mm) Copper conductor (Feeder Wire)	1.3335	7 (e)	1010	10	1020.0	
19/7/1.25 (160 sq mm) Copper conductor (Large Jumper)	1.504	15.(d)	As required	-	As required	
19/2.10 (65 sq mm) PVC Catenary wire	-	15 (c) & 15 (e)	As required	-	As required	

**NOTE:**

**1) Col.4** of the above table indicates the bare unit requirement of the various types of wire and conductors for various items of schedule-1. This includes allowance for sag wherever required.

**2) Col.5** of the above table indicates the permissible allowances for the erection which should be left over with the contractor and should be returned to the Engineer in the form of scrap on completion of work. Such working allowance has been indicated on the assumption that all wire and conductors shall be made available in tailor made lengths as shall be indicated by the contractor to suit individual employment and, further, that the actual supplies shall be made in the serial order as will be indicated by the Contractor. Should the Engineer be unable to supply the conductor as per above on account of which drums of a length longer than the ones desired by the contractor shall have to be erected, then such, extra length as shall result from the difference of the length of the drums actually employed and length of the drums ordered by the contractor shall be considered over and above the quantities admitted as allowances for erection under col. 5. Such extra length shall, in addition, be considered and shall be returned to the Engineer in the form of scrap.

**3) Col.6** of the above table indicates the total quantities of wires and conductors to be supplied to the contractor by the Engineer, free of cost. Such quantities do not take into account extra quantities which may be used on account of note 2 above and quantities damaged which shall be allowed for over and above the quantities indicated in Col. 6.

**4)** Whenever cadmium copper wire (130) is required against item 5(a) (ii), the same will supplied by the Engineer and the quantity of cadmium copper wire (65) against this item will be correspondingly reduced.

When copper wire (130) is required against item 6(a) the same will be supplied by the Engineer and the quantities of cadmium copper wire (65) and contact wire (107) against this item will be correspondingly reduced.

**5)** Whenever anti-theft jumper is provided against item 15(a), the length of jumper used shall be calculated depending on the setting distance of the anchor structure and the quantity required shall be supplied by the Engineer.

Whenever large jumper (105) is employed against item 15(a), the requirement of cadmium copper wire (65) shown against this item will not be permissible and vice-versa.

Whenever anti-creep is of the boom anchor type, catenary (cadmium copper) wire against 15(a) shall be 2 meters instead of 0.5 meters.

**6)** If required by the contractor, the Engineer will supply to the contractor wires and conductors required for replacement due to thefts, accidents etc. The cost of such wires and conductors shall be reimbursable to the Engineer by the contractor.

# **PART - V**

## **FORMS OF TENDERS ETC**

**PART - V**  
**FORMS OF TENDERS ETC**

It is essentially required to be uploaded by the tenderer that their offer, Packet-A, & Packet-B, are in the order of para 1.1.7(a), 1.1.7(b)(i) and 1.1.7(b)(ii), of Part-I, Chapter-I. All tender documents to be uploaded should be essentially serial numbered (printed/machine numbered).

FORM NO	SCHEDULES	DESCRIPTIONS
1A		Offer letter (To be uploaded with prequalification Bid with Packet "A")
1B		Summary of Prices for OHE,PSI,SACDA . (To be uploaded with Packet "B")
2		Memorandum of the Tenderer <b>(Deleted)</b>
3		Deviation from the Tender Paper <b>(Deleted)</b>
4		Alternative Proposal of the Tenderer
	Schedule-1,Section -1	Schedule of prices & Total Prices for OHE (General)
	Schedule-1,Section -2	Schedule of prices & Total Prices for OHE (Concrete)
	Schedule-1,Section -3	Schedule of prices & Total Prices for OHE (Ferrous)
	Schedule-1,Section -4(a)	Schedule of prices & Total Prices for OHE (Non Ferrous)
	Schedule-1,Section -4(b)	Schedule of prices & Total Prices for Catenary & Contact Wires (Non Ferrous)
	Schedule-1,Section -5	Schedule of prices & Total Prices for OHE (Insulators)
	Schedule-1,Section -6	Non Schedule items for Supply & erection of different type of Caution Board
	Schedule-1,Section -6	Non Schedule items for supply & erection of Safety Items for (SWS)
	Schedule-1,Section -7	Non Schedule Prices & Total Prices for SCADA -DELETED
	5	Schedule-1,Section -7
	Schedule-1,Section -8	Tools & Plant Equipments
	-	Schedule of prices & Total Prices for TSS - DELETED
	-	Schedule of prices & Total Prices for TSS - DELETED
	-	Schedule of prices & Total Prices for TSS - DELETED
	-	Non Schedule items for TSS (Part- A, Part- B & Part- C) - DELETED
	-	Non Schedule items for TSS (Part- A, Part- B & Part- C)
	-	Non Schedule Prices & Total Prices for SCADA <b>-Deleted-</b>
	-	Non Schedule Prices & Total Prices for AMC of SCADA <b>-Deleted-</b>
	-	Non Schedule Prices & Total Erection Prices for Adjustment Rates of SCADA <b>-Deleted-</b>
6	-	List of Imported Special Tools, Plant, Equipment and Materials for Const. <b>(Deleted)</b>
7	-	Unit Prices of "On Account Rates" for OHE (General)
	-	Unit Prices of "On Account Rates" for OHE (Concrete)
	-	Unit Prices of "On Account Rates" for OHE (Ferrous)
	-	Unit Prices of "On Account Rates" for OHE (Non Ferrous)
	-	Unit Prices of "On Account Rates" for OHE (Insulator)
8	-	Schedule of Prices of Equipments, Components & Materials, for OHE & TSS Works <b>(Deleted)</b>
9A	-	Schedule of Prices of Special Tools, Plants for Maintenance for OHE & TSS Works <b>(Deleted)</b>
9B	-	Schedule of Prices of Special Tools, Plants for Maintenance for SCADA Works <b>(See Annexure- 5 "C") - Deleted-</b>
10 (Sh.1 to 4)	-	Tenderer's scheme of work and time schedule for OHE, SWS & TSS.
11A	-	Names of manufacturer/s, places of manufacture and inspection of supplies (CORE/RDSO approved sources).
11B	-	Names of manufacturer/s, places of manufacture and inspection of supplies (other than CORE/RDSO approved sources).
11C	-	Complete technical data and particulars of the equipments offered, as specified in the Tender papers together with descriptive literature, leaflets etc.
12A(Sh.1 to 5)	-	TENDERER's CREDENTIALS (To be Uploaded with Packet "A" with the details for OHE Works.
12B	-	TENDERER's CREDENTIALS (To be Uploaded with Packet "A" with the details for TSS Works.
12C	-	TENDERER's CREDENTIALS (To be Uploaded with Packet "A" with the details for SCADA Works. --
12D	-	POSITION OF WORKS AWARDED
13	-	Guarantee Bond for Earnest Money <b>(Deleted)</b>
14	-	Agreement
15	-	Guarantee Bond for security Deposit
16	-	Standing Indemnity Bond for "ON ACCOUNT" payments
17	-	Extension of period of completion of work on contractor's account
18	-	Extension of period of completion of work on purchaser's account
19	-	Guarantee bond against "On Account" payments
20	-	Guarantee bond against Mobilisation Advance
21	-	Guarantee bond against Provisional Acceptance Payments <b>(Deleted)</b>
22	-	Bank Guarantee Proforma for Performance Guarantee
23	-	Memorandum of Understanding for Joint Venture
24	-	Proforma for Bank details for e-payment
25	-	Proforma for 7 Days Notice for WORKS AS A WHOLE /IN PARTS
26	-	Proforma for 48 Hours Notice for WHOLE WORK
26 A	-	Proforma for 48 Hours Notice for PART OF THE WORK
27	-	Proforma for Termination Notice for WHOLE WORK
27 A	-	Proforma for Termination Notice for WHOLE WORK for PART OF THE WORK
28	-	Proforma for affidavit to be uploaded by tenderer along with the tender offer <b>(For two Packet System of Tendering Only)</b>
29	-	Proforma for Final Supplementary Agreement
30	-	Affidavit By Sole Proprietorship Firm
31	-	Power of attorney for signing of bid on behalf of partnership firm
32	-	Power of attorney on the behalf of the joint venture
33	-	Consent of partners of partnership firm

34		Power of attorney for signing joint venture agreement of partnership firm
35		Affidavit by sole proprietorship firm when participating inJV
36		Board's resolution of company for entering into JV
37		Power of attorney by a company ( incorporated under company act) for JV
38		Partner's resolution of LLP firm for entering in to JV
39		Power of attorney by an LLP Firm(incorporated under LLP act) for JV
40		Power of attorney for signing of BID( when tenderer is company incorporated under companies act)
41		Board resolution of company incorporated under companies act for submitting tender by company.
42		Power of attorney for signing of bid( when tenderer is LLP firm incorporated under LLP act)
43		Performa for Declaration
44		Instruction regarding Electronic tendering system
45		Form regarding constitution of firm
46		Detail of Plant and Machinery already available with the firm
47		List of Engineer/Personnel already available/proposed to be Employed for Deployment on this work
48		Statement of works executed/completed by the Contractors during last 7 (seven) years ending last day of month previous to the one in which tender is invited.
49		Statement of works being executed/ in hand by the contractor/s
50		Detail of contractual payment received in last 3 (three) financial year and current financial year.
51		Real Time Gross Saving (RTGS)/National Electronic Fund Transfer (NEFT) Model mandate Form
52		Completion certificate
53		Declaration/Undertaking
54		Annual Contractual Turnover Data for the Previous 3/4 Years

**HARYANA RAIL INFRASTRUCTURE DEVELOPMENT  
CORPORATION LIMITED**

**TENDER FORMS (FIRST SHEET)**

**Tender no: HRIDC/GGN/ELECT/MSIL/2022/01**

**Name of work “Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments for (i) Electrification of Maruti Suzuki Railway Yard” and “General Electrical works of Proposed Station Building in Maruti Yard in connection with Railway Siding for Maruti Suzuki India Ltd. MANESAR” and (ii) OHE Modification of PATLI YARD area including Provision of double line Sectioning Post (SP) with CB arrangement & SCADA Equipments at PATLI STATION and electrification of PATLI-MANESAR Single line connectivity in connection with HORC project, in the state of Haryana.**

To,

**The Managing Director,**

Haryana Rail Infrastructure Development Corporation Limited

SCO-. 17-19, 3<sup>rd</sup> Floor, Sector-17A, Chandigarh

E-mail: hridc2017@gmail.com

- 1. Dear Sir, I/We, \_\_\_\_\_ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this tender open for acceptance for a period of 120 (One hundred twenty) days from the date fixed for opening the same and in default thereof, I/We will be liable for forfeiting of my/our “Bid Security”. I/We offer to do the work “Design, Supply, Erection, Testing & Commissioning of 25 kV, 50 Hz, Single Phase High Rise OHE system for Electrification Works including foundations, structures and all ancillary equipments for (i) Electrification of Maruti Suzuki Railway Yard” and “General Electrical works of Proposed Station Building in Maruti Yard in connection with Railway Siding for Maruti Suzuki India Ltd. MANESAR” and (ii) “OHE Modification of PATLI YARD area including Provision of double line Sectioning Post (SP) with CB arrangement & SCADA Equipments at PATLI STATION and electrification of PATLI-MANESAR Single line connectivity in connection with HORC project, in the state of Haryana “ for Haryana Rail Infrastructure Development Corporation Limited, at the rates quoted in the attached schedule and hereby bind myself/ourselves to complete the work in all respects within 15 (Fifteen) months from the date of issue of letter of acceptance of the tender.**
- 2. I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract (April ,2022), with all correction slips issued from time to time and to carry out the work according to the Special Conditions of Contract, Technical Specifications, specifications of materials and Schedule of Rates as laid down by HRIDC in the present contract.**

**3. Bid Security INR 10,60,600 /- (Rupees Ten Lakhs Sixty Thousand Six Hundred only) has already been deposited online/submitted as Bank Guarantee bond. Bid security may be forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:**

**a) I/We do not submit the Performance Guarantee within the time specified in the Tender document;**

**b) I/We do not execute the contract documents within seven (7) days after receipt of notice issued by HRIDC that such documents are ready; and**

**c) I/We do not commence the work within fifteen (15) days after receipt of orders to that effect. without prejudice to any other right or remedies in case my/our Tender is accepted and if:**

i) I/We do not submit the Performance Guarantee within the time specified in the Tender document;

ii) I/We do not execute the contract documents within seven (7) days after receipt of notice issued by HRIDC that such documents are ready; and

iii) I/We do not commence the work within fifteen (15) days after receipt of orders to that effect.

4.(a) I/We am/are a Start-up firm registered by ..... Department of Industrial Policy and Promotion (DIPP) and my registration number is ..... valid up to ..... (Copy enclosed) and hence exempted from submission of Earnest Money.

5. We are a Labour Cooperative Society and our Registration No. is ..... with .....and hence required to deposit only 50% of Earnest Money.

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

Signature of Witnesses:  
.....

(1) .....

(2) .....

Signature of Tenderer(s)

Date.....

Address of the Tenderer(s)

(Complete postal address)



**SUMMARY OF PRICES FOR OHE, PSI, SCADA AND GENERAL SERVICES WORKS**

From: \_\_\_\_\_

To,  
The President of India,  
Acting through the Managing Director,  
Haryana Rail Infrastructure Development Corporation Limited  
SCO-. 17-19, 3<sup>rd</sup> Floor, Sector-17A, Chandigarh  
E-mail: hridc2017@gmail.com

Dear Sir,

Subject: Tender of \_\_\_\_\_

I/We the undersigned hereby offer the summary of prices for the subject work as under: -

(All Figure in Rupees)

Abstract of 25 kV single Phase Overhead Equipment, SCADA and General Services Work In C/w Proposrd Maruti Sidind, Electrification of Manesar- Patli Single line Connectivity and Modification of Patli Yard including Double line SP at HORC Line ( 17.5 TKM)									
HIGH RISE OHE, SCADA, T&P AND GENARAL SERVICES EQUIPMENT									
Schedule 1		HIGH RISE OHE, SCADA, T&P							
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
S N.	Sub-section	Supply	Percentage (%) above SOR Rates as per average of LAR	Amount	Erection	Percentage (%) above SOR Rates as per average of LAR	Amount	Grand Total Supply+Erection	REMARKS
1	Section-1 (General)	1375930.00	145.11%	3372542.02	471430.50	129.77%	1083205.86	4455747.88	To be quoted above/below/At par on advertised value (Shown in Column i ) of each section (Sr. No. 1 to 10)
2	Section-2 (Concrete)	3373968.00	231.65%	11189764.87	1147378.00	211.08%	3569263.48	14759028.35	
3	Section-3 (Ferrous)	22541932.73	160.06%	58622550.26	1043158.87	141.45%	2518707.09	61141257.35	
4	Section-4(a) (Non-Ferrous)	3805123.00	132.77%	8857184.81	381227.20	124.87%	857265.60	9714450.41	
5	Section-4(b) (Non-Ferrous)	22141920.00	132.77%	51539747.18	0.00	0.00%	0.00	51539747.18	
6	Section-5 (Insulator)	2818968.23	158.38%	7283650.11	0.00	0.00%	0.00	7283650.11	
7	Section-6 (NS ITEMS)							4269509.45	
<b>TOTAL</b>		<b>56057841.96</b>		<b>140865439.26</b>	<b>3043194.57</b>		<b>8028442.04</b>	<b>153163390.74</b>	
8	Section- 7 (SCADA Work)							<b>1946160.24</b>	
9	Section-12 [Tools & Plants (OHE & PSI)]							<b>615887.70</b>	
Schedule 2		GENERAL SERVICES WORK							
10	Section-1 General Services work							<b>26386378.97</b>	
11	<b>Grand Total (Including GST @18%)</b>							<b>182111817.65</b>	
12	<b>Round Off</b>							<b>182111818.00</b>	

The above prices are inclusive of all taxes i.e. GST, Octroi, Local levies, labour cess on work contract etc.

The tenderer should quote single uniform percentage Above/At par/Below for all sections of SOR items. If the percentage quoted by the tenderer does not clearly indicate the rates are Above/ At par/Below through sign convention, the indicated rates will be considered to be above SOR.

Yours Faithfully,  
Place:  
Date:

Signature/s of Tender  
Seal of Tender

Witnessed by:  
1. Signature  
Name in Block letters  
Address

2. Signature  
Name in Block letter  
Address

SUMMARY OF PRICES  
FOR  
Schedule-1  
TRACTION SUB-STATION

**---- DELETED -----**

**SUMMARY OF PRICES**  
**FOR**  
**Schedule-1**  
**SCADA WORKS**

**Schedule-1, Section-7**  
**FOR SCADA WORKS**

**FORM - 2**

MEMORANDUM OF THE TENDERER

**FOR OHE & TSS WORKS**  
**- DELETED**

---

**FORM - 3**

DEVIATIONS FROM THE TENDER PAPER

**FOR OHE & TSS WORKS**  
**- DELETED -**

---

**To be uploaded with Packet-A**

**FORM - 4**

ALTERNATIVE PROPOSALS OF THE TENDERERS

**FOR OHE & TSS WORKS**

**Abstract of 25 kV single Phase Overhead Equipment, SCADA and General Services Work In C/w Proposrd Maruti Sidind, Electrification of Manesar- Patli Single line Connectivity and Modification of Patli Yard including Double line SP at HORC Line ( 17.5 TKM)**

**HIGH RISE OHE, SCADA, T&P AND GENARAL SERVICES EQUIPMENT**

Schedule 1	HIGH RISE OHE, SCADA, T&P							
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
S N.	Sub-section	Supply	Percentage (%) above SOR Rates as per average of LAR	Amount	Erection	Percentage(%) above SOR Rates as per average of LAR	Amount	Grand Total Supply+Erection
1	Section-1 (General)	1375930.00	145.11%	3372542.02	471430.50	129.77%	1083205.86	4455747.88
2	Section-2 (Concrete)	3373968.00	231.65%	11189764.87	1147378.00	211.08%	3569263.48	14759028.35
3	Section-3 (Ferrous)	22541932.73	160.06%	58622550.26	1043158.87	141.45%	2518707.09	61141257.35
4	Section-4(a) (Non-Ferrous)	3805123.00	132.77%	8857184.81	381227.20	124.87%	857265.60	9714450.41
5	Section-4(b) (Non-Ferrous)	22141920.00	132.77%	51539747.18	0.00	0.00%	0.00	51539747.18
6	Section-5 (Insulator)	2818968.23	158.38%	7283650.11	0.00	0.00%	0.00	7283650.11
7	Section-6 (NS ITEMS)							4269509.45
<b>TOTAL</b>		<b>56057841.96</b>		<b>140865439.26</b>	<b>3043194.57</b>		<b>8028442.04</b>	<b>153163390.74</b>
8	Section- 7 (SCADA Work)							<b>1946160.24</b>
9	Section-12 [Tools & Plants (OHE & PSI)]							<b>615887.70</b>
<b>Schedule 2</b>		<b>GENARAL SERVICES WORK</b>						
10	Section-1 General Services work							<b>26386378.97</b>
11						<b>Grand Total (Including GST @18%)</b>		<b>182111817.65</b>
12						<b>Round Off</b>		<b>182111818.00</b>

**Quantity Schedule of OHE In C/w Proposrd Maruti Sindind, Electrification of Manesar- Patli Single line Connectivity and Modification of Patli Yard including Double line SP at HORC Line ( 17.5 TKM)**

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 1 (GENERAL)**

**This schedule shall be read in conjunction with its explanatory notes in tender document for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.**

Item No.	Description	Unit	(All prices are in Rs.)						
			SOR Rate		Qty.	Total Prices			
			Materials	Erection		Materials	Erection	Total (M+E)	
1	2	3	4	5	6	7	8	9	
1(a)	Preparation of designs and drawings for overhead equipment.	Track km.	0	9344	17.5	0.00	1,63,520.00	1,63,520.00	
1(b)	Preparation of designs and drawings for switching stations (FP/SP/SSP)	Each	0	16051	2	0.00	32,102.00	32,102.00	
5(a)(i)	Supply without insulator and erection of mounting arrangements for span wire.	Each	3199	434	4	12,796.00	1,736.00	14,532.00	
8(a) (xii)	Marking/paintig of temperature & 'Y'- Measurement of OHE mast at BWA locations	Each	0	62	55	0.00	3,410.00	3,410.00	
8(b)(i)	Supply without insulator and erection of material for termination of Single conductor of Over head equipment or terminating wire.	Each	2411	408	20	48,220.00	8,160.00	56,380.00	
8(b) (iii)	Supply without Insulator and erection of material for termination of all aluminium 25KV Feeder / return conductor (Single SPIDER)	Each	3043	408	8	24,344.00	3,264.00	27,608.00	
8(b) (vi)	Supply without insulator and erection of materials for termination of tramway type OHE (Regulated)	Each	1816	408	0	0.00	0.00	0.00	
8(b) (ix)	Supply without insulator and erection of materials for termination of copper cross feeder with gantries.	Set	2895	408	11	31,845.00	4,488.00	36,333.00	
9(dz)	Supply without insulator and erection of anti-creep with Cadmium copper catenary wire in polluted area	Each	2,792	1317	0	0.00	0.00	0.00	
9(ez)	Supply without insulator and erection of anti-creep with Cadmium copper catenary wire suitable for tramway type OHE (Regulated) in polluted	Each	2,719	1317	0	0.00	0.00	0.00	
<b>Page Total</b>							<b>1,17,205.00</b>	<b>2,16,680.00</b>	<b>3,33,885.00</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	
11(a)(i)	Supply without Insulator and erection of cut-in (9Tonne) Insulator	Each	688	283	22	15,136.00	6,226.00	21,362.00	
11(a)(ii)	Supply without Insulator and erection of a suspension (9 Tonne) Insulator	Each	713	168	8	5,704.00	1,344.00	7,048.00	
11(b)	Supply without Insulator and erection of 25 kV Post Insulator	Each	515	130	16	8,240.00	2,080.00	10,320.00	
11(c)	Supply without Insulator and erection of 3 kV Disc Insulator	Each	922	132	0	0.00	0.00	0.00	
11(d)	Supply without Insulator and erection of 11 kV Post Insulator	Each	133	108	0	0.00	0.00	0.00	
17(b)	Extra for special embedment of earth electrode.	Each	0	679	0	0.00	0.00	0.00	
18(a)	Supply & Erection of 25kV SF-6 Gas filled Interrupters	Each	2,05,019	1,913	0	0.00	0.00	0.00	
18(b)	Supply & Erection of 25kV Vacuum type Interrupter	Each	1,73,491	1,913	4	6,93,964.00	7,652.00	7,01,616.00	
19	Supply and Erection of 25kV Potential Transformers Type-I	Each	44,466	429	4	1,77,864.00	1,716.00	1,79,580.00	
20(a)	Supply and Erection of 42KV Lightning Arrestors (station class)	Each	15,119	278	2	30,238.00	556.00	30,794.00	
20(b)	Supply and Erection of 7.5 KV Lightning Arrestors	Each	705	145	0	0.00	0.00	0.00	
21	Supply and Erection of Terminal Boards in control cubicles.	Each	5,061	204	1	5,061.00	204.00	5,265.00	
22(a)	Supply and Erection of an Iron clad 110 V.D.C Fuse Box.	Each	1,593	47	1	1,593.00	47.00	1,640.00	
22 (b)	Supply and erection of an Iron clad 230 V.A.C Fuse Box.	Each	1,762	47	1	1,762.00	47.00	1,809.00	
23	Supply and Erection of Lead Acid Batteries.	Each	42,715	3,065	1	42,715.00	3,065.00	45,780.00	
24	Supply and Erection of Battery chargers.	Each	41,587	418	1	41,587.00	418.00	42,005.00	
25(a)	Supply and Installation of cables for Control and indication circuit	Metre	201	7	170	34,170.00	1,190.00	35,360.00	
25(b)	Supply and Installation of cables for Heater supply	Metre	95	7	150	14,250.00	1,050.00	15,300.00	
25(c)	Supply and Installation of cables for Catenary indication	Metre	137	7	150	20,550.00	1,050.00	21,600.00	
25(d)	Supply and Installation of cables for L.T. Power supply	Metre	217	10	50	10,850.00	500.00	11,350.00	
25(e)	Supply and Installation of cables for 110V D.C. supply	Metre	137	10	50	6,850.00	500.00	7,350.00	
27(a)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (10 kVA).	Each	27,426	4,572	1	27,426.00	4,572.00	31,998.00	
27(b)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (5 kVA).	Each	22,971	4,572	0	0.00	0.00	0.00	
	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (25 kVA).	Each	93,611	4,572	1	93,611.00	4,572.00	98,183.00	
<b>Page Total</b>							<b>12,31,571.00</b>	<b>36,789.00</b>	<b>12,68,360.00</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	
27(d)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (50 kVA).	Each	1,21,643	4,572	0	0.00	0.00	0.00	
28	Supply without Insulator & erection of 25 kV D.O. fuse switch.	Each	4,934	239	2	9,868.00	478.00	10,346.00	
29(a)	Erection, oil filtration, testing & commissioning of Booster transformer.	Each	59	8,466	0	0.00	0.00	0.00	
31	Modification to erected equipments :					0.00	0.00	0.00	
31(a)	Transfer of equipment from one mast or support to another.	Each	804	1,179	14	11,256.00	16,506.00	27,762.00	
31(b)	Provision of an additional bracket assembly/ assemblies on a mast or support.	Each	0	1,047	14	0.00	14,658.00	14,658.00	
31(c)	Re-adjustment of head-span	Each	0	1,156	2	0.00	2,312.00	2,312.00	
31(d)	Dismantling of overhead equipment.	Km	0	6,222	4	0.00	24,888.00	24,888.00	
31(e)	Dismantling of Feeder/ Return Conductor	Km	0	2,697	0.5	0.00	1,348.50	1,348.50	
31(f)	Splicing & extension of an anchored overhead equipment.	Each	0	1,156	4	0.00	4,624.00	4,624.00	
31(gz)	Dismantling of a Section Insulator Assembly	Each	670	1,156	9	6,030.00	10,404.00	16,434.00	
31(h)	Slewing and putting back of OHE in original shape	Span	0	937	6	0.00	5,622.00	5,622.00	
31(i)	Dismantling of an Isolator	Each	0	627	7	0.00	4,389.00	4,389.00	
31(j)	Dismantling of a Post/ Pedestal Insulator.	Each	0	204	7	0.00	1,428.00	1,428.00	
31(m)(i)	Manning of Switching stations (SP/SSP)	Each per month	0	19,148	6	0.00	1,14,888.00	1,14,888.00	
31(m) (ii)	Manning of Traction Sub-stations	Each per month	0	30,878	0	0.00	0.00	0.00	
35	Supply and Erection of materials for internal and external lighting of Switching Station Building (SP/SSP).	Each	0	16,416	1	0.00	16,416.00	16,416.00	
36 (a)	Unloading of all type of Steel Structures.	MT	0	61	0	0.00	0.00	0.00	
36 (b)	Loading of all type of Steel Structures.	MT	0	113	0	0.00	0.00	0.00	
37 (a)	Unloading of all type of Copper & Aluminium conductors.	MT	0	55	0	0.00	0.00	0.00	
37 (b)	Loading of all type of Copper & Aluminium conductors.	MT	0	55	0	0.00	0.00	0.00	
<b>Page Total</b>							<b>27,154.00</b>	<b>2,17,961.50</b>	<b>2,45,115.50</b>
<b>Total for Section-1 (GENERAL) =</b>							<b>13,75,930.00</b>	<b>4,71,430.50</b>	<b>18,47,360.50</b>

**NOTE:-** for 31(m)(i) & 31(m) (ii): In case Feeding post is situated in adjacent to TSS, same will also be included for manning alongwith TSS.

**SCHEDULE - 1  
SCHEDULE OF PRICES & TOTAL PRICES**

**Section-2 (Concrete)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)						
			SOR Rate		Qty.	Total Prices			
			Materials	Erection		Materials	Erection	Total (M+E)	
1	2	3	4	5	6	7	8	9	
2(a)	Concrete for foundation and plinth								
	(i) In hard soil:	Cum	2,056	749	34	69,904	25,466	95,370	
	(ii) In rocky soil	Cum	2,120	977	10	21,200	9,770	30,970	
2(az)	Concrete for foundation and plinth								
	(i) In hard soil:	cum	2,359	749	0	0	0	0	
	(ii) In rocky soil	cum	2,423	977	0	0	0	0	
2(b)	In other than hard soil and rock	Cum.	2,140	566	1,475	31,56,500	8,34,850	39,91,350	
2(c)	Reinforced concrete	Cum.	2,852	676	38	1,08,376	25,688	1,34,064	
2(e)	Extra for supply & sinking of concrete shells	Cum.	2,225	314	2	4,450	628	5,078	
2(f)	Casting of foundations using mechanized Augur.	Cum	2,629	389	2	5,258	778	6,036	
34(a)	Supply of materials and construction of Super Structure of SP/SSP building (Control cubicles)	Each	0	81,393	1	0	81,393	81,393	
34(b)	Cement concrete for foundation with stone ballast 40mm nominal size	Cum.	0	1,360	40	0	54,400	54,400	
34(c)	RCC work for foundation and plinth in ratio 1:1½:3.	Cum.	0	2,211	2	0	4,422	4,422	
34(d)	Brick work in foundation plinth, retaining walls and drainage.	Cum.	0	1,203	80	0	96,240	96,240	
34(e)	Construction of retaining wall with random rubble masonry in cement & sand.	Cum.	0	931	5	0	4,655	4,655	
34(f)	Earth work in excavation and filling including compaction					0	0	0	
	(i) In normal soil	Cum.	0	26	175	0	4,550	4,550	
	(ii) In hard soil	Cum.	0	33	20	0	660	660	
34(g)	Earth work, excavation for foundation					0	0	0	
	(i) In normal soil	Cum.	0	25	70	0	1,750	1,750	
	(ii) In hard soil	Cum.	0	32	20	0	640	640	
34(h)	Excavation of pile of 100 mm to 200 mm dia upto 3.5M deep.	Metre	0	43	0	0	0	0	
34(i)	Plastering of retaining wall with 1:4 cement & sand mortar.	Sqm	0	36	40	0	1,440	1,440	
34(j)	Supply & Spreading of Ballast/Gravel in the Switch Yard.	Sqm	345	2	24	8,280	48	8,328	
<b>Total for Section-2 (Concrete) =</b>						<b>33,73,968.00</b>	<b>11,47,378</b>	<b>45,21,346.00</b>	

**SCHEDULE - 1  
SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION -3 (FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials(S)	Erection(E)	Total (M+E)
1	2	3	4	5	6	7	8	9
3(a)(i)	Supply and erection of traction masts fabricated from Rolled mild steel beam (BFB) of size 152mm x152mm x 37.1 Kg/m and galvanised in length 9.5 m or 8.5 m long.	MT	45,259	1,037	0	0.00	0.00	0.00
3(a)(ii)	Supply and erection of traction masts, main masts of switching stations, Booster transformer station, fabricated from Rolled mild steel joist (RSJ) of size 203mm x 152 mm x 52.0 Kg/m and galvanised in lengths 9.5 m or 8.5 m long.	MT	42,491	1,037	4	1,69,964.00	4,148.00	1,74,112.00
3(b)(i)	Supply and erection of fabricated and galvanised structures (O,N & R type portals) with all necessary components other than masts.	MT	53,854	3,546	60	32,31,240.00	2,12,760.00	34,44,000.00
3(b)(ii)	Supply and erection of Structure steel (traction masts) fabricated and galvanised of all Type : B-Series Mast.	MT	45,423	1,037	206.11	93,62,134.53	2,13,736.07	95,75,870.60
3(b)(iii)	Supply & Erection of special fabricated and galvanised steel structures other than Portals & traction- Masts not covered under items 3(b)(i) & 3(b)(ii).	MT	47,703	3,546	25.5	12,16,426.50	90,423.00	13,06,849.50
3(c)	Supply only of fabricated steel other than masts	MT	66,257	0	20.5	13,58,268.50	0.00	13,58,268.50
3(e)(i)	Supply and erection of a Guy Rod Assembly	Each	4,086	473	80	3,26,880.00	37,840.00	3,64,720.00
3(g)	Supply of steel reinforcement for RCC	MT	42,171	0	18	7,59,078.00	0.00	7,59,078.00
3(e)(ii)	Supply and erection of Anchoring Arrangement of traction mast with Galvanised steel stranded wire	Each	6,472	473	0	0.00	0.00	0.00
3(i)	Supply and erection of 25KV Caution Boards/Plates.	Each	131	42	0	0.00	0.00	0.00
4(a)(i)	Supply without insulator and erection of Single bracket assembly.	Each	5,734	429	585	33,54,390.00	2,50,965.00	36,05,355.00
4(a)(ii)	Extra on 4 (a)(i) for supporting two OHES.	Each	1,268	129	0	0.00	0.00	0.00
<b>Page Total</b>						<b>1,97,78,381.53</b>	<b>8,09,872.07</b>	<b>2,05,88,253.60</b>

1	2	3	4	5	6	7	8	9
4(a) (iii)	Supply without Insulator and erection of Single bracket assembly suitable for tramway type OHE (Regulated)	Each	4,705	429	0	0.00	0.00	0.00
4(a) (iv)	Extra on item 4(a)(iii) for supporting two tramway type OHE (Regulated)	Each	1,424	129	0	0.00	0.00	0.00
4(a)(v)	Supply without insulator and erection of Single bracket assembly for composite OHE	Each	5,741	429	0	0.00	0.00	0.00
4(b)(i)	Supply without Insulator and erection of a pull off arrangement for one OHE	Each	4,848	267	3	14,544.00	801.00	15,345.00
4(b)(ii)	Extra for each additional equipment pulled.	Each	2,664	267	3	7,992.00	801.00	8,793.00
4(b) (iii)	Supply without Insulator and erection of a pull off arrangement for regulated tramway type OHE.	Each	2,744	212	0	0.00	0.00	0.00
4(b) (iv)	Supply without Insulator and erection of a pull off arrangement for one composite OHE.	Each	4,848	267	0	0.00	0.00	0.00
5(b)	Supply without insulator and erection of suspension of conventional/ composite OHE from Head Span.	Each	3,852	461	0	0.00	0.00	0.00
8(a)(v)	Supply and erection of Regulating Equipment (3-Pulley type) with counter weight assembly for conventional/ composite OHE.	Each	32,186	1,764	46	14,80,556.00	81,144.00	15,61,700.00
8(a) (vi)	Supply and erection of Regulating Equipment (3-Pulley type) with counter weight assembly for tramway type OHE (Regulated)	Each	24,282	1,485	0	0.00	0.00	0.00
8(a)(x)	Same as 8(a)(v) but excluding stainless steel wire rope.	Each	29,189	1,764	0	0.00	0.00	0.00
8(a) (xi)	Same as 8(a)(vi) but excluding stainless steel wire rope.	Each	21,611	1,485	0	0.00	0.00	0.00

8(b)(ii)	Supply without Insulator and erection of materials for termination of Double conductor.	Each	4,185	469	46	1,92,510.00	21,574.00	2,14,084.00
8(b)(v)	Supply without Insulator and erection of materials for termination of Earth wire	Each	2,244	195	0	0.00	0.00	0.00
<b>Total</b>						<b>16,95,602.00</b>	<b>1,04,320.00</b>	<b>17,99,922.00</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
8(b) (vii)	Supply without Insulator and erection of materials for termination of double conductors for composite OHE.	Each	4,081	469	0	0.00	0.00	0.00
9(a)	Supply without Insulator and erection of anticreep with galvanized steel wire.	Each	10,740	1,317	24	2,57,760.00	31,608.00	2,89,368.00
9(b)	Supply without Insulator and erection of anticreep with galvanized steel wire suitable for tramway type Overhead equipment (Regulated)	Each	9,204	1,317	0	0.00	0.00	0.00
9(c)	Supply without Insulator and erection of anticreep for composite OHE with galvanized Steel wire.	Each	11,345	1,317	0	0.00	0.00	0.00
13(e)	Extra on item 13(a), (b) or (c) for an inter-locking device	Each	916	108	0	0.00	0.00	0.00
14	Supply & erection of a connection between return conductor and rail.	Each	5,031	1,645	0	0.00	0.00	0.00
16(a) (i)	Supply and erection of a structure bond.	Each	528	131	405	2,13,840.00	53,055.00	2,66,895.00
16(a)(ii)	Supply and erection of a Galvanised steel stranded wire structure bond	each	1,511	131	7	10,577.00	917.00	11,494.00
16(b)	Supply and erection of a longitudinal bond	Each	298	117	50	14,900.00	5,850.00	20,750.00
16(c)	Supply & erection of a transverse and special bond.	Each	679	140	35	23,765.00	4,900.00	28,665.00
17(a)	Supply & erection of a single earth electrode.	Each	1,191	498	30	35,730.00	14,940.00	50,670.00
17(c)	Supply and erection of earth bus	Metre	126	35	200	25,200.00	7,000.00	32,200.00
17(e)	Supply and erection of 8 SWG G.I. wire for earthing	Metre	11	9	35.2	387.20	316.80	704.00
30(a) (i)	Supply and erection of fencing panels at switching stations.	Metre	2,298	39	150	3,44,700.00	5,850.00	3,50,550.00
30(a) (ii)	Supply and erection of fencing uprights	MT	63,551	1,869	2	1,27,102.00	3,738.00	1,30,840.00
30(b) (i)	Supply and erection of anticlimbing device for Switching stations	Metre	153	4	50	7,650.00	200.00	7,850.00
30(b) (ii)	Supply and erection of anticlimbing device for B.T. stations.	Each	1,448	250	0	0.00	0.00	0.00
30(b) (iii)	Supply and erection of anticlimbing device for L.T. Supply Transformer	Each	635	148	2	1,270.00	296.00	1,566.00
30(b) (iv)	Supply and erection of anti monkey menace.	Each	2,534	148	2	5,068.00	296.00	5,364.00
<b>Page Total</b>						<b>10,67,949.20</b>	<b>1,28,966.80</b>	<b>11,96,916.00</b>
<b>Total for Section-3</b>						<b>2,25,41,932.73</b>	<b>10,43,158.87</b>	<b>2,35,85,091.60</b>

**SCHEDULE - 1**  
**SCHEDULE OF PRICES & TOTAL PRICES**  
**SECTION - 4 (a) (NON-FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
5az(ii)	supply and erection of span wire	Metre	498	23	235	117030	5,405.00	122435
5(c)	Supply of without insulator and erection of Suspension/ registration of contact wire only.	Each	1,196	183	4	4,784.00	732.00	5,516.00
6(az)	Supply and erection of Over Head equipment only	Km	46,757	13,521	19	8,88,383.00	2,56,899.00	11,45,282.00
6(bz)	Supply & Erection of contact wire only	Km	2,828	6,048	0	0.00	0.00	0.00
6(cz)	Supply and Erection of contact wire only (Regulated with bridle wire)	Km	27,230	7,944	0	0.00	0.00	0.00
7(a)	Supply and Erection of all aluminium 25KV Feeder/ Return conductor (Single Spider)	Km	87,846	1,584	1	87,846.00	1,584.00	89,430.00
7(c)	Supply and erection of earth wire.	Km.	43,213	1,208	0	0.00	0.00	0.00
7(d)	Supply and Manual Erection of all aluminium 25KV Feeder/ Return conductor (Single Spider)	Km	87,846	2,476	1	87,846.00	2,476.00	90,322.00
7(e)	Supply and Erection of copper cross feeder wires (37/2.25 mm HDBC)	Km	5,77,320	1,584	0.3	1,73,196.00	475.20	1,73,671.20
10(az)	Extra on item 6(a) for supply and erection of additional fittings at a turnout, diamond crossing or overlap	Each	3,096	541	40	1,23,840.00	21,640.00	1,45,480.00
10(bz)	Extra on item 6(b) for supply and erection of additional fittings required at a turnout, diamond crossing or overlap.	Each	2,603	431	0	0.00	0.00	0.00
10(cz)	Extra on item 6(c) & (d) for supply and erection of additional fittings required at a turnout, diamond crossing or overlap.	Each	5,552	541	0	0.00	0.00	0.00
12(az)	Supply without Insulator & erection of a section insulator assembly	Each	16,405	1,406	20	3,28,100.00	28,120.00	3,56,220.00
12(b)	Supply without insulators.& erection of a double wire section insulator assembly	Each	16,612	1,412	0	0.00	0.00	0.00
<b>Page Total</b>						<b>18,11,025.00</b>	<b>3,17,331.20</b>	<b>21,28,356.20</b>

1	2	3	4	5	6	7	8	9
12(cz)	Supply without Insulator & erection of a section insulator assembly suitable for tramway type OHE (Regulated)	Each	16,295	1,249	0	0.00	0.00	0.00
12(d)	Supply & Erection of a Ceramic/beaded Glass Fibre type (PTFE) Short Neutral section assembly	Each	2,63,409	2,174	2	5,26,818.00	4,348.00	5,31,166.00
13(a)	Supply without Insulator and erection of a 25 KV single pole isolator	Each	18,104	1,302	15	2,71,560.00	19,530.00	2,91,090.00
13(b)	Supply without Insulators & erection of two 25 kV Single Pole Isolator gang operated without earth contact assembly.	Each	36,148	1,377	0	0.00	0.00	0.00
13(c)	Supply without Insulators & erection of 25kV Double Pole Isolator.	Each	29,523	1,438	8	2,36,184.00	11,504.00	2,47,688.00
13(d)	Extra for supply & erection of an earth contact assembly in an Isolator.	Each	6,025	150	3	18,075.00	450.00	18,525.00
15(a)(i)	Supply & erection of large copper jumpers	Each	2,508	236	21	52,668.00	4,956.00	57,624.00
15(a)(ii)	Supply & erection of small copper jumpers	Each	294	236	10	2,940.00	2,360.00	5,300.00
15(az)(iii)	Supply & erection of copper jumpers	Each	92	236	4	368.00	944.00	1,312.00
15(a)(iv)	Supply & erection of a copper jumper (5mm dia droper wire).	Each	804	236	4	3,216.00	944.00	4,160.00
15(b)	Supply and erection of an aluminium jumper.	Each	1,286	109	4	5,144.00	436.00	5,580.00
15(c)	Supply and erection of insulated catenary cable in the span under over-line structures.	Each	2,621	217	0	0.00	0.00	0.00
15(d)	Supply of materials and erection of Large copper jumper 160 Sq. mm between Aluminium bus and cross feeders	Each	3,154	236	2	6,308.00	472.00	6,780.00
15(e)	Supply of materials and erection of Large copper jumper 160 Sq. mm between cross feeder and OHE	Each	4,801	236	2	9,602.00	472.00	10,074.00
17(d)	Supply and erection of copper strips for equipment earthing.	Metre	271	32	15	4,065.00	480.00	4,545.00
26(a) (i)	Supply & erection of : Aluminum bus-bars 36mm x 28mm.	Metre	195	31	150	29,250.00	4,650.00	33,900.00
<b>Page Total</b>						<b>11,66,198.00</b>	<b>51,546.00</b>	<b>12,17,744.00</b>

1	2	3	4	5	6	7	8	9
26(a) (ii)	Supply & erection of Solid copper bus-bars 18mm.	Metre	879	44	50	43,950.00	2,200.00	46,150.00
26(b) (i)	Supply and erection of Aluminum bus-bar connectors:- Bus terminal (6480)	Each	1,341	19	50	67,050.00	950.00	68,000.00
26(b) (ii)	Supply and erection of Aluminum bus-bar connectors:- Bus splice (6490)	Each	1,482	19	50	74,100.00	950.00	75,050.00
26(b) (iii)	Supply and erection of Aluminum bus-bar connectors:- Bus tee connector (6500)	Each	1,495	17	50	74,750.00	850.00	75,600.00



26(b) (iv)	Supply and erection of Aluminum bus-bar connectors:- Terminal connector 36/20 (6530)	Each	1,349	17	50	67,450.00	850.00	68,300.00
26(b) (v)	Supply and erection of Aluminum bus-bar connectors:- Tap connector (6520)	Each	1,349	19	50	67,450.00	950.00	68,400.00
26(b) (vi)	Supply and erection of Aluminum bus-bar connectors:- Flexible bus splice (6550)	Each	3,924	19	50	1,96,200.00	950.00	1,97,150.00
26(b) (vii)	Supply and erection of Aluminum bus-bar connectors:- Terminal connector Bolted Type (6830-1)	Each	1,067	17	50	53,350.00	850.00	54,200.00
26(c) (i)	Supply & erection of solid copper bus-bar connectors: Bus terminal (6310)	Each	888	19	50	44,400.00	950.00	45,350.00
26(c) (ii)	Supply & erection of solid copper bus-bar connectors: Bus splice (6320)	Each	980	19	50	49,000.00	950.00	49,950.00
26(c) (iii)	Supply & erection of solid copper bus-bar connectors: Bus tee joint (6330)	Each	2,664	19	50	0.00	950.00	950.00
26(c) (iv)	Supply & erection of solid copper bus-bar connectors: Bus terminating tee (6351)	Each	1,804	19	50	90,200.00	950.00	91,150.00
<b>Page Total</b>						<b>8,27,900.00</b>	<b>12,350.00</b>	<b>8,40,250.00</b>
<b>Total for Section-4(a)</b>						<b>38,05,123.00</b>	<b>3,81,227.20</b>	<b>41,86,350.20</b>

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 4(b) (Non-Ferrous)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be

Item No.	Description	UOM	SOR Rate			Qty	Total Prices		
			Materials	Erection			Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9	
6(ax)(i)	Supply 107 sqmm 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(az)	MT	652000	0	20.96	13665920	0	13665920	
6(ax)(ii)	Supply 65 Sqmm, 19/2.10 mm Cadmium copper catenary wire required for item nos. 5(az)(ii), 6(az), 9(dz), 9(ez), 10(az), 10(cz), 12(cz), 15(az)(iii), and 31(az)	MT	652000	0	13	8476000	0	8476000	
<b>Total for Section -4(b)</b>						<b>22141920</b>	<b>0</b>	<b>22141920</b>	

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 5 ( INSULATORS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	UOM	SOR Rate			Qty.	Total Prices		
			Materials	Erection			Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9	
4(ax)	<b>Supply of Insulators for item 4(a)(i)&amp;4(a)(iii)</b>								
4(ax)(i)	Stay Arm Porcelain (CD-1050 mm)	Each	1554.72	0.00	585	9,09,511.20	0	9,09,511.20	
4(ax)(ii)	Stay Arm Composite (CD-1050 mm)	Each	1498.75	0.00	9	13,488.75	0	13,488.75	
4(ax)(iii)	Stay Arm Composite (CD-1600 mm)	Each	2293.56	0.00	9	20,642.04	0	20,642.04	
4(ax)(iv)	Bracket Porcelain (CD-1050 mm)	Each	1338.07	0.00	585	7,82,770.95	0	7,82,770.95	
4(ax)(v)	Bracket Composite (CD-1050 mm)	Each	890.29	0.00	9	8,012.61	0	8,012.61	
4(ax)(vi)	Bracket Composite (CD-1600 mm)	Each	2293.56	0.00	9	20,642.04	0	20,642.04	
4(bx)	<b>Supply of 9-Tonne Insulators for items 4(b)(i) &amp; 4(b)(iii)</b>								
4(bx)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	2	3,924.66	0	3,924.66	
4(bx)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	2	2,481.22	0	2,481.22	
4(bx)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00	
5(ax)	<b>Supply of 9-Tonne insulators for item 5(a)(i), 5(b) &amp; 5(c)</b>								
5(ax)(i)	Porcelain (CD-1050 mm)	Set	3924.66	0.00	0	0.00	0	0.00	
5(ax)(ii)	Composite (CD-1050 mm)	Set	2481.22	0.00	0	0.00	0	0.00	
5(ax)(iii)	Composite (CD-1600 mm)	Set	4587.12	0.00	0	0.00	0	0.00	
8(bx)	<b>Supply of 9-Tonne insulators for item 8(b)(i), (ii), (iii), (vi), (vii), (viii) &amp; (ix)</b>								
8(bx)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	46	90,267.18	0	90,267.18	
8(bx)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	2	2,481.22	0	2,481.22	
8(bx)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	2	4,587.12	0	4,587.12	
9(ax)	<b>Supply of 9-Tonne insulators for item 9(a), (b), (c), (d) &amp; (e)</b>								
9(ax)(i)	Porcelain (CD-1050 mm)	Set	3924.66	0.00	24	94,191.84	0	94,191.84	
9(ax)(ii)	Composite (CD-1050 mm)	Set	2481.22	0.00	3	7,443.66	0	7,443.66	
9(ax)(iii)	Composite (CD-1600 mm)	Set	4587.12	0.00	3	13,761.36	0	13,761.36	
11(ax)	<b>Supply of 9-Tonne Insulator for item 11(a)(i) &amp; 11(a)(ii)</b>								
11(ax)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	20	39,246.60	0	39,246.60	
11(ax)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	0	0.00	0	0.00	
11(ax)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00	
11(bx)	Supply of 25 kV Post Insulator for Item 11 (b)	Each	3947.24	0.00	24	94,733.76	0	94,733.76	
11(cx)	Supply of 3 kV Disc Insulator for Item 11 (c)	Each	422.92	0.00	0	0.00	0	0.00	
11(dx)	Supply of 11 kV Post Insulator for Item 11 (d)	Each	422.92	0.00	0	0.00	0	0.00	
12(ax)	<b>Supply of 9 Tonne and Sectioning Insulators for item No.12(a)</b>								
12(ax)(i)	Porcelain 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	6614.43	0.00	20	1,32,288.60	0	1,32,288.60	
12(ax)(ii)	Composite 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	5892.71	0.00	2	11,785.42	0	11,785.42	
<b>Page Total</b>						<b>22,52,260.23</b>	<b>0.00</b>	<b>22,52,260.23</b>	
1	2	3	4	5	6	7	8	9	
12(ax)(iii)	Composite 9-Tonne (CD-1600 mm) & Sectioning Insulator	Set	6945.66	0.00	0	0.00	0	0.00	
12(bx)	<b>Supply of 9 Tonne and Sectioning Insulators for item No.12(b)</b>								
12(bx)(i)	Porcelain 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	11266.53	0.00	0	0.00	0	0.00	
12(bx)(ii)	Composite 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	10544.81	0.00	0	0.00	0	0.00	
12(bx)(iii)	Composite 9-Tonne (CD-1600 mm) & Sectioning Insulator	Set	11597.76	0.00	0	0.00	0	0.00	
12(cx)	Supply of Sectioning Insulators for 12(c) and 12(cz)	Each	4652.00	0.00	0	0.00	0	0.00	
13(ax)	Supply of Post & Operating rod insulators for item 13(a)	Set	10291.00	0.00	20	2,05,820.00	0	2,05,820.00	
13(bx)	Supply of Post & Operating rod insulators for item 13(b)	Set	20582.00	0.00	0	0.00	0	0.00	
13(cx)	Supply of Post & Operating rod insulators for item 13(c)	Set	20582.00	0.00	16	3,29,312.00	0	3,29,312.00	
28(x)	Supply of Post insulators for item 28	Set	7894.00	0.00	4	31,576.00	0	31,576.00	
<b>Page Total</b>						<b>5,66,708.00</b>	<b>0.00</b>	<b>5,66,708.00</b>	
<b>Total for section-5</b>						<b>28,18,968.23</b>	<b>0.00</b>	<b>28,18,968.23</b>	

**Note :** Earlier, Item nos. 11(a)(i), 11(a)(ii), 11(b), 11(c) & 11(d) include supply as well as erection both. For similarity with other items, supply and erection have been separated. Supply portion is under section-5 (Insulators) and erection portion included in Section-1 (General).

**Quantity of Non- Schedule item of OHE In C/w Proposrd Maruti Sidind,Electrification of Manesar- Patli Single line Connectivity and Modification of Patli Yard including Double line SP at HORC Line ( 17.5 TKM)**

<b>Schedule 1, Section-6</b>					
<b>Item No.</b>	<b>Brief Description of Items</b>	<b>Unit</b>	<b>Qty</b>	<b>Unit Rate of Supply &amp; Erection</b>	<b>Total Amt.</b>
<b>NS-1(a)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution clearance to OHE near by rectified" Board Size 400mmx270mmx2mm	Nos.	20	758.27	<b>15165.37</b>
<b>NS-1(b)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Power block working limit" Board Size 450mmx450mmx2mm	Nos.	10	1072.84	<b>10728.45</b>
<b>NS-1( c)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution unwired turnout" Board Size 900mmx600mmx2mm	Nos.	20	2859.55	<b>57190.92</b>
<b>NS-1(d)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Electric Engine Stop Board" Board Size 900mmx600mmx2mm	Nos.	10	2852.915	<b>28529.15</b>
<b>NS-1( e)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Caution live wire" Board Size 400mmx270mmx2mm	Nos.	40	521.125	<b>20845</b>
<b>NS-2</b>	Design,Manufacturing supply of retro reflective type sigma board as per RDSO drawing no. T1/DRG/OHE/PLTBRD/RDSO/00036/12/0 (Sixe-450mmx60mm) And RDSO Specification No. ETI/OHE/33A(12/97) Rev.8	Set	10	1485.208	<b>14852.08</b>
<b>NS-3(a)</b>	Fabrication, developing and supply of sectioning diagram, schematic and TSWR board Fabrication and supply of pre compressed particle laminated board white in colour with Aluminium beading 1/2" x 1/2" on all around the board and an arrangement of fixing/hanging on wall of adequate strength of top of board as required	Square foot	200	81.73	<b>16346.97</b>
<b>NS-3(b)</b>	Fabrication, developing and supply of sectioning diagram, schematic and TSWR board developing the sectioning diagram, schematic diagram & TSWR diagram with computerised digital printing on adhesive vinyl of adequate size as required.	Square foot	200	548.369	<b>109673.87</b>
<b>NS-4(a)</b>	Dismantling of Mast/Gantry	MT	4	4587.125	<b>18348.5</b>
<b>NS-4(b)</b>	Extra on erection under power block for Item No. NS-4a	MT	4	4587.125	<b>18348.5</b>
<b>NS-5(a)</b>	Dismantling of Portal	MT	3	6426	<b>19278</b>
<b>NS-5(b)</b>	Extra on erection under power block for Item No. NS-5a	MT	3	6426	<b>19278</b>
<b>NS-6(a)</b>	Dismantling of a Copper/Aluminium Jumper	Each	0	360	<b>0</b>
<b>NS-6(b)</b>	Extra on erection under power block for Item No. NS-6a	Each	0	360	<b>0</b>
<b>NS-7(a)</b>	Shifting of OHE Termination (fixed) location from one mast/support to another.	Each	6	2871.25	<b>17227.5</b>
<b>NS-7(b)</b>	Extra on erection under power block for Item No. NS-7a	Each	6	2871.25	<b>17227.5</b>
<b>NS-8(a)</b>	Shifting of OHE Termination (Regulated) from one mast/support to another.	Each	6	3091.3	<b>18547.8</b>
<b>NS-8(b)</b>	Extra on erection under power block for Item No. NS-8a	Each	6	3091.3	<b>18547.8</b>
<b>NS-9(a)</b>	Adjustment on bracket assemblies for assemblies for lowering/raising the height of contact and catenary wire where Encumbrance is changed.	Each	15	2093.82	<b>31407.27</b>
<b>NS-9(b)</b>	Extra on erection under power block for Item No. NS-9a	Each	15	2093.82	<b>31407.27</b>
<b>NS-10(a)</b>	Adjustment on bracket assemblies for assemblies for lowering/raising the height of contact and catenary wire where Encumbrance is not changed.	Each	15	1914.7715	<b>28721.57</b>
<b>NS-10(b)</b>	Extra on erection under power block for Item No. NS-10a	Each	15	1914.772	<b>28721.5725</b>
<b>NS-11</b>	Loading, leading, Transportation, unloadingand stacking of steel structure & Conductor etc from Dismatling site to Concern Engineer Incharge Store.	MT	20	3343.502	<b>66870.04</b>

<b>NS-12(a)</b>	Hiring & operating of 01 Nos. MUV (Multi Utility Vehicle) of loading capacity of one MT, Sitting capacity of 4 person 4 stroke, 4 Cylinder engine, factory build metal body cargo box type- Mahindra, TATA or similar type multi utility vehicle (with 24 Hours available) including major minor repairs, cost of lubricant, fuels, salary of driver, toll taxes and all other taxes complete operation & maintenance for running of 1200 KM in a month for the use of Electrical Department of HRIDC for supervision of work & for transportation of material/machines & other usage. The Vehicle shall run on pucca/lacha road and along the track. The Contractor shall have road permit for use vehicle in the state of Haryana.	Months	12	25643.600	307723.2
<b>NS-12(b)</b>	Extra on Item NS-12a for more than 1200 KM (1x12x1500=18000)	Per KM	18000	5.460	98280
<b>NS-13</b>	Hiring of 1 No vehicle (Maruti Dzire or similar) on daily basis including all maintenance, major/minor repairs, cost of lubricants, fuels, driver, GST, taxes etc. complete (only extra hours, Night halt charges, Toll tax and parking charges will be paid extra) for the use of HRIDC officers.				
<b>NS-13 (a)</b>	Fix Charges up to Km 100 per day	Per Day	50	1169.000	58450
<b>NS-13 (b)</b>	Extra charges beyond Km 100 per day per vehicle	Per Km	2000	8.290	16580
<b>NS-14</b>	Setting up of earthing Station at Switching post	Job	1	65313	65313
<b>NS-15(a)</b>	Supply & Erection of Safety item with supply of fixing material (Plastic/wooden/gitti & Secrew) for supply & erection of electric shock treatment chart (Glass framed) size 22"x28" complete with aluminium angle beading 1"x1" all around	Nos.	20	736.02	14720.4
<b>NS-15(b)</b>	Supply & Erection of Safety item with supply of fixing material (Plastic/wooden/gitti & Secrew) for supply & erection of electric shock treatment chart & its first aid coloured calendar in Hindi & English Size 550mm x 900mm with plastic at top & bottom.	Nos.	20	55.332	1106.64
<b>NS-16</b>	Route Mapping of OHE mast by Oliver G kit with use of GPS System in 25 KV AC OHE System of all siding of XXXX Division.	Km	17.1245	2103.015	36013.08037
<b>NS-17</b>	Lowering/Raising the height of OHE Termination on same Mast/support	Each	10	1468	14680
<b>NS-18</b>	Provision of Buried Rail	Job	1	65175	65175
<b>NS-19</b>	Supply of 25 KV single pole Vacuum Circuit breaker.	Each	1	507423	507423
<b>NS-20</b>	Erection, testing & commissioning of 25 KV single pole Vacuum Circuit breaker.	Each	1	6764	6764
<b>NS-21</b>	Supply of 25 kV Potential Transformer (Type-II)	Each	1	100910	100910
<b>NS-22</b>	Erection of 25 kV Potential Transformer (Type-II)	Each	1	945	945
<b>NS-23</b>	Supply of 25 kV Current Transformer (1500/750/5A)	Each	1	131428	131428
<b>NS-24</b>	Erection of 25 kV Current Transformer (1500/750/5A)	Each	1	922	922
<b>NS-25</b>	Supply, Erection, Testing & commissioning of control & relay panel as per RDSO specification no. TI/SPC/PSI/PROTECT/6071 or latest suitable for one feeder CB & 2 BM	Nos.	1	2192702	2192702
<b>NS-26</b>	Provision of First Aid staff & nearest doctor name board/nearest fire fighting name and address board	Nos.	1	650	650
<b>NS-27</b>	Provision of First Aid box and stretcher with wooden box and hanging arrangement etc.	Nos.	1	11869	11869
<b>NS-28</b>	Provision of Wooden key box with glass front in frame with hinges and locking arrangement 18x24x6 inch.	Nos.	1	2701	2701
<b>NS-29</b>	Supply of hand Gloves (Tested for 25 kV AC)	Nos.	5	1155	5775
<b>NS-30</b>	Provision of Portable fire fighting Dry Chemical powder 5 Kg ISI mark	Nos.	1	3270	3270
<b>NS-31</b>	Provision of Portable fire fighting- CO2 fire extinguisher 10 Kg	Nos.	1	14527	14527
<b>NS-32</b>	Provision of Portable fire fighting- Fire bucket 10 Ltrs	Nos.	5	320	1600
<b>NS-33</b>	Provision of Portable fire fighting- Fire bucket Stand	Nos.	1	2139	2139
<b>NS-34</b>	Supply & Erection of Electric Shock treatment chart & its first aid coloured calendar in Hindi & English Size-550mm x 900mm with plastic at top & bottom	Nos.	10	58	580
		<b>Total Amount</b>			<b>4269509.45</b>

**Quantity Schedule of SCADA Work in C/w Proposrd Maruti Sidind, Electrification of Manesar- Patli Single line Connectivity and Modification of Patli Yard including Double line SP at HORC Line ( 17.5 TKM)**

**SCHEDULE -1 , SECTION - 7 (SCADA)**

S.No.	SOR Item No.	Description	Unit	Qty.	Basic Rate		Rate		Total
					Material	Erection	Material	Erection	
	1	2	3	4	5	6	7	8	9
1	1010101	Design and Drawings	Lumsum	1	197332.55	0	197332.55	0.00	197332.55
2	1010201 & 1010202	Supply, Erection, Testing & Commissioning of Supervisory Control and Data Acquisition (SCADA) equipments at the Remote Control Centre for required work Station.	Lumsum	0	5684749.27	500744.6	0.00	0.00	0.00
3	1010301 & 1010302	Supply , installation & testing of standerd SCADA software	Lumsum	0	2941372.43	333298.4	0.00	0.00	0.00
4	1010501 & 1010502	Supply, Erection, Testing and Commissioning of GPS Receiver	Lumsum	0	327396.44	19757.82	0.00	0.00	0.00
5	1010801 & 1010802	Supply, Erection, Testing & Commissioning of Remote Station Equipments at remote stations:- For Sectioning Posts (SP/SPP)	Lumsum	1	908444.86	57013.38	908444.86	57013.38	965458.24
6	1010901	Modification/ Up gradation, testing and commissioning in existing standerd SCADA software at RCC Equipment for configuration integration/ hooking up of additional RTUs of adject section with master station.	Lumsum	1	0	783369.5	0.00	783369.45	783369.45
7	1011001 & 1011002	Supply, Erection, Testing & Commissioning of 2 X 5 KVA dual redundant hot standby UPS System	Lumsum	0	414747.73	30954.19	0.00	0.00	0.00
8	1011101 & 1011102	Supply, Erection, Testing & Commissioning of Low maintainance lead acid battery Sets	Lumsum	0	1347687.13	85618.55	0.00	0.00	0.00
9	1011201 & 1011202	Supply & Erection of Furniture at RCC	Lumsum	0	366165.64	26343.97	0.00	0.00	0.00
								<b>Total Amount</b>	<b>1946160.24</b>

**SCHEDULE OF PRICES & TOTAL PRICES**

**Tools & Plants (OHE & PSI)**

**Schedule 1, Section-12**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

RVNL SOR Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
28002	Tirfor 5T /3 T ISI marked as per IS :5604/1984 or latest (Make TRACTEL /TIRFOR or equivalent as approved by Engineer)	Nos	19,651	0	1	19651	0	19651
28004	Pull lift 0.75 T/0.8 T ISI mark (Make TRACTEL or equivalent as approved by engineer)	Nos	7,909	0	1	7909	0	7909
28005	Fibre/light weight winch type Ladder Trolley suitable to move on railway track for maintenance of 25KV AC OHE. (SUMER make or equivalent as approved by engineer) .	Nos	70,560	0	1	70560	0	70560
28007	Earthing discharge rod complete suitable for working voltage of 25KV AC traction, fibre glass body screw type in a suitable carry bag as per RDSO specification no ETI/OHE/51(9/87) or latest and as approved by engineer.	Each	14,495	0	5	72475	0	72475
28008	Aluminium Straight ladder extendable type (11mtr), Closed height 6mtr Extended height 11 mtr .(SUMER make Ref-AL100/8809 or equivalent as approved by engineer) .	Nos	17,024	0	2	34048	0	34048
28009 (a)	Portable electric drill suitable for drilling holes of 12-23mm dia, working on single phase, 230V AC supply alongwith 2 nos suitable spare drill bits. (Make: Railli wolf model WDH-12 or equivalent model of Hitachi/Black & Decker as approved by Engineer).	Nos	14914	0	1	14914	0	14914
28010	First aid box made of GI/AL sheet, ISI marked, filled with medicines as per concerned HRIDC/zonal Railway standard with suitable locking arrangement and as approved by Engineer Inchrge.	Nos	2397	0	1	2397	0	2397

28011	Stretcher two fold type, made of high quality aluminium alloy tubes. Aprox. Dimensions: unfolded 2100x560x150mm and folded 1100x200x110mm, max weight 8kg, suitable for load weight upto 150kg, to be supplied with sturdy carry case as approved by Engineer	Nos	3,105	0	1	3105	0	3105
28017	Stainless steel Digital micro meter suitable for measuring 0-25 mm dia, resolution 0.001mm and accuracy of (+/-)1µm. Mitutoyo make or equivalent as approved by engineer.	Nos	9957	0	1	9956.7	0	9956.7
28020	Portable 5KVA Silent diesel Gen Set with battery push button start. Make: KOEL/Honda/Mahindra or as approved by Engineer	Set	1,84,000	0	2	368000	0	368000
28022	Vernier Calipers Digital, range 0-200 mm Mitutoyo make Model 500-197-30 or equivalent as approved by Engineer	Nos	12,872	0	1	12872	0	12872
<b>Total for Tools &amp; Plants (OHE &amp; PSI)</b>						<b>615887.7</b>		<b>615887.7</b>

**Quantity Schedule of Electrical wiring and Other General Electrical works in C/w Proposed Maruti Siding/Yard**

**Schedule -2, Section -1**

S NO.	ITEM Description	Item Code	Item Qty	Qty Unit	Unit Rate (Rs)	Amount
<b>NS 1- Recessed/Surface conduit wiring system - Supply of material and wiring of LP/TP/FP/Ex.Fan point and other point with 1.5 sqmm PVC single core multistranded copper wire insulated concealed in stone/brick masonry wall in 19/20 mm PVC conduit with 1.5sqmm PVC wire insulated copper for earth wire 1-way/2-way switch 5/6A as required and good quality of ceiling rose including connection(with modular switch,socket &amp; ceiling rose) As per specification.</b>						
1	Recessed/Surface conduit wiring system - Supply of material and wiring of LP/TP/FP/Ex.Fan point and other point with 1.5 sqmm PVC single core multistranded copper wire insulated concealed in stone/brick masonry wall in 19/20 mm PVC conduit with 1.5sqmm PVC wire insulated copper for earth wire 1-way/2-way switch 5/6A as required and good quality ceiling rose including connection(with modular switch,socket & ceiling rose) As per specification.	1	260	Numbers	353.59	91933.40
<b>NS 2- Supply and fixing 5/6Amp plug,(modular 5-pin 230V socket) including modular switch and with modular board and wiring with 2.5 sqmm PVC CU cable as per spec.</b>						
2	Supply and fixing 5/6A plug,modular 5-pin 230V socket including modular switch and with modular board and wiring with 2.5sqmm PVC CU cable as per spec.	2	120	Numbers	212.00	25440.00
<b>NS 3- Supply and fixing 15/16Amp plug, (modular 5-pin 230V power socket) including modular switch and with modular board and wiring with 04.0 sqmm PVC CU cable as per spec.</b>						
3	Supply and fixing 15/16A plug, modular 5-pin 230V socket including modular switch and with modular board and wiring with 04.0 sqmm PVC CU cable as per spec.	3	55	Numbers	234.51	12898.05
<b>NS 4- Supply and fixing 2 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standarder size ,concealed fixing of MS /PVC as per site engineer.</b>						
4	Supply and fixing 2 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standarder size, concealed fixing of MS /PVC as per site engineer.	4	55	Numbers	91.14	5012.70
<b>NS 5- Supply and fixing 4 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm,good quality and standarder size ,concealed fixing of MS /PVC as per site engineer.</b>						
5	Supply and fixing 4 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standarder size ,concealed fixing of MS /PVC as per site engineer.	5	80	Numbers	125.96	10076.8
<b>NS 6- Supply and fixing 8 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standarder size ,concealed fixing of MS /PVC as per site engineer.</b>						
6	Supply and fixing 8 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm good quality and standarder size ,concealed fixing of MS /PVC as per site engineer. As per specification.	6	42	Numbers	217.10	9118.20
<b>NS 7- Supply and fixing 12 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standarder size ,concealed fixing of MS /PVC as per site engineer.</b>						
7	Supply and fixing 12 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm ,good quality and standarder size ,concealed fixing of MS /PVC as per site engineer.	7	25	Numbers	233.5	5837.25
<b>NS 8- Supply, laying, connection and commission of sub- main 2x2.5 Sqmm with PVC insulated single core copper conductor cable and same size(2.5 Sqm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI marked PVC conduit in recessed/ on surface as per site requirement and As per specification.</b>						
8	Supply, laying, connection and commission of sub- main 2x2.5 Sqmm with PVC insulated single core copper conductor cable and same size(2.5 Sqm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification..	8	1400	meter	70.90	99260.00
<b>NS 9- Supply, laying, connection and commission of sub- main 2x4 Sqmm with PVC insulated single core copper conductor cable and same size(4 sqmm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.</b>						
9	Supply, laying, connection and commission of sub- main 2x4 Sqmm with PVC insulated single core copper conductor cable and same size(4 sqmm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.	9	800	Meter	118.49	94792.00
<b>NS 10- Supply, laying, connection and commission of sub- main 2x6 Sqmm with PVC insulated single core copper conductor cable and same size PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.</b>						
10	Supply, laying, connection and commission of sub- main 2x6 Sqmm with PVC insulated single core copper conductor cable and same size PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.	10	600	Meter	120.00	72000.00
<b>NS 11- Supply,Installation ,testing and connection of 1200/1400mm ceiling fans ISI marked 5 star rated reputed make and as per specification.</b>						
11	Supply,Installation ,testing and connection of 1200/1400mm ceiling fans ISI marked 5 star rated.	11	50	Numbers	1271.93	63596.50
<b>NS 12- Supply and fixing of ceiling fan regulator electronic type 5-step (modular type) as per specification.</b>						
12	Supply and fixing of ceiling fan regulator electronic type 5-step(modular type) as per specifications.	12	50	Numbers	344.10	17205.00
<b>NS 13 - Supply of 4 Core 16 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988 or latest 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable as per specification.</b>						
13	Supply of 4 Core 16 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable.	13	1500	Numbers	209.25	313875.00
<b>NS 14- Supply of 4 Core 35 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1)1988 or latest 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable and s per specification.</b>						
14	Supply of 4 Core 35 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable.	14	1000	Numbers	360.0	360000.00
<b>NS 15- Supply of 4 Core 70 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988 or latest 1.1 KV grade LT XLPE insulated armoured cable and as per specification.</b>						

15	Supply of 4 Core 70 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured, aluminium conductor cable.	15	4200	Meter	643.5	2702700.00
<b>NS 16- Supply of 4 Core 120 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured cable as per specification.</b>						
16	Supply of 4 Core 120 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured, aluminium conductor cable.	16	500	Numbers	997.5	498750.00
<b>NS 17- Supply and laying of HDPE pipe conforming to IS 4984:1995, 75/80 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.</b>						
17	Supply and laying of HDPE pipe conforming to IS 4984:1995, 75/80 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.	17	2000	Meter	86.90	173800.00
<b>NS 18- Supply and laying of HDPE pipe conforming to IS 4984:1995, 50 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.</b>						
18	Supply and laying of HDPE pipe conforming to IS 4984:1995, 50 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.	18	3200	Meter	88.89	284448.00
<b>NS 19- Supply and laying of HDPE pipe, dia 160mm(OD) under road/ground/ floor/railway track or as per site requirement already excavated trench. Wall the material grade PE-80 and class of pipe should be PN-4 IS-4984/1995 thickness between 6.2mm to 7.1 mm As per specification.</b>						
19	Supply and laying of HDPE pipe, dia 160mm under road/ground/ floor/railway track or as per site requirement already excavated trench. As per specification.	19	300	Meter	450.47	135141.00
<b>NS 20- Supply and fixing of 50mm internal dia G.I. pipe medium "B" class as per IS 1239 for cable laying with pole/wall/under road/floor As per specification.</b>						
20	Supply and fixing of 50mm dia G.I. pipe medium B class for cable laying. As per specification	20	45	Meter	217.77	9799.65
<b>NS 21- Laying of LT/HT cables in Air/pole/cable tray/trench etc. with suitable fixing arrangement and As per specification.</b>						
21	Laying of LT/HT cables in Air/pole/cable tray/trench etc. As per specification.	21	7500	Meter	19.80	148500.00
<b>NS 22- Excavation &amp; Refilling of trench of size 0.5 mtr wide x 1.2 mtr deep as per specification. trench work may be on kuchha/pucca land and all type of soil as per site requirement and without protective layer of brick. Surface of trench shall be made good in all respect and satisfaction of site engineer includes suitable protection of loop cable and As per specification.</b>						
22	Excavation & Refilling of trench of size 0.5 mtr wide x 1.2 mtr deep as per specification. trench work may be on kuchha/pucca land and all type of soil as per site requirement and without protective layer of brick. Surface of trench shall be made good in all respect and satisfaction of site engineer includes suitable protection of loop cable and As per specification.	22	5200	Metre	117.69	611988.00
<b>NS 23- Supply, fixing &amp; commissioning of 300 mm sweep ISI marked exhaust fan with louver shutter. As per specification.</b>						
23	Supply, fixing & commissioning of 300 mm sweep ISI marked exhaust fan with louver shutter. As per specification.	23	30	Numbers	1166.91	35007.30
<b>NS 24- Supply and fixing of Double Door MCB TPN DB 8 modules 4 row, neutral and earth link, with one no four pole MCB 40 amp, one no FP RCCB 40 amp 30 mA and twenty four no SP MCB 40/32/25/16/10/6amp. 'C' series. Breaking capacity not less than 10 kA. MCB, RCCB and DB should be as per tech spec. and of same make.</b>						
24	Supply and fixing of Double Door MCB TPN DB 8 modules 4 row, neutral and earth link, with one no four pole MCB 40 amp, one no FP RCCB 40 amp 30 mA and twenty four no SP MCB 40/32/25/16/10/6amp. 'C' series	24	5	Numbers	16345.62	81728.10
<b>NS 25- Supply and fixing of Double Door MCB DB SP 12 way (10+ 2 module), neutral and earth link, with one no DP MCB 40amp, one no DP RCCB 40 amp 30 mA and eight no SP MCB 32/25/16/10/6 amp. 'C' series. Breaking capacity not less than 10 kA. MCB, RCCB and DB should be as per tech spec. and of same make.</b>						
25	Supply and fixing of Double Door MCB DB SP 12 way (10+ 2 module), neutral and earth link, with one no DP MCB 40amp, one no DP RCCB 40 amp 30 mA and eight no SP MCB 32/25/16/10/6 amp. 'C' series	25	4	Numbers	7438.01	29752.04
<b>NS 26- Supply, fixing, testing and commissioning of 22 W Energy efficient LED tubular lamp four feet with its driver and Luminaire of CRCA steel sheet enclosure, IP-20 for indoor application, operating voltage (140-270)V, minimum 2000 Lumens, color temperature 6500°K, CRI&gt;65, as per specification of reputed make and as per tech spec.</b>						
26	Supply, fixing, testing and commissioning of 22 W Energy efficient LED tubular lamp four feet with its driver and Luminaire of CRCA steel sheet enclosure, IP-20 for indoor application, operating voltage (140-270)V, minimum 2000 Lumens, color temperature 6500°K, CRI>65 of reputed make..	26	140	Numbers	611.14	85559.60
<b>NS 27- Supply, Transportation, erection, testing, installation &amp; commissioning of self contained drinking water cooler with all connected standard fitting, accessories etc and 5 Kva wall mounted IC controlled electronic auto voltage corrector with time delay relay. Supply and erection of earth electrode and connection to earthing system etc as required.</b>						
27	Supply, Transportation and Installation of water cooler 150 ltrs. With all connected standard fitting and accessories.	27	2	Numbers	80805.73	161611.46
<b>NS 28- Supply, fabrication, erection, testing and commissioning of G.I. octagonal pole 6 meters long with top dia 70 mm, bottom dia 130 mm, base plate size 220x220x12mm and sheet thickness 3 mm, single arm/double arm suitable for street light fixture including digging of pit, making foundation and muffing with cement, concrete ratio M-20 as relevant IS code and As per specification.</b>						
28	Supply, fabrication, erection, testing and commissioning of G.I. octagonal pole 6 meters long with top dia 70 mm, bottom dia 130 mm, base plate size 220x220x12mm and sheet thickness 3 mm, single arm/double arm suitable for street light fixture including digging of pit, making foundation and muffing with cement, concrete ratio M-20 As per specification As per specification.	28	40	Numbers	11434.00	457360.00
<b>NS 29- Supply, fixing and commissioning of street light fitting accessories i.e. GI pipe of suitable bore/size as per fitting, clamps, nuts, bolts, cable/wire etc. as per site Engineer. As per specification.</b>						
29	Supply, fixing and commissioning of street light fitting accessories i.e GI pipe of suitable size.	29	30	Numbers	142.85	4285.50
<b>NS 30- Supply, Erection, testing &amp; commissioning of 40 Watt LED Energy efficient LED based street light fitting with pressure die cast aluminium housing with driver &amp; suitable fixing arrangement, IP-65 for outdoor application, operating voltage (140-270)V, System efficacy more than 100 lm/W, color temperature 6500K, CRI&gt;65, of reputed make as per reference list and as per tech specification.</b>						
30	Supply, Erection, testing & commissioning of 40 Watt LED Energy efficient LED based street light fitting with pressure die cast aluminium housing with driver & suitable fixing arrangement, IP-65 for outdoor application, operating voltage (140-270)V, System efficacy more than 100 lm/W, color temperature 6500K, CRI>65, of reputed make and as per tech.	30	70	Numbers	4041.05	282873.50
<b>NS 31- Supply, fixing testing and commissioning of (OFF delay) modular digital timers for operation of platforms and circulating area street light. As per specification.</b>						



31	Supply, fixing testing and commissioning of (OFF delay) modular digital timers for operation of platforms and circulating areas, street light. As per specification.	31	2	Numbers	5059.61	10119.22
<b>NS 32- Supply, fixing, testing and commissioning of Supply, testing and commissioning of feeder pillar of size 900x600x300 mm and bus bar capacity 200 Amp 3 phase and neutral with box. As per specification</b>						
32	Supply, fixing, testing and commissioning of Supply, testing and commissioning of feeder pillar of size 900x600x300 mm and bus bar capacity 200 Amp 3 phase and neutral with box. As per specification.	32	5	Numbers	3586.04	17930.20
<b>NS 33- Drilling of horizontal bore below Rly track or in all types of soil / rock by pushing method for laying of HDPE/SPUN/DWC/CI/GI pipe of various sizes up to 450 mm dia. As per Specification.</b>						
33	Drilling of horizontal bore below Rly track or in all type od soil by pushing method for laying of HDPE/SPUN/DWC/CI/GI pipe of various sizes up to 450 mm dia. As per Specification	33	350	Meter	2788.83	976090.50
<b>NS 34- Supply installation Testing &amp; Commissioning of rechargeable batten type Emergency light, 60 LEDs 4 watt or higher with one hour minimum backup make as per reference list. As per specification.</b>						
34	Supply installation Testing & Commissioning of rechargeable batten type Emergency light 60 LED 4 watt or higher with one hour minimum backup.	34	20	Numbers	2720.28	54405.60
<b>NS 35- Supply / preparing of drawing in AutoCAD (Original + 2 copies) showing electrical installation being done through this contract for station/ yard and As per specification.</b>						
35	Supply / preparing of drawing in AutoCAD (Original + 2 copies) showing electrical installation being done through this contract for station/ yard As per specification	35	2	Numbers	3418.03	6836.06
<b>NS-36 Supply, installation, testing and commissioning of Single sided LED signage board with pictogram/symbol. As per specification.</b>						
36	Supply, installation, testing and commissioning of single sided LED signage board with symbol. As per specification.	36	80	Square Foot	2018.28	161462.40
<b>NS 37- Supply, installation, testing and commissioning of double sided LED signage board with pictogram/symbol. As per specification.</b>						
37	Supply, installation, testing and commissioning of double sided LED signage board with symbol. As per specification.	37	88	Square Foot	2503.21	220282.48
<b>NS 38- Supply and fixing of Rubber mat (ISI marked) nonstick type suitable for 11 kv AC size 2000x1000x25mm. As per specification.</b>						
38	supply and fixing of Rubber mat (ISI marked) nonstick type suitable for 11 kv AC size 2000x1000x25mm. As per specification.	38	8	Numbers	900.85	7206.80
<b>NS 39- Supply, installation, testing and commissioning of LT heat shrinkable straight through joint with required accessories complete in all respect suitable for LT XLPE 4 core cable as per site requirement.make as per reference list. complete work will be as per instruction and satisfaction of HRIDC site engineer and as per specification.</b>						
39	Supply, installation, testing and commissioning of LT heat shrinkable straight through joint. As per specification.	39	3	Numbers	1947.99	5843.97
<b>NS 40- Supply and erection of MS cable route marker of size not less than 200x150x3mm thick M.S.Plate. for HT / LT Elect. underground cable as per Drawing and specification.</b>						
40	Supply and erection of MS cable route marker of size not less than 200x150x3mm thick M.S.Plate. for HT / LT Elect.	40	50	Numbers	402.00	20100.00
<b>NS 41- Dismantling of Rail/cable tray Pole &amp; Over head line, EFT's, cable tray complete, As per specification.</b>						
41	Dismantling of Rail/cable tray Pole & Over head line, EFT's, cable tray complete, As per specification.	41	20	Numbers	500.53	10010.60
<b>NS 42- Supply, installing,testing and commissioning earth electrode complete in all respect with perforatedGI pipe medium "B" class (Blue) conforming to IS 1239 part-I length of 3 mtr., bore50mm with all accessories like nut bolt, reducer nipple, wire meshed funnel and CC finished chamber covered by CIRCC frame etc. Digging pit and refilling it with charcoal and salt in successive layers and connection with 8 SWG GI wire and as per IS:3043 and drawing and testing of earth resistance as reqd.</b>						
42	Supply, installing,testing and commissioning earth electrode complete in all respect with perforatedGI pipe medium "B" class (Blue) conforming to IS 1239 part-I length of 3 mtr., bore50mm with all accessories like nut bolt, reducer nipple, wire meshed funnel and CC finished chamber covered by CIRCC frame etc.	42	10	Numbers	1127.18	11271.80
<b>NS 43- Design,manufacture,Supply,testing ,erection and commissioning of indoor type LT PANEL ,Medium voltage switch board front operated type will have digital ammeter,voltmeter,multifunction energy meter of reputed make on all the main and 3 phase.LED type indication lamps on all the mains,digital ammeter &amp; 3 phase flush type mounted electronic energy meter counter display in every outgoing MCCB's copper bus bar and accessories as per spec with following features. (A) incoming 2x250 amp 4 pole MCCB's with change over provision (if required) with microprocessor release having integral overload,short circuit, earth fault and neutral protection and breaking capacity 60 KA (Ics=100%Icu). (B)outgoing 2x125 amps, 2x100 amps and 2x63 amp 4 poles MCCB's with adjustable overload and adjustable short trip unit and breaking capacity 36KA (Ics=100%Icu).the panel is to be provided with over voltage protection with suitable relay. work includes formation for panel foundation and other civil work with suitable trench up to the satisfaction of the site engineer(technical specification enclosed). panel shall be manufactured from CPRI tested firm.all the material should be of reputed make and as per tech spec.General arrangement ,single line diagram and technical detail (make &amp; model no)of the equipment and electrical accessories to be used in panel shall be supplied by the successful tenderer for approval of HRIDC OFFICERS and record before fabrication of panel.copies of test certificates for switch gers and original routines test along with factory inspection report of panel for approval and acceptance of panel.</b>						
43	Design,manufacture,Supply installation ,testing and commissioning of LT panel as per specification. It consist of two separate incoming 4 Pole 250 Amp MCCB 60 KA(Ics100%Icu) with chngover provision(if required) and 02 nos.O/P of 63 Amp, 2 nos O/P of 100 amp and 02 nos O/P of 125 amp MCCB's as per specification.	43	1	Numbers	157841.00	157841.00
<b>NS 44- Supply, erection, testing and commissioning of phase change over distribution board (phase selector box) size 610x450x190 mm fabricated from 1.6mm thick CRCA sheet power coated with 01 no 100 Amp FP MCCB at the incomer and 01 no 100 amp SPN MCCB as outgoing and 01 no 63 amp phase selector switch with multi LED indication lamps &amp; by pass arrangement. As per specification.</b>						
44	Supply, erection, testing and commissioning of phase change over distribution board (phase selector box) size 610x450x190 mm fabricated from 1.6mm thick CRCA sheet power coated with 01 no 100 Amp FP MCCB at the incomer and 01 no 100 amp SPN MCCB as outgoing and 01 no 63 amp phase selector switch with multi LED indication lamps & by pass arrangement	44	1	Numbers	9688.00	9688.00
<b>NS 45- Supply and fixing of PVC cable duct 40 x 60 (w x h) slot greenish gray of standard make As per specification.</b>						
45	Supply and fixing of PVC cable duct 40 x 60 (w x h) slot greenish gray of standard make As per specification.	45	600	Meter	90.02	54012.00
<b>NS 46- Arrangement of electrification of gunties at the time of NI work . As per specification.</b>						

46	Arrangement of electrification of gumties at the time of NI work. As per specification.	46	1	Numbers	19361.75	19361.75
<p><b>NS 47- Supply erection, testing and commissioning of 30 mtrs high mast tower/shaft totally hot dip galvanized and suitable for wind velocity as per IS 875 part-3. system with the help of suitable equipment including accessories , control panel housing suitable timer contactor circuit for automatic ON &amp; OFF of the mast lights at a pre-set time high mast system Each high mast shall also have 12 Nos Light Arrangement and one twin dome led based aviation obstruction light with 2 nos 30-50 w lamp similar to BJAOL-2 suitable for luminaires NOTE:- Accessories includes 3 point suspension head frame steel wire rope of suitable dia double drum winch galvanised lantern carriage &amp; other arrangement for each high mast shall have one feeder pillar box as per specification Control panel includes the control circuit for lowering/ raising operation of mast integral detachable power tool with motor including torque limiter time switch and lighting final including lines required for switching . Design/casting of shallow foundation of mast /panel shall be with M-20 concrete. Considering safe soil bearing capacity at site as 10T/SQ MTR at 2 mtr depth. Foundation bolt, nuts washers anchors plate templates should be made of spl steel Amendment/ modification may be done as per site/tech specification requirement to the satisfaction of rty representative at the cost of firm as per tech specification ,ISS/IE rules and site requirement Make Philips,GE, Bajaj, C&amp;G or eqvt approved make.</b></p>						
47	Supply, erection, testing and commissioning of 30 M high mast tower/shaft with help of Suitable equipment including Accessories,control panel,12 Nos light arrangement,1 twin domw aviation obstruction light with 2 nos 30-50 watt lamp Note: Accessories includes 3 point suspension head frame steel wire rope of suitable dia double drum winch galvanised lantern carriage & other arrangement for each high mast shall have one feeder pillar box as per specification Control panel includes the control circuit for lowering/ raising operation of mast integral detachable power tool with motor including torque limiter time switch and lighting final including lines required for switching . Design/casting of shallow foundation of mast /panel shall be with M-20 concrete . Considering safe soil bearing capacity at site as 10T/SQ MTR at 2 mtr depth . Foundation bolt, nuts washers anchors plate templates should be made of spl steel Amendment/ modification may be done as per site/tech specification requirement to the satisfaction of rty representative at the cost of firm as per tech specification ,ISS/IE rules and site requirement Make Philips,GE, Bajaj, C&G or eqvt approved make	47	17	Job	454382.4	7724500.63
<p><b>NS 48- Laying of cable undre the road/Railway track recessing in platform /wall along with Railway Track. in laid HDPE /GI pipe as required 1.1 KV grade LT XLPE insulated armored, aluminum conductor cable including making chase &amp; plastering after laying of cable/digging of cable trench, sand cushioning, protective covering with second class bricks, provision of cable route marker as per tech. spec. including end terminations with AI. Crimping socket/lugs testing and commissioning of following sizes. NOTE:- i) All cable connection shall be made with proper size of crimping socket /grandest by the contractor at his own cost and labour ii) Road/floor where cable is to be laid shall be made good as original by the firm at his own cost and to the satisfaction of HRIDC Engineer.</b></p>						
48	Laying of cable undre the road/Railway track,recessing in platform /wall along with Railway Track. in laid HDPE /GI pipe as required 1.1 KV grade LT XLPE insulated armored, aluminum conductor cable including making chase & plastering after laying of cable/digging of cable trench, sand cushioning, protective covering with second class bricks, provision of cable route marker as per tech. spec. including end terminations with AI. Crimping socket/lugs testing and commissioning of following sizes. NOTE:- i) All cable connection shall be made with proper size of crimping socket /grandest by the contractor at his own cost and labour ii) Road/floor where cable is to be laid shall be made good as original by the firm at his own cost and to the satisfaction of HRIDC engineer.	48	200	Meter	48.53	9706.00
<p><b>NS 49- Supply, fixing, testing and commissioning of LED type flood light luminaries wattage 400 Watt made up of pressure die cast housing and heat sink in aluminium extrusion with IP- 66 protection as per CEE/NR/121-Elect/PS/2018 (Rev-03) dt 28/06/18 &amp; CEE/NR/121- Elect/PS/2019(Rev-04) dt 04 /11/19 or latest specification and as per site requirement. Guarantee five years from date of commissioning and as per specification.</b></p>						
49	Supply, fixing, testing and commissioning of LED type flood light luminaries wattage 400 Watt made up of pressure die cast housing and heat sink in aluminium extrusion with IP- 66 protection as per CEE/NR/121-Elect/PS/2018 (Rev-03) dt 28/06/18 & CEE/NR/121- Elect/PS/2019(Rev-04) dt 04 /11/19 or latest specification and as per site requirement. Guarantee five years from date of commissioning and as per specification.	49	204	Numbers	22250.00	4539000.00
<p><b>NS 50- SITC of mono-block submersible pump 2.0 HP complete with all assesaries in all respect. As per specification.</b></p>						
50	SITC of mono-block submersible pump 2.0 HP complete in all respect. As per specification.	50	2	Numbers	13294.87	26589.74
<p><b>NS 51- Supply and fixing of MS Jali 1"x1" welded on MS angle .As per specification.</b></p>						
51	Supply and fixing of MS jali 1"x1" welded on MS angle .As per specification.	51	250	Kg	56.95	14237.50
<p><b>NS 52- Supply &amp; fixing of G.I. pipe 50 MM dia B class with flanges, sockets and welding as per IS 1239 for delivery pipe. As per specification.</b></p>						
52	Supply & fixing of G.I. pipe 50 MM dia B class with flanges, sockets and welding as per IS 1239 for delivery pipe. As per specification.	52	30	Meter	204.12	6123.60
<p><b>NS 53- Supply and fixing pipe fitting bends, sockets, flanges, delivery valve, Non Return valve and supporting clamps (2 set). As per specification.</b></p>						
53	Supply and fixing pipe fitting bends, sockets, flanges, delivery valve, Non Return valve and supporting clamps (2 set). As per specification.	53	2	Numbers	3654.70	7309.40
<p><b>NS 54- Supply, fixing, testing, commissioning of 3 core 6.00 Sq.mm. size PVC insulated PVC sheathed multi strand flat copper cable conductor. As per specification.</b></p>						
54	Supply, fixing, testing, commissioning of 3 core 6.00 Sq.mm. size PVC insulated PVC sheathed multi strand flat copper cable conductor. As per specification.	54	200	Meter	70.49	14098.00
<p><b>NS 55- Supply of Submersible mono block pump (150 mm dia) 5 HP, 415 V. Complete with accessories at site. As per specification.</b></p>						
55	Supply of Submersible mono block pump (150 mm dia) 5 HP, 415 V. as per spec.	55	2	Numbers	19866.69	39733.38

<b>NS 56- Supply, fixing, testing and commissioning of automatic control panel with DOL starter for 5 HP three-phase pump including connections and providing cable from main board to control. As per specification.</b>						
56	Supply, fixing, testing and commissioning of automatic control panel with DOL starter for 5 HP three-phase pump including connections and providing cable from main board to control.As per specification.	56	2	Numbers	10106.21	20212.42
<b>NS 57- Lowering, testing and commissioning of monoblock submersible pump set. As per specification.</b>						
57	Lowering, testing and commissioning of horizontal monoblock submersible pump set. As per specification.	57	2	Numbers	1472.26	2944.52
<b>NS 58- Supply, installation, testing and commissioning of 32 Amp. SPN DP MCB, 10 kA, 'C' series with metal enclosure. As per specification.</b>						
58	Supply, installation, testing and commissioning of 32 Amp. SPN DP MCB, 10 kA, 'C' curve with metal enclosure. As per specification.	58	10	Numbers	1470.82	14708.20
<b>NS 59- Supply,Fixing, testing &amp; commissioning of 1.5 Ton heavy duty Split inverter type Airconditionar with including petty hardwares, gas charging along with the cost of refrigerant with LCD display cordless remote , 5 star rating suitable for 1 phase, 230 Volts &amp; IC controlled electronic auto voltage corrector.</b>						
59	Supply,Fixing, testing & commissioning of 1.5 Ton heavy duty Split Airconditionar with with including petty hardwares, gas charging along with the cost of refrigerant with LCD display cordless remote , 5 star rating suitable for 1 phase, 230 Volts & IC controlled electronic auto voltage corrector.	59	15	Numbers	56990.00	854850.00
<b>NS 60- Supply and fixing of Metal Clad Plug Socket 20A single phase with 32A MCB including fixing and sheet metal enclosure box with one 20A plug top (Ray roll type) to be supplied with board as per spec . As per specification.</b>						
60	Supply and fixing of Metal Clad Plug Socket 20A single phase with 32A MCB including fixing and sheet metal enclosure box with one 20A plug top (Ray roll type) to be supplied with board as per spec . As per specification.(Item Directory - Not Applicable)	60	35	Set	915.55	32044.25
<b>NS 61- Supply, fixing, testing and commissioning of storage geyser 25 liter capacity from reference list. The geyser shall be 5 star rated or above . As per specification.</b>						
61	Supply, fixing, testing and commissioning of storage geyser 25 liter capacity from reference list. The geyser shall be 5 star rated or above . As per specification.	61	5	Numbers	3651.76	18258.80
<b>NS 62- Supply, installation, testing and commissioning of 100 LPD solar water heating system with evacuated tube collector and wire mesh cover, insulated hot water stainless steel tank, air vent and drainage, interconnections, circulating piping in between the system, collectors and hot water tank stand, control valve, temperature gauge and other accessories and electrical back up as per technical specification &amp; MNRE approved.</b>						
62	Supply, installation, testing and commissioning of 100 LPD solar water heating system with evacuated tube collector.	62	4	Numbers	23056.03	92224.12
<b>NS 63- Supply and fixing of cold 3/4 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps etc. complete Material should be of good quality of reputed make and as per Tech. Spec.</b>						
63	Supply and fixing of cold 3/4 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps etc. complete. Material should be of good quality of reputed make and as per Tech. Spec.	63	40	Meter	136.87	5474.80
<b>NS 64- Supply and fixing of 50 mm thick rock wool insulated hot water 1 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps, wire mesh and aluminum cladding with self tapping cocks. Material should be of good quality of reputed make and as per Tech. Spec.</b>						
64	Supply and fixing of 50 mm thick rock wool insulated hot water 1 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps, wire mesh and aluminum cladding with self tapping cocks. Material should be of good quality of reputed make and as per Tech. Spec.	64	40	Meter	348.32	13932.80
<b>NS 65- Supply, fixing, testing and commissioning of cold water tank with gun metal brass valves . Stand and full bottom 's support for 200 Ltrs. Tank. As per specification.</b>						
65	Supply, fixing, testing and commissioning of cold water tank with gun metal brass valves. Stand and full bottom 's support for 200 Ltrs. Tank. As per specification.	65	4	Meter	1803.73	7214.92
<b>NS 66- Supply, installation,testing and commissioning of 125 KVA Capacity radiator cooled Silent DG Set with AMF panel and Complete with all accessories like-exhaust fan system, diesel engine, capable of delivering continous power output at 3 phase 4 wire 415 Volts AC Supply with control panel, electronic energy meter, digital Ammeter, Voltmeter, Power factor meter, Digital frequency meter, clustered LED Type indication light, cable glands, earthing terminal maintainance free battery set mounted on wooden frame and plank, Anti-Vibration pad and all other accessories equipment, protective device, Exhaust fan shall be istalled as per latest CPCB norms. as per specification.</b>						
66	Supply, installation, testing,commissioning of 125 KVA Capacity radiator cooled Silent DG Set with AMF panel and Complete with exhaust fan system, diesel engine, capable of delivering continous power output at 3 phase 4 wire 415 Volts AC Supply with control panel, electronic energy meter, digital Ammeter, Voltmeter, Power factor meter, Digital frequency meter, clustered LED Type indication light, cable glands, earthing terminal maintainance free battery set mounted on wooden frame and plank, Anti-Vibration pad and all other accessories equipment, protective device, Exhaust fan shall be istalled as per latest CPCB norms.	66	0	Numbers	885000.00	0.00
<b>NS 67- Supply and providing of Maintenance Free Earthing with primary MS conductor 40 mm dia 3000 mm long and secondary MS Electrode 80 mm dia 3000 mm long including digging pit of size 5ft.x5ft.x10ft. and using earth enhancement chemical compound minimum 75 kg. Per pit suitable for 40 KA current capacity and as per RDSO specification No. RDSO/PE/SPEC/PS/0109(REV-0)-2008</b>						
67	Supply and providing of Maintenance Free Earthing with primary MS conductor 40 mm dia 3000 mm long and secondary MS Electrode 80 mm dia 3000 mm long including digging pit of size 5ft.x5ft.x10ft. and using earth enhancement chemical compound minimum 75 kg. Per pit suitable for 40 KA current capacity and as per RDSO specification No. RDSO/PE/SPEC/PS/0109(REV-0)-2008	67	5	Numbers	18969.1	94845.50

<b>NS 68- Supply of material,fabrication ,insalltion and commissioning of rolling in Examination light MS box of suitable dimension comprising of sheet steel 1.6 mm thick,60 micron power coating -gray shed, gland plates neoprene EDPM/rubber gaeket padlock arrangement,zinc passivated earth bolt canopy etc.all the material should be good quality.</b>						
68	Supply of material,fabrication ,insalltion and commissioning of rolling in Examination light MS box of suitable dimension comprising of sheet steel 1.6 mm thick,60 micron power coating -gray shed, gland plates neoprene EDPM/rubber gaeket padlock arrangement,zinc passivated earth bolt canopy etc.all the material should be good quality.	68	15	Numbers	4914.64	73719.60
<b>NS 69- Supply,Fixing, testing &amp; commissioning of LED light 30 Watt pressure dia cast housing and heat sink in aluminium extrusion with IP-66 protection suitable for rolling examination MS box to work on 220-240 V AC supply.</b>						
69	supply,fixing testing and commissioning of LED light 30 watt suitable for rolling light examination box.	69	30	Numbers	1500.0	45000.00
<b>NS 70- Supply, fixing, testing and commissioning of recess mounted LED foot/step light fitting indirect type, complete with driver and all accessories, operating voltage 230 VAC model no. PE-12-D-L-5X00B of Pyrotech or similar of reputed make and as per tech. spec.</b>						
70	Supply, fixing, testing and commissioning of recess mounted LED foot/step light fitting indirect type, complete with driver and all accessories, operating voltage 230 VAC model no. PE-12-D-L-5X00B of Pyrotech or similar of reputed make and as per tech. spec	70	12	Numbers	1430.93	17171.16
<b>NS-71 Supply &amp; fixing of flexible stand type LED reading bed side light fitting of suitable watt having adjustable movement for reading in a finished used on/off switch complete with LED lamp. .</b>						
71	Supply & fixing of flexible stand type LED reading bed side light fitting of suitable watt having adjustable movement for reading in a finished used on/off switch complete with LED lamp. .	71	20	Numbers	671.46	13429.20
<b>NS 72- Supply and fixing of junction box size 390x305x170mm comprising of SMP/FRP material with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. similar to Sintex model no. GSJB 3525 or similar with 4 no. aluminium busbar cap 200 Amp., suitable for 415 volt supply requirement. The box shall be fixed robustly with clamps at pole/ wall as per requirement. All the material should be of good quality and as per tech. spec.</b>						
72	Supply and fixing of junction box size 390x305x170mm comprising of SMP/FRP material with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. similar to Sintex model no. GSJB 3525 or similar with 4 no. aluminium busbar cap 200 Amp., suitable for 415 volt supply requirement.	72	10	Numbers	2406.0	24060.00
<b>NS 73- Supply,fixing and installation of perforated cable Tray of size 300x75 mm made out of MS sheet and hot dip galvanized (85 microns) 2 mm thick. All the material should be of good quality and satisfaction of HRIDC Officers.</b>						
73	Supply ,fixing and installation of Perforated Cable Tray of size 100x50 mm made out of MS sheet and hot dip galvanized (85 microns) 1.6 mm thick with suitable fixing Arrangement.	73	1800	Meter	1346.0	2422800.00
<b>NS 74- Supply ,fixing and installation of Perforated Cable Tray of size 150x50 mm made out of MS sheet and hot dip galvanized (85 microns) 1.6 mm thick. All the material should be of good quality and satisfaction of HRIDC Officers.</b>						
74	Supply ,fixing and installation of Perforated Cable Tray of size 150x50 mm made out of MS sheet and hot dip galvanized (85 microns) 1.6 mm thick with suitable fixing Arrangement.	74	1200	Meter	653.0	783600.00
<b>NS-75 Supply, erection, testing &amp; commissioning of control and distribution panel for colour light signalling for 5 to 25 kva AT supply in 25 kV AC traction system as per RSDO technical specifications No.T/SPC/PSI/CLS/ 0020 (12/02) With A&amp;C slips No. 1 to 4 or latest, connections as required.</b>						
75	Supply, erection, testing & commissioning of control and distribution panel for colour light signalling for 5 to 10 kva AT supply in 25 kV AC traction system as per RSDO technical specifications No.T/SPC/PSI/CLS/ 0020 (12/02) With A&C slips No. 1 to 4 or latest, connections as required.	75	2	Numbers	94590.0	189180.0
<b>NS -76 Supply,fixing commissioning ,installation and testing of 2 Kva pure sine wave 24 volt online inverter consist of intelligent battery charging mechnisum with adaptive battery chraging and 150 AH tubular battery of voltage 12 volt suitable for heavy duty application. warranty of inverter is 24 months and for Battery - 36 months. and as per specification.</b>						
76	Supply,fixing commissioning ,installation and testing of 2 Kva pure sine wave 24 volt online inverter consist of intelligent battery charging mechnisum with adaptive battery chraging and 150 AH tubular battery of voltage 12 volt suitable for heavy duty application. warranty of inverter is 24 months and for Battery - 36 months. and as per specification.	76	1	Numbers	40079.0	40079.0
<b>NS -77 Supply, installing,testing and commissioning earthing system complete in all respect with 600mmx600mmx6mm thick G.I earth plate, adding of charcoal or coke and salt,providing concrete enclosure and MS cover platemith lifting arrangement, watering pipe etc. as required and as per specification.</b>						
77	Supply, installing,testing and commissioning earthing system complete in all respect with 600mmx600mmx6mm thick G.I earth plate, adding of charcoal or coke and salt,providing concrete enclosure and MS cover platemith lifting arrangement, watering pipe etc. as required and as per specification.	77	30	Numbers	4202.0	126060.0
<b>NS-78 -Supply and laying 25mm x6mm G.I. strip for earth connection at not less than 0.50 meter below ground or in recess as required.</b>						
78	Supply and laying 25mm x6mm G.I. strip for earth connection at not less than 0.50 meter below ground or in recess as required.	78	110	Meter	86.0	9460.0
<b>NS- 79 Supply and fixing of suitable GI angle for fixing support for cable tray with suitable foundation arrangement as per specification and satisfaction of site engineer.</b>						
79	Supply and fixing of suitable GI angle for fixing support for cable tray with suitable foundation arrangement as per specification and satisfaction of site engineer.	79	200	kg	111.00	22200.0
<b>NS-80 Supply of 4 Core 185 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured cable and as per specification.</b>						
80	Supply of 4 Core 185 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured cable and as per specification.	80	300	Meter	1516.0	454800.0
<b>TOTAL</b>						<b>26386378.97</b>

**SCHEDULE - 3**  
**UNIT PRICES**  
**SECTION - 1 (GENERAL)**

The rates given below against different items of work in different sections of this schedule are the standard schedule of rates of Jan'06. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

RAILWAY DRAWINGS			RAILWAY IDENTIFICATION	DESCRIPTION OF EQUIPMENTS COMPONENTS & MATERIALS.	UNIT OF MEASUREMENT	UNIT PRICES AT CONTRACTOR'S DEPOT IN (Rs)
SERIES	DRG No & MOD	REF No.				
1	2	3	4	5	6	7
CABLES				2.5 sq.mm copper cable 7 core PVC insulated.	Metre	104
				2.5 sq.mm copper cable 2 core PVC insulated	Metre	39
				25 sq.mm Aluminium cable 2 core PVC Insulated	Metre	162
				4.0 sq. mm Aluminium cable 2 core PVC insulated	Metre	40
<b>EQUIPMENTS</b>						
Metal Oxide gapless type lightning Arrestor complete.					Each	15119
7.5 KV lightening Arrestor complete					Each	705
Potential transformer type-I complete					Each	44406
Integral locks complete					Each	916
Inter locks complete					Each	1833
Earth contact assembly complete					Each	3877
25 KV single pole isolator assembly					Each	16917
25 KV Double pole isolator assembly					Each	29463
25 KV D.O. Fuse switch complete					Each	4934
Regulating equipment (Winch type)					Each	9868
Regulating equipment (3 pulley type)					Each	5780
L.T. supply transformers, 25KV/240V 50 kVA					Each	121584
L.T. supply transformers, 25KV/240V 25 kVA					Each	93552
L.T. supply transformers, 25KV/240V 10 kVA					Each	23312
L.T. supply transformers, 25KV/240V 5 kVA					Each	19525
SF-6 gas filled 25 kV Interrupters					Each	174266
Vacuum type 25 kV Interrupters					Each	147467

1	2	3	4	5	6	7
PART II: SWITCHING STATIONS BATTERIES						
				Lead Acid Battery 110V (40 Ah)	Set	34256
				Battery Stand	Each	8458
				Tool Board	Each	615
				15A Iron clad fuse box two way	Each	1593
				250V Iron clad fuse box four way	Each	1762
				Battery charger(Complete) Fixing bolts and nuts etc.	Each Set	41587
				Terminal Board	Each	4920

□□□□□

**SCHEDULE - 3**  
**UNIT PRICES**  
**SECTION - 2 (CONCRETE)**

The rates given below against different items of work in different sections of this schedule are the standard schedule of rates of Jan'06. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

RAILWAY DRAWINGS			RAILWAY IDENTIFICATION	DESCRIPTION OF EQUIPMENTS COMPONENTS & MATERIALS.	UNIT OF MEASUREMENT	UNIT PRICES AT CONTRACTOR'S DEPOT IN (Rs)
SERIES	DRG No & MOD	REF No.				
1	2	3	4	5	6	7
ETI/OHE/P	5090-4 (MOD.F)	1 to 3		Cement concrete counter weight assembly (Excl. counter weight eye rod).	Set	6355

□□□□□

**SCHEDULE - 3**  
**UNIT PRICES**  
**SECTION - 3 (FERROUS)**

The rates given below against different items of work in different sections of this schedule are the standard schedule of rates of Jan'06. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

RAILWAY DRAWINGS			RAILWAY IDENTIFICATION	DESCRIPTION OF EQUIPMENTS COMPONENTS & MATERIALS.	UNIT OF MEASUREMENT	UNIT PRICES AT CONTRACTOR'S DEPOT (in Rs)
SERIES	DRG No & MOD	REF No.				
1	2	3	4	5	6	7
ETI/OHE/P	1030-2 (Mod.D)	2&3	16/3,N	S.S. Bolt M 16x50/38 with nut and Phosphor bronze spring washer.	Each	95
-do-	1040-2 (Mod.E)	2&3	16/3,N	S.S. Bolt M 16x50/38 with nut and Phosphor bronze spring washer.	Each	95
-do-	1050-3 (Mod.A)	2&3	16/3, N	S. S. Bolt M16x50/38 with Nut & Phosphor Bronze Washer	Each	95
-do-	1070-1 (Mod.B)	3 to 5	12/17, N	S.S. Bolt M 10x35/30 with nut punched washer A-12 and Phosphor bronze spring washer.	Set of 2 Nos	70
-do-	1080-1 (Mod.B)	2	12/14	S.S. Stud Bolt M 12x25/20	Set of 8 Nos	208
-do-	1110-2 (Mod.D)	1&2	1118 & 1119	Contact wire Ending Clamp(107).	Each	226
-do-	<b>1110-2 (Mod.E)</b>	<b>1&amp;2</b>	<b>1118-3 &amp; 1119-3</b>	<b>Contact wire Ending Clamp (107).</b>	<b>Each</b>	<b>226</b>
-do-	-do-	3,4&5	263	G.S. pin $\phi$ 20x50(Snap head) with punched washer A 22 & Annealed copper split pin $\phi$ 4x40	Each	18
-do-	1120 (Mod.B)	4 to 6	261	G.S. pin m 20x55 (Snap head) with punched washer A 22 & Annealed copper split pin $\phi$ 4x40	Each	18
ETI/OHE/P	1120-1 (Mod A)	1 to 5	1122 & 1123	Catenary ending clamp	Each	367
-do-	1130	4 to 6	261	G.S. Pin $\phi$ 20x55 (Snap head),punched washer A 22 and Anealed Copper Split Pin 4 x 40.	Each	18
-do-	1140 (Mod.B)	4 to 6	261	G.S. pin $\phi$ 20x55 (Snap head) with punched washer A 22 & Annealed copper split pin $\phi$ 4x40	Each	18
RE/33/P	1160 (Mod.J)	2&5	1162-S & 10 N	S.S. $\phi$ 10`U` Bolt with nuts.	Each	65
-do-	-do-	3, 6 & 7	161-S	S.S. Pin $\phi$ 10x35 mm with punched washer A 12& annealed copper split pin 2.5x20 mm.	Each	27



1	2	3	4	5	6	7
-do-	1170 (Mod.K)	3 & 5	1173-S & 10 N	S.S. $\phi$ 10`U'bolt with nuts.	Each	65
-do-		7 to 9	161-S	S.S.pin $\phi$ 10x35 mm with punched washer A 12 and copper split pin 2.5 x 20.	Each	27
ETI/OHE/P	1192 (Mod.C)	2, 3 & 4	10/16 N	S.S. bolt M 10x35/30 with nut, Phosphor bronze spring washer B 10 and annealed copper split pin 2.5 x 20	Each	33
-do-	1194 (Mod.A)	2 to 4	10/16 N	S.S. Bolt M 10x35/30 with nut, Phosphor bronze spring washer B 10 & annealed copper split pin 2.5x20	Each	33
ETI/OHE/P	1216 (Mod.D)	1&2	(1214- 2, 2492- 2)	Knuckle tube clamp(MCI)	Each	268
ETI/OHE/P	1216 (Mod.D)	3	14/1 NL	G.S. Bolt M 14x75/34 with Nut and lock nut.	Each	15
ETI/OHE/P	1263	1	1263	Strain clamp link	Each	62
RE/33/P	1270-1 (Mod.F)	2, 3 &5	261	G.S. Snap head pin $\phi$ 20 x 55 with punched washer A 22 and annealed copper split pin 4 x 40.	Each	18
-do-	-do-	3	12/18	S.S. Stud M-12x50/50	Set of 8 Nos	300
ETI/OHE/P	1310	-	-	S.S. Bolt $\phi$ 10x35/30 with nut, Phosphor bronze spring washer B-10 & annealed copper split pin $\phi$ 2.5 x 25.	Set of 2 Nos	67
-do-	1320 (Mod.B)	2 to4	1322, 10 N	S.S.`U' Bolt M-10 with Nuts & Phosphor bronze spring washers B 10.	Each	75
-do-	1330 (Mod.B)	2&4 to 6	4032- S& 10 NL	S.S.`U' Bolt $\phi$ 10 mm with Nut, lock nut & annealed copper split pin 2.5 x 20.	Each	76
-do-	1360 (Mod.B)	4 to6	261	G.S. pin $\phi$ 20x55(snap head) punched washer A 22 and annealed copper split pin 4 x 40.	Each	18
-do-	1370-1 (Mod.F)	1	1371-1	Raised Register Arm Clamp	1Set	247
-do-	-do-	2&3	16/6 NL	G.S. Bolt M 16x60/38 with Nut, Lock nut and Galvanised steel spring washer B 16	Set of 2 nos	24
-do-	1390-1 (Mod.D)	1	1391-1	Crossing clamp piece	Set of 4 Nos	261
-do-	-do-	2 to 4	14/1 N	G.S. Bolt M 14x75/34 with Nut, punched washer A16 and annealed copper split pin 3.2x25	Set	37
-do-	1400 (Mod.C)	1&4	1401, 1174	Short Dropper assembly	Each	37

1	2	3	4	5	6	7
-do-	1400, Mod-C	5,7 & 8	10/18N	S.S. Bolt M 10x55/30 with Nut, Phosphor bronze spring washer B- 10 and punched washer	Each	44
-do-	-do-	6&7	10/17 N	S.S. Bolt M 10x40/26 with Nut & Phosphor bronze spring washer B- 10	Each	36
-do-	1540 (Mod.D)	2 to 4	12/19 N	S.S. Bolt M 12x60/30 with Nut, punched washer A 14 and Phosphor bronze spring washer B 12.	Set of 2 Nos	129
-do-	1550 (Mod.E)	2 to 4	12/19 N	S.S Bolt M 12x60/30 with nut punched washer A 14 and Phosphor bronze spring washer B 12.	Set of 3 Nos	194
-do-	1560 (Mod.D)	2 to 4	12/19 N	S.S. Bolt M 12x60/30 with nut, punched washer A 14 and Phosphor bronze spring washer B 12	Set of 3 Nos	194
ETI/OHE/P	1580 (Sh.1- Mod.F)	3 to 9	1583, 12 N	S.S `U` Bolt $\phi$ 12mm with Nut, Phosphor bronze spring washer B 12, punched washer A 14, 16 $\phi$ pin 70 mm long, punched washer A 18 and annealed copper split pin 4 x 32	Set of 2 Nos	177
ETI/OHE/P	1600 (Mod.C)	1&2	1601&1 602	20 mm Strain clamp	Each	747
ETI/OHE/P	-do-	3 to 8	1603, 12 N	S.S. `U` Bolt $\phi$ 12, nut, punched washer A 14, snap head pin $\phi$ 16x55, punched washer A 18 and annealed copper split pin 4x32	Set of 2 Nos	349
RE/33/P	2086 (Mod.C)	1		Large bracket sleeve	Each	104
ETI/OHE/P	2110 (Mod.B)	3 to 5	2113 &14 N	G.S. `U` Bolt $\phi$ 14 mm with Nut & spring washer B 14.	Set of 2 Nos	67
ETI/OHE/P	2120 (Mod.B)	5&6	2113/1 4 N	`U` Bolt $\phi$ 14 mm with Nuts and spring washer B 14.	Set of 2 Nos	67
ETI/OHE/P	-do-	4	2124-S 12 NL	Direct catenary clamp stud with S.S. Nut lock nut.	Set of 2 Nos	78
ETI/OHE/P	2130 (Mod.B)	3 to 5	2133 & 14 N	G.S. `U` Bolt $\phi$ 14 mm with Nut & spring washer B 14.	Set of 2 Nos	67
ETI/OHE/P	2140 (Mod.C)	4	2124-S 14 NL	Direct catenary clamp Stud with S.S. Nut and lock nut	Set of 2 Nos	78
ETI/OHE/P	-do-	5&6	2133 &14 N	G.S. `U` Bolt $\phi$ 14 mm with nuts and spring washer B-14.	Set of 2 Nos	67
TI/DRG/OHE/ FTGFE/RDSO	00007/10 /0	1&2	2151-2 &2152- 2	Standard Register arm Hook (Forged).	Each	338
-do-	-do-	3	16/3 NL	G.S. Bolt M 16X50/38 with nut & lock nut.	Set of 2 nos	19
TI/DRG/OHE/ FTGFE/RDSO	00010/10 /0	1&2	2161-2 &2162- 2	Large Register Arm hook (Forged).	Each	367

1	2	3	4	5	6	7
-do-	-do-	3	16/3 NL	G.S. Bolt M 16x50/38 with nut & lock nut	Set of 2 Nos	19
-do-	2274-1 (Mod.D)	1	2274-1	Dropper clip(38) for standard Bracket tube	Each	24
-do-	-do-	2 to 5	16/2, 16 LN	G.S. Bolt M 16x40/32 with lock nut, spring washer B 16 & annealed copper split pin 4x32.	Each	11
-do-	2277 (Mod.D)	1	2277	Dropper clip(49) for large bracket tube	Each	24
-do-	-do-	2 to 5	16/2 & 16 LN	G.S. Bolt M 16x40/32 with lock nut, spring washer B 16 and annealed copper split pin 4x32	Each	11
-do-	2341 (Mod.B)	1	2341	Steady Rod piece of length 0.76 m.	Each	197
ETI/OHE/P	-do-	2	2342	Steady Rod piece of length 0.96 m	Each	249
-do-	-do-	3	2343	Steady Rod piece of length 1.16 m.	Each	301
-do-	-do-	4	2344	Steady Rod piece of length 1.36 m.	Each	353
-do-	2352 (Mod.A)	1	2352	Bent Steady Arm swivel	Each	59
TI/DRG/OHE/ FTGFE/RDSO	00016/10 /0	1	2361-1	25 mm Drop Bracket part (Forged).	Each	352
-do-	-do-	2	10/14 LN	SS Bolt M 10x25/20 with lock nut	Each	22
ETI/OHE/P	2380 (Mod.C)	5&7	2113 & 14 N	G.S.'U' Bolt M 14 with nuts & spring washer B 14.	Set.	70
-do-	-do-	6&7	2133 & 14 N	G.S.'U' Bolt M 14 with nuts & spring washer B 14.	Set.	70
TI/DRG/OHE/ FTGFE/ RDSO/	00003/00 /0	1	2391-1	Steady Arm hook(BFB) (Forged)	Each	130
ETI/OHE/P	2392 (Mod C)	1	2392	BFB Steady Arm Swivel	Each	44
-do-	2402 (Mod.A)	1	2402	Tubular Stay adjuster	Each	116
-do-	2402-1 (Mod.B)	1	2402-1	Tubular stay adjuster (large)	Each	145
TI/DRG/OHE/ FTGFE/ RDSO/	00004/03 /0	1	2403-2	Tubular stay sleeve (Forged)	Each	141
-do-	2404 (Mod C)	2&4	2404- 1S &109-S	S.S. Bolt $\phi$ 10mm with lock nut	Each	26
TI/DRG/OHE/ FTGFE/ RDSO/	00002/00 /1	1	2422-2	Register Arm Eye piece (25 mm) (Forged)	Each	63
RE/33/P	2432 ( Mod.E)	1	2432	Raised Register Arm Adjuster (25mm)	Each	110

1	2	3	4	5	6	7
ETI/OHE/P	2461-1 (Mod.F)	1	2461-1	Dropper clip (34 mm) for register Arm tube	Each	22
ETI/OHE/P	2461-1 (Mod.F)	2 to 4	16/2 LN	G.S. Bolt M 16x40/32 with lock nut, spring washer B 16 and Annealed copper split pin 4x32	Each	11
-do-	2471-1 (Mod.E)	1	2471-1	Dropper clip (25)for Raised Register Arm	Each	22
-do-	-do-	2 to 4	16/2 LN	G.S. Bolt M 16x40/32 with lock nut, spring washer B 16& Annealed Copper Split pin 4 x 32.	Each	11
TI/DRG/OHE/ FTGFE/ RDSO/	00015/10 /0	1&2	2491-2 & 2492-2	25 mm Steady Arm clamp (Forged)	Each	254
-do-	-do-	3	14/1 NL	G.S. Bolt M 14x75/34 with nut & lock nut	Each	15
ETI/OHE/P	2520 (Mod.B)	2	2522	Normal Bent Steady arm Eye piece	Each	200
-do-	-do-	3	2523	Normal Bent steady arm Hook	Each	176
ETI/OHE/P	-do-	4	2352	Bent Steady Arm Swivel	Each	59
-do-	2540 (Mod.B)	5	2541	BFB steady arm eye piece	Each	54
-do-	-do-	6	2542	BFB Steady Arm Swivel	Each	44
-do-	2541 (Mod.E)	1	2541	BFB Steady Arm eye piece	Each	56
-do-	2542 (Mod.C)	3	2542-2	BFB Steady Arm swivel	Each	44
ETI/OHE/P	2550-1/2 (Mod.L)	1,2, 6	2551- 1& 2502	Standard anti -wind clamp and AL. Alloy snap head rivet 4x35	Set	70
-do-	-do-	1,3 & 6	2551-1 & 2503	-do-	Set	96
-do-	-do-	4 to 5	10/20 N	S.S. Bolt M 10x70/26 with nut & Phosphor bronze spring washer B 10	Each	44
-do-	2550-3 (Mod.E)	1,2 & 5	2551-1 & 2504	Anti wind clamp for tram- way OHE (REG) with snap head rivet M 4x35	Set	106
-do-	-do-	3&4	10/ 20 N	S.S. Bolt M 10x70/26 With nut & Phosphor bronze spring washer B 10	Each	44
-do-	2730 (Mod.A)	3& 4	4032- S, 108-S & 109-S	S.S. 'U' Bolt M 10 with nuts, lock nut & Annealed copper split pin 2.5x20	Set	156

1	2	3	4	5	6	7
-do-	3010 (Mod.C)	1	3011	Double clevis (MCI)	Each	204
-do-	3010 (Rev.C)	2 to 4	262	G.S. Snap Head pin M 20x60 punched washer A 22 and annealed copper split pin 4x40	Set of 2 Nos	37
TI/DRG/OHE/ FTGFE/ RDSO/ RE/33/P	00005/04 /0	-	3021-1	Mast fittings for hook insulator (Forged)	Each	276
-do-	3070-1 (Mod.H)	1 to3	3070-1	Mast Bracket fitting assembly (150)	Each	775
-do-	-do-	4 to 7	261	G.S. pin M 20x55(snap head) punched washer A 22, Annealed copper split pin 3.2x25 and Annealed copper split pin 4x40	Each	20
-do-	3070-2 (Mod.D)	1 to3	3070-2	Mast Bracket fitting assembly (200)	Each	846
-do-	-do-	4 to 7	261	G.S. Pin m 20x55 (span Head), Punched washer A 22, annealed copper split pin 3.2 x 25 and Annealed copper split pin 4 x 40.	Each	20
-do-	3071 (Mod.F)	1	3071	Mast Bracket clevis	Each	197
-do-	3071-1 (Mod.B)	1	3071-1	Mast Bracket clevis (Forged)	Each	381
RE/OHE/P	3072 (Mod.A)	1	3072	Mast Bracket clevis pin	Each	20
RE/33/P	3072-1 (Mod.A)	1	3072-1	Mast Bracket clevis pin	Each	20
-do-	3073 (Mod.D)	1	3073	Mast Bracket swivel (150)	Each	578
-do-	<b>3073 (Mod.E)</b>	<b>1</b>	<b>3073-3</b>	<b>Mast Bracket swivel (150)</b>	<b>Each</b>	<b>578</b>
-do-	3074 (Mod.E)	1	3074	Mast Bracket swivel (200).	Each	648
-do-	<b>3074 (Mod.F)</b>	<b>1</b>	<b>3074-3</b>	<b>Mast Bracket swivel (200).</b>	<b>Each</b>	<b>648</b>
ETI/OHE/P	3076 (Mod.C)	1 to8	3076	Standard Backing angle	KG	66
-do-	3231 (Mod.C)	1	3231	Mast Anchor fitting (welded).	Each	273
-do-	3231-2 (Mod.C)	1	-	Mast anchor fitting welded (to be used with cement counter weight assembly)	Each	296
-do-	3232 (Mod.C)	1	3232	Mast guy rod fitting (welded)	Each	310
-do-	3233 (Mod.B)	1	-	Mast Anchor fitting(200).	Each	442
-do-	3234/5 (Mod.B)	1	3234	Mast guy rod fitting (200/150)	Each	832
ETI/OHE/P	-do-	2	3235	Mast guy rod fitting (200/200)	Each	987

1	2	3	4	5	6	7
-do-	3240 (Mod.D)	X	-	Anchor fittings on `K' series mast.	Each	588
-do-	-do-	Y	-	Guy rod fitting	Each	668
-do-	-do-	Z	-	Backing angles	Each	474
-do-	3241-2 (Mod.B)	X	-	Anchor fitting on `K' series mast	Each	588
-do-	-do-	Y	-	Guy rod fitting	Each	668
-do-	4001 (Mod.A)	2 to 4	102-S & 108-S	S.S bolt M 10x35/30 with nut, Phosphor bronze spring washer and Annealed copper split pin 2.5x25	Each	33
-do-	4002 (Mod.A)	2 to 4	102-S & 108-S	S.S. bolt M 10x35/30 with nut, Phosphor bronze spring washer and Annealed copper split pin 2.5x25	Each	33
ETI/OHE/P	5000 (Mod.B)	1	5001	Anchor bolt(length 1.6m)	Each	740
-do-	-do-	2	5001-1	-do- (length 2.1m)	Each	881
-do-	-do-	3	5001-3	-do- (length 0.85m)	Each	197
-do-	-do-	4	5002	Guy rod stirrup	Each	219
-do-	-do-	5	5004	Guy rod M 25mm with nut, lock nut, plain washer and split pin (length 9.3m).	Each	2326
			(OR)			
-do-	9070/1 (Mod.B)	1&3 to 6	9070	Guy rod dia 20mm	Set	2326
-do-	5000 (Mod.B)	6	5005	Guy rod M 25 (Steel Galv.to IS: 2062-1999) with nut, lock nut, plain washer and split pin (length 9.7m)	Each	2361
ETI/OHE/P	-do-	7	5006-1 (OR)	Short Guy rod M 25mm with nut lock nut, plain washer and split pin (length 5.35m).	Each	1311
-do-	9070/1 (Mod.B)	2&3 to 6	9071	Guy rod dia 20mm	Set	1311
-do-	5000 (Mod.B)	8	5007-1	Anchor `V' bolt.	Each	183
-do-	-do-	9	5008	B.C. Anchor loop	Each	740
-do-	5020-1	1 to 4	5021,5 023 & 5024	9 Tonne adjuster complete (Eye & clevis type) (Forged)	Each	515
-do-	5020-2	1 to 4	5021-5 024 & 5025	9 Tonne adjuster complete (Double clevis type) (Forged)	Each	564
-do-	5030 (Mod.C)	1	5031	Anchor double strap	Set	59

1	2	3	4	5	6	7
-do-	-do-	2 to 4	261	G.S. pin M 20x55 (Snap head) with washer M 20mm and copper split pin 4x40	Set of 2 Nos	36
TI/DRG/OHE/FTGFE/ RDSO/	00001/00 /1	1	5041-1	18 mm single clevis (Forged)	Each	141
-do-	-do-	2 to 4	262	G.S. pin M 20 x 60mm with Annealed copper split pin 4x40&G.S flat washer M 20	Each	18
ETI/OHE/P	5060-2 (Mod.C)	9 to 12 & 23	5063-1 & 5067	Standard guide tube assembly	Each	940
-do-	5090 (Mod.C)	1 to 3	5091, 5092 & 5093	Counter weight assembly (Excl. counter weight eye rod with nut and split pin)	Set.	12406
-do-	-do-	4&5	5094 & 238	Counter weight eye rod, G.S. nut M20, washer and Annealed copper split pin 4x40	Each	254
TI/DRG/OHE/ATD/RDSO/0004 /00/0	5090-1 (Mod.D)	1 to 3	5091-1 5092-1 5093-1	Trapezoidal counter weight assembly (Excl eye rod)	Set	13921
-do-	-do-	4,7 & 8	5099-1 & 20N & 238	Trapezoidal counter weight eye rod with $\phi$ 20 G.S nut, Punched washer A-22 and Annealed copper split pin 4x40	Each	345
-do-	-do-	5,9 & 10	5097-3	G.S. bolt M 16x1890/100 both ends threaded, 2 nuts flat washer m 18 & spring washer B-16	Set of 2 Nos.	508
-do-	-do-	6	5096	M.S. Galv. guide plate 100x10 thick 370 long with 2 hooks welded.	Each	296
ETI/OHE/P	5090-3 (Mod.F)	1	5094-1	Counter weight eye rod	Each	148
-do-	-do-	2	5098-1	Counter weight piece	Each	416
-do-	-do-	2A to 4	5098, 5092 & 5091	Counter weights	Set	7754
-do-	-do-	5,5A & 6	-	G.S. $\phi$ nut and GI punched washer A-22 and Annealed copper split pin 4x40.	Each	8
ETI/OHE/P	5090-4 (Mod.F)	4&5	-	Counter weight eye rod with nut, washer, split pin and bolt 12x850/49 with nut, flat washer and split pin 3.2x25	Set	134
-do-	-do-	4A, 5A & 6	-	Counter weight eye rod 650mm long, nut, washer & split pin with bolt $\phi$ 12x450/49 with nut, flat washer and split pin 3.2x20 & counter weight Piece.	Set.	70

1	2	3	4	5	6	7
-do-	5090-5 (Mod.B)	1 to 4	5091, 5092, 5093 & 5098	Counter weight assembly for 3 pulley type regulating equipment	Set.	20885
ETI/OHE/P	-do-	5 to 8	5099	Counter weight eye rod (1550mm) long with nut, Washer and split pin.	Each	310
-do-	5090-6 (Mod.B)	1 to 4	5091, 5092 & 5098-1 & 5098	Counter weight assembly for 3 pulley type regulating equipment (Tramway type)	Set.	13132
-do-	-do-	5 to 6	5094 & 20 N	Counter weight eye rod with Nut & split pin 4x40	Each	252
-do-	5183 (Mod.C)	1	5183	Double Eye Distance Rod (ø 20mm)	Each	217
-do-	5190-1 (Mod.C)	1	5194	Compensating plate	Set	183
-do-	-do-	2 to 4	261	G.S. Snap Head Pin ø20x55, punched washer A-22 and Annealed copper split pin 4x40.	Set of 3 Nos.	54
-do-	5190-2 (Mod.C)	1	5195	Equalising plate 8mm.	Set	327
-do-	-do-	2 to 4	261	G.S. Snap Head pin ø 20x55 punched washer A-22 and Annealed copper split pin 4x40.	Set of 3 nos.	54
-do-	5191 (Mod.B)	1	5191	Compensating plate	Each	190
ETI/OHE/P	5191-1/2 (Mod.D)	1	5191-1 or 5191-2	Compensating plate	Each	190
-do-	5192 (Mod.B)	1	5192	Equalising plate	Each	350
-do-	5192-1/2 (Mod.C)	1	5192-1 or 5192-2	Equalising plate	Each	338
-do-	5193 (Mod.B)	1	5193	Short Equalising plate	Each	148
-do-	5220 (Mod.F)	1	5221	Guy Rod Double strap (100) Assembly	Set	124
ETI/OHE/P	-do-	2	5222	Guy Rod Double strap (150/250)	Set	226
-do-	-do-	3&4	24/1 LN	Steel Galv. Bolt M-24x70/54 with lock nut and Annealed copper split pin 5x40.	Set of 2 Nos.	72
-do-	6000 (Mod.C)	5&6	105-S, 108-S & 109-S	S.S. Bolt ø 10x65/30, with Nut, lock nut and washer	Each	44
-do-	6030 (Mod.B)	4&5	6034S, 108S & 109S	S.S. Bolt ø 10, Nut, lock nut and washer.	Set of 2 Nos	187



1	2	3	4	5	6	7
-do-	6070-1	4, 6 & 8	-	11 KV Post Insulator cap clamp (jumper), G.S.HEX Bolt M 12x40/30 with spring washer	Set	126
-do-	-do-	5,7 & 8	-	11 KV Post Insulator clamp(Bus bar) G.S. HEX, Bolt M 12x55/30 with spring washer	Set	126
-do-	6075/ 6076 (Mod.C)	1	6075	3 KV Pedestal Insulator cap clamp (Bus bar)	Set of 2 Nos	102
-do-	-do-	2	6076	3 KV Pedestal Insulator cap clamp (jumper)	Set of 2 No.	102
ETI/OHE/P	6094 (Mod.B)	1	6094	Post Insulator jumper clamp	Set of 2 Nos	54
-do-	6095 (Mod.B)	1	6095	Post Insulator Bus bar clamp	Set of 2 Nos	54
-do-	6170 (Mod.C)	2&3	101-S & 108-S	S.S. Bolt $\phi$ 10x35/30 with Nut and Phosphor Bronze spring washer $\phi$ 10	Each	32
ETI/OHE/P	6181-1 (Mod.D)	1	6181-1	Section Insulator double Strap only.	Set	28
-do-	-do-	2 to 4	-	S.S. Pivot pin with flat washer and Annealed copper split pin 2.5x25	Set of 2 Nos	38
ETI/PSI/P	6480 (Mod.C)	3 & 4	-	S.S. Bolt M12x60/40 with Nut flat washers and Phosphor bronze spring washer	Set of 8 Nos	510
-do-	6490 (Mod.B)	3 & 4	-	S.S. Bolt $\phi$ 12x60/40 complete with Nut, flat washer and Phosphor bronze spring washer	Set of 8 Nos	510
ETI/PSI/P	6500 (Mod.C)	3 & 4	-	S.S. Bolt M-12x60/30 complete with Nut, flat washer and Phosphor bronze spring washer.	Set of 8 Nos	510
-do-	6510 (Mod.D)	3 & 4	-	S.S. Bolt $\phi$ 12x60/40 complete with Nut, flat washer and spring washer	Set of 4 Nos	255
ETI/PSI/P	6520 (Mod.B)	4 & 5	-	S.S. Bolt $\phi$ 12x60/40 complete with Nut, flat washer and Phosphor bronze spring washer	Set of 8 Nos	510
-do-	6530 (Mod.C)	4 & 5	-	S.S. Bolt $\phi$ 12x60/40 complete with Nut, flat washer and Phosphor bronze spring washer	Set of 8 Nos	510
-do-	6550 (Mod.B)	6 & 7	-	S.S bolt $\phi$ 12x70/40 complete with nut, flat washer and Phosphor bronze spring washer	Set of 8 Nos	566
-do-	-do-	8	-	G.S stud bolt $\phi$ 16x30/20 with flat washer and Phosphor bronze spring washer.	Set of 4 Nos	34
-do-	6560 (Mod.B)	3 & 4	-	S.S. bolt $\phi$ 12x60/30 complete with nut, flat washer and Phosphor bronze spring washer	Set of 12 No	797
-do-	6830-1 (Mod.D)	3 & 4	12/20 N	S.S. Bolt M 12x50/30 with nut, flat washer A 14 and Spring washer B 12	Set of 4 Nos	238
ETI/OHE/P	7021 (Mod.A)	1& 2	7021	Earth electrode	Each	881
RE/33/P	7040 (Mod.E)	1	7040	Earth wire mast clamp.	Each	338

1	2	3	4	5	6	7
RE/33/P	-do-	2 & 3	-	G.S. wire mast clamp hook with $\phi$ 16 nut, lock nut, washer and bolt $\phi$ 16x 65/ 38 with nut, lock nut and washer.	Each	37
-do-	7050 (Mod.D)	1 & 2	7050 or 7051-1	Earth wire strain clamp	Each	423
-do-	-do-	3 to 8	218,26 2	G.S. 'U' bolt $\phi$ 16mm,nut, spring washer, snap head pin $\phi$ 20x60, plain washer $\phi$ 20 & copper split pin $\phi$ 4x36	Set	78
-do-	7501 (Mod.F)	-	7501	Typical structural number plate (100mm size)	Each	121
RE/33/P	7511 (Mod.B)	-	-	Typical isolator number Plate	Each	59
ETI/PSI/P	7520 (Mod.B)	-	-	Typical number plate for interrupter and D.P. isolator	Each	59
-do-	7521 (Mod.B)	-	-	-do- Potential Transformer type-1	Each	59
-do-	7522 (Mod.B)	-	-	-do- Booster Transformer	Each	59
-do-	7525	-	-	-do- Auxiliary Transformer	Each	59
ETI/OHE/SK	123 (Mod.D)	2 to 4	-	S.S. Bolt $\phi$ 12x60/30 with nut, washer and Phosphor bronze spring washer	Set	135
-do-	-do-	2 to 4	-	G.S. Bolt $\phi$ 16x60/38 with nut, washer & Phosphor bronze spring washer	Set	44
ETI/OHE/SK	130 (Mod.D)	2 to 5	102-S &108-S	S.S. bolt $\phi$ 10x35/30 with nut, Phosphor bronze .spring washer and copper split pin $\phi$ 2.5x25 and flat washer.	Each	36
-do-	176 (Mod.D)	1	1161-1	AL. Alloy catenary suspension clamp body (MCI).	Each	331
-do-	-do-	4	SK-205	M.S. sheet Galv. suspension clamp lock plate.	Each	70
-do-	-do-	2,3& 5 to 7	1162-S	S.S. 'U' Bolt M 10mm,G.S pin $\phi$ 16x 50mm S.S. nut $\phi$ 10mm, copper split pin 2.5x25mm & G.S. flat washer $\phi$ 16mm.	Each	135
-do-	205 (Mod.B)	1	-	Double suspension Lock plate (Galvanised M.C.I.)	Each	70
-do-	231 (Mod.D)	2 to 4	12/19N	S.S. bolt M 12x60/30 with Set nut, flat washer and Phosphor bronze spring washer		135
-do-	-do-	2to 4	16/6N	G.S. bolt M 16x60/38 with nut, flat washer and spring washer.	Set	44
ETI/OHE/SK	333 (Mod.D)	2 to 6	-	S.S. Bolt $\phi$ 10x35/30 with nut, Phosphor bronze spring washer, copper split pin $\phi$ 2.5x25, Al- Cu. Bimetallic washer and flat washer.	Each	41
-do-	436 (Mod.B)	3 to 8	AL- 436/2	S.S. 'U' bolt $\phi$ 12 spring washer flat washer, nut, snap head pin $\phi$ 16 and Split pin 2.5x25	Set	162
-do-	468 (Mod.A)	2&5	-	S.S. 'U' bolt $\phi$ 10mm with nut	Set	119

1	2	3	4	5	6	7
-do-	-do-	1&4	1161-1	AL. catenary suspension clamp assembly & lock plate (MCI).	Set.	341
-do-	-do-	3,6 &7	-	G.S. Pin $\varnothing$ 16/50mm, copper split pin 2.5x25mm & G.S. Flat washer $\varnothing$ 16mm	Each	16
-do-	469 (Mod .A)	1&2	1171-1 AL-205	Double suspension clamp assembly body & lock plate (MCI).	Each.	417
-do-	469 (Mod.A)	3& 5	1173 S 108 S	S.S. 'U' bolt $\varnothing$ 10mm with nuts.	Set. Of 2Nos	136
-do-	-do-	7to 9	-	G.S. pin $\varnothing$ 16x50, copper split pin $\varnothing$ 2.5x25 and flat washer.	Each.	16
				Galvanised steel wire (19/2.5mm)	Metr	61
				G.I. wire 8 SWG	Metr.	11
				M.S. flats 40x6mm	KG	63
SMALL PART STEEL				Small part steel work of shapes and sizes	MT	66257
TUBES						
RE/33/P	2041(Mod.D)	-	-	Standard bracket tube ( $\varnothing$ 30/38 mm)	Metr	226
-do-	2081(Mod.E)	-	-	Large bracket tube ( $\varnothing$ 40/49 mm)	Metr	240
-do-	2401 (Mod.C) 2431 (Mod.D)	-	-	25mm Nominal bore steel tube for stay and Register arms.	Metr	127
EQUIPMENTS						
				S.S. Wire ropes for 3 Pulley type regulating equipment (8M long.)	Each	2996
				S.S. Wire ropes for 3 pulley type regulating equipment (7 M. long)	Each	2673
GALVANISED STEEL BOLTS & NUTS ETC						
ETI/C	0073 (Mod.A)	-	10/1	Bolt M 10x30/25 mm	Each	3
-do-	-do-	-	10/2	Bolt M 10x35/30 mm	Each	4
-do-	-do-	-	10/3	Bolt M 10x170/32 mm	Each	13

1	2	3	4	5	6	7
-do-	-do-	-	-	Nut for M 10 Bolt	Each	2
	-do-	-	-	Lock nut for M 10 bolt	Each	1
-do-	-do-	-	12/1	Bolt M 12x40/30 mm	Each	5
-do-	-do-	-	12/2	Bolt M 12x45/30 mm	Each	5
-do-	-do-	-	12/3	Bolt M 12x 55/30 mm	Each	5
-do-	-do-	-	12/4	Bolt M 12 x 60/30 mm with hole for split pin	Each	8
ETI/C	0073 (Mod-A)	-	12/5	Bolt M 12x120/36 mm	Each	10
-do-	-do-	-	12/6	Bolt M 12x200/49 mm	Each	13
-do-	-do-	-	12/7	Bolt M 12x240/49 mm	Each	19
-do-	-do-	-	12/8	Bolt M 12x350/49 mm	Each	28
-do-	-do-	-	12/9	Bolt M 12x450/49 mm	Each	36
ETI/C	0073 (Mod.A)	-	-	Nut for M 12 bolt	Each	2
-do-	-do-	-	-	Lock nut for M 12 bolt	Each	3
-do-	-do-	-	14/1	Bolt M 14x75/34 mm	Each	9
-do-	-do-	-	14/2	Bolt M 14x100/34 mm	Each	12
-do-	-do-	-	-	Nut for M 14 Bolt	Each	3
-do-	-do-	-	-	Lock nut for M 14 bolt	Each	3
-do-	-do-	-	16/1	Bolt M 16x30/25 mm	Each	5
-do-	-do-	-	16/2	Bolt M 16x40/32 mm	Each	6
-do-	-do-	-	16/3	Bolt M 16x50/38 mm	Each	6
-do-	-do-	-	16/4	Bolt M 16x50/40 mm	Each	9
-do-	-do-	-	16/5& 16/6	Bolt M 16x60/38 mm with /without hole for split pin	Each	7
-do-	-do-	-	16/7	Bolt M 16x65/38 mm	Each	8
-do-	-do-	-	16/8	Bolt M 16x65/60 mm	Each	11
-do-	-do-	-	16/9	Bolt M 16x75/38 mm	Each	12
-do-	-do-	-	16/10	Bolt M 16x100/38 mm	Each	16
-do-	-do-	-	16/11	Bolt M 16x175/46 mm	Each	22
-do-	-do-	-	16/12	Bolt M 16x210/57 mm	Each	30
-do-	-do-	-	16/13	Bolt M 16x220/57 mm	Each	22
-do-	-do-	-	16/14	Bolt M 16x240/57 mm	Each	34
-do-	-do-	-	16/15	Bolt M 16x260/57 mm.	Each	28
ETI/C	0073 (Mod-A)	-	16/16	Bolt M 16x270/57 mm	Each	38
-do-	-do-	-	16/17	Bolt M 16x300/57 mm	Each	42
-do-	-do-	-	16/18	Bolt M 16x320/57 mm	Each	34
-do-	-do-	-	16/19	Bolt M 16x360/57 mm	Each	35
-do-	-do-	-	16/20	Bolt M 16x370/57 mm	Each	52
ETI/C	0073 (Mod.A)	-	16/21	Bolt M 16x400/57 mm	Each	56
-do-	-do-	-	16/22	Bolt M 16x460/57 mm	Each	64
-do-	-do-	-	16/23	Bolt M 16x500/57 mm	Each	70
-do-	-do-	-	16/24	Bolt M 16x600/57 mm	Each	84
-do-	-do-	-	16/25	Bolt M 16x650/57 mm	Each	91

1	2	3	4	5	6	7
-do-	-do-	-	-	Nut for M 16 bolt	Each	2
-do-	-do-	-	-	Lock nut for M 16 bolt	Each	2
-do-	-do-	-	18/1	Bolt M 18 x 75/42 mm. With hole for split pin	Each	22
-do-	-do-	-	18/2	Bolt M 18 x 80/42 mm. with hole for split pin	Each	23
-do-	-do-	-	-	Nut for M 18 bolt	Each	6
-do-	-do-	-	-	Lock nut for M 18 bolt	Each	5
-do-	-do-	-	20/1	Bolt M 20 x 50/37 mm	Each	13
-do-	-do-	-	20/2	Bolt M 20 x 50/46 mm	Each	15
-do-	-do-	-	20/3	Bolt M 20 x 65/46 mm	Each	15
-do-	-do-	-	20/4	Bolt M 20 x 85/46 mm	Each	19
-do-	-do-	-	20/5	Bolt M 20 x 100/46 mm	Each	20
-do-	-do-	-	20/6	Bolt M 20 x 200/52 mm	Each	46
-do-	-do-	-	20/7	Bolt M 20 x 230/65 mm	Each	39
-do-	-do-	-	20/8	Bolt M 20 x 260/65 mm	Each	45
ETI/C	0073 (Mod-A)	-	20/9	Bolt M 20 x 280/65 mm	Each	49
-do-	-do-	-	20/10	Bolt M 20 x 310/65 mm	Each	51
-do-	-do-	-	20/11	Bolt M 20 x 330/65 mm	Each	54
-do-	-do-	-	20/12	Bolt M 20 x 360/65 mm	Each	59
-do-	-do-	-	20/13	Bolt M 20 x 380/65 mm	Each	84
-do-	-do-	-	20/14	Bolt M 20 x 470/65 mm	Each	104
ETI/C	0073 (Mod.A)	-	20/15	Bolt M 20 x 550/65 mm	Each	86
-do-	-do-	-	20/16	Bolt M 20 x 650/65 mm	Each	97
-do-	-do-	-	20/17	Bolt M 20 x 700/65 mm	Each	113
-do-	-do-	-	-	Nut for M 20 Bolt	Each	2
-do-	-do-	-	-	Lock Nut for M 20 Bolt	Each	2
-do-	-do-	-	24/1	Bolt M 24 x 70/54 mm with hole for split pin	Each	27
-do-	-do-	-	-	Nut for M 24 Bolt	Each	12
-do-	-do-	-	-	Lock Nut for M 24-bolt	Each	5
RE/33/P	250 (Mod.B)	1	2113	'U' Bolt M 14 mm	Each	26
-do-	-do-	2	2133	'U' Bolt M 14 mm	Each	25
-do-	260 (Mod.C)	1	261	Pin ø 20 x 55 mm	Each	13
-do-	-do-	2	262	Pin ø 20 x 60 mm	Each	13
-do-	-do-	3	263	Pin ø 20 x 50 mm	Each	12
STAINLESS STEEL BOLTS & NUTS ETC21						
ETI/C)	0073 (Mod.A)	-	10/14	BOLT M 10 x 25/20 mm	Each	17
-do-	-do-	-	10/15 & 10/16	Bolt M 10 x 35/30 mm with & without hole for split pin	Each	21
-do-	-do-	-	10/17	Bolt M 10 x 40/26 mm	Each	4
-do-	-do-	-	10/18	Bolt M 10 x 55/30 mm	Each	5

1	2	3	4	5	6	7
ETI/C	0073 (Mod.A)	-	10/19	Bolt M 10 x 65/30 mm	Each	30
-do-	-do-	-	10/20	Bolt M 10 x 75/26 mm	Each	33
-do-	-do-	-	108 S	S.S. Nut for M 10 Bolt	Each	6
-do-	-do-	-	109 S	S.S. Lock Nut for M 10 Bolt	Each	5
-do-	-do-	-	12/14	Bolt M 12 x 25/20 mm	Each	26
-do-	-do-	-	12/15	Bolt M 12 x 25/25 mm	Each	3
-do-	-do-	-	12/16	Bolt M 12 x 30/30 mm	Each	3
ETI/C	0073 (Mod.A)	112 S	12/17	Bolt M 12 x 45/30 mm	Each	30
-do-	-do-	-	12/18	Bolt M 12 x 50/50 mm	Each	5
-do-	-do-	-	12/19	Bolt M 12 x 70/40 mm	Each	48
-do-	-do-	-	-	S.S. Nut for M 12 Bolt	Each	10
-do-	-do-	-	-	S.S. Lock Nut for M 12 Bolt	Each	8
-do-	-do-	-	14/14	Bolt M 14 x 75/34 mm	Each	9
-do-	-do-	-	-	S.S. Nut for M 14 Bolt	Each	30
-do-	-do-	-	-	S.S. Lock Nut for M 14 Bolt	Each	21
ETI/OHE/P	2124 (Mod.B)	1	2124 S	Direct catenary clamp stud	Each	21
-do-	1320 (Mod.B)	2	-	'U' Bolt $\phi$ 10 mm	Each	54
-do-	150	6	4032- S	'U' Bolt $\phi$ 10 mm	Each	53
RE/33/P	160 (Mod.A)	-	161-S	Pin $\phi$ 10 x 35 mm	Each	22
-	-	-	-	Pin $\phi$ 12 x 45 mm	Each	49
-	-	-	-	Pin $\phi$ 16 x 60 mm	Each	102
-do-	-	-	-	Pin $\phi$ 18 x 75 mm	Each	102
G.S.'J' Bolts ETI/C/0074(Mod.A)						
-do-	-	-	-	'J' Bolt $\phi$ 16 x 120/60	Each	23
-do-	-	-	-	'J' Bolt $\phi$ 16 x 175/60	Each	42
-do-	-	-	-	'J' Bolt $\phi$ 16 x 200/60	Each	51
-do-	-	-	-	'J' Bolt $\phi$ 16 x 220/60	Each	49
-do-	-	-	-	'J' Bolt $\phi$ 16 x 240/60	Each	56
-do-	-	-	-	'J' Bolt $\phi$ 16 x 250/60	Each	53
-do-	-	-	-	'J' Bolt $\phi$ 16 x 300/60	Each	65
-do-	-	-	-	'J' Bolt $\phi$ 16 x 340/60	Each	70
-do-	-	-	-	'J' Bolt $\phi$ 16 x 345/60	Each	70
-do-	-	-	-	'J' Bolt $\phi$ 16 x 400/60	Each	66
SPRING WASHERS				Galv. Steel spring washer $\phi$ 12 mm	per 100 nos	113
				Galv. Steel spring washer $\phi$ 14 mm	per 100 nos	124
				Galv. Steel spring washer $\phi$ 16 mm	Per 100 nos	138
				Galv. Steel spring washer $\phi$ 20 mm	per 100 nos	197

1	2	3	4	5	6	7
FLAT WASHERS						
				Rustless flat washer ø 10mm	per 100 nos.	529
				Rustless flat washer ø 12mm	per 100 nos.	787
				Rustless flat washer ø 16mm	per 100 nos.	1255
				Galv. Steel flat washer ø14mm	per 100 nos.	176
				Galv. Steel flat washer ø16mm	per 100 nos.	190
				Galv. Steel flat washer ø20 mm	per 100 nos.	204
				Galv. Steel flat washer ø 24 mm	per 100 nos.	254
				Galv. Steel tapered washer ø 16mm	per 100 nos.	740
Steel Structures				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 8.5m long.	MT	45259
				Traction masts fabricated from Rolled mild steel Joist (RSJ) of size 203mm x 152mm x 52.0 Kg/m and galvanised in length 9.5 m or 8.5m long.	MT	42491
				Fabricated and galvanized structures (O,N & R type portals) with necessary components other than masts.	MT	53854
				Structural steel (traction mast) fabricated and galvanised, of type B-150, B-175 & B-200.	MT	45423
				Fabricated & galvanised steel structure other than portals and traction masts covered under item 3(b)(i) & 3(b)(ii).	MT	47703

□□□□□

**SCHEDULE - 3**  
**UNIT PRICES**  
**SECTION - 4(a) (NON-FERROUS)**

The rates given below against different items of work in different sections of this schedule are the standard schedule of rates of Jan'06. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

RAILWAY DRAWINGS			RAILWAY IDENTIFICATION	DESCRIPTION OF EQUIPMENTS COMPONENTS & MATERIALS.	UNIT OF MEASUREMENT	UNIT PRICES AT CONTRACTOR'S DEPOT (in Rs)
SERIES	DRG No & MOD	REF No.				
1	2	3	4	5	6	7
ETI/OHE/P	1010 (Rev.A)	1	1010	Terminal connector (15mm) multiple holes(Bolted type)	Each	916
-do-	1030-2 (Mod.D)	1	1031-2	Contact wire parallel clamp(Large).	Set	155
ETI/OHE/SK	534 (Mod.C)	1&2	SK-534/1 SK-534/2	Parallel Clamp (Large) compression type.	Each	162
			( OR )			
ETI/OHE/SK	535 (Mod.B)	1&2	SK-535/1 SK-535/2	Jumper Clamp (Large) compression type	Each	162
			( OR )			
ETI/OHE/P	1030-3 (Mod.A)	1 to 3	1031-3	Parallel Clamp	Set	187
-do-	1040-2 (Mod.E)	1	1041-2	Contact wire parallel clamp(Small)	Set of 2Nos	135
ETI/OHE/SK	575 (Mod.A)	1&2	SK-534/1 SK-575/2	Parallel Clamp (Small) compression type.	Each	162
			( OR )			
ETI/OHE/SK	576 (Mod.B)	1&2	SK-576/1 SK-535/2	Jumper Clamp (Small) compression type	Each	162
			( OR )			
ETI/OHE/P	1040-3 (Mod.B)	1 to 3	1041-3	Parallel Clamp(90/50)	Set	247
ETI/OHE/P	1050-3 (Mod.A)	1	1051-3	Parallel Clamp Part (150/160)	Set	247
ETI/OHE/P	1070-1 (Mod.B)	1&2	-	Bridle wire clamp (6mm) with lock plate	Each	85
-do-	1080-1 (Mod.B)	1	1081-1	Contact wire splice (toothed type)	Set of 2Nos	705
-do-	1090	1 to 4	1091 to 1094	Catenary splice(65)	Set	261
-do-	1120 (Mod.B)	1 to 3	1121, 1094 & 1092	Catenary Ending Clamp (65)	Each	240
-do-	1130	1, 2 & 3	1131, 1104 & 1102	Feeder Ending Clamp (150)	Set	420
-do-	1140 (Mod.B)	1 to 3	1131, 1143 & 1102	Large span wire ending clamp (130)	Each	409
RE/33/P	1160 (Mod.J)	1,3, 4,6 & 7	1161, 1163 & 161-S	Suspension clamp	Each	376



1	2	3	4	5	6	7
-do-	-do-	1	1161	Suspension clamp body	Each	204
-do-	-do-	4	1163	Suspension Clamp lock plate.	Set of 2 nos.	10
RE/33/P	1170 (Mod.K)	1,2, 4,& 6 to 9	1171, 1172, 1174, 1163 & 161-S	Double suspension clamp	Each	348
-do-	-do-	1	1171	Double suspension clamp Body	Each	347
-do-	-do-	2	1172	Double suspension lock plate.	Each	68
-do-	-do-	4	1174	Packing saddle	Each	31
-do-	-do-	6	1163	Suspension clamp lock plate	Set of 2 Nos	10
-do-	1180 (Mod.F)	1	1181	Contact wire dropper clip part	Set of 2 Nos.	52
-do-	-do-	2	1182	Locking wire	Each	2
			(OR)			
ETI/OHE/SK	572 Sh-1 (Mod. B)	1 to 3	SK-572/1 SK-572/2	Contact wire dropper clip	Each	Not in use
ETI/OHE/P	1192 (Mod.C)	1	1192	Catenary Dropper clip	Each	19
-do-	1194 (Mod.A)	1	1194	Bridle wire dropper clip	Each	20
RE/33/P	1220 (Mod.E)	1	1221	Contact wire swivel clip part	Set of 2 Nos.	138
-do-	-do-	2	1222	Contact wire swivel clip pin	Set of 2 Nos.	9
-do-	1270-1 (Mod.F)	1	1272	Suspension clevis(18mm)	Each	121
-do-	1280 (Mod.C)	1&2	1281 & 1282	Double contact wire splice	Set	2851
ETI/OHE/P	1310	1	1311	Pull off clamp	Each	37
-do-	-do-	2	1192	Catenary Dropper clip	Set of 2 Nos.	38
-do-	1320 (Mod.B)	1	1321	U' clamp(50/50) body	Each.	148
-do-	1330 (Mod.B)	1	1331	Distance piece `U' clamp saddle.	Each.	68
-do-	-do-	3	4036	`U' Bolt saddle	Each	68
ETI/OHE/P	1350	1	1351	Thimble (10 mm)	Each	37
-do-	1360 (Mod.B)	1 to 3	1131, 1362& 1361	Steel wire Ending clamp (90)	Each	420
-do-	1400 (Mod.C)	1&4	1401, 1174	Short Dropper assembly	Each	37

1	2	3	4	5	6	7
ETI/OHE/P	-do-	2	1402	Variable short dropper clip(cont. wire)	Each	37
-do-	1540 (Mod.D)	1	1541	Parallel clamp part (10/20)	Set of 2 Nos.	268
-do-	-do-	5	-	Bimetallic strip (90x35x1 mm)	Each	56
ETI/OHE/P	1550 (Mod.E)	1	1551	Parallel clamp part(20/20)	Set of 2 Nos.	279
-do-	1560 (Mod.D)	1	1561	Parallel clamp(15/20)	Set of 2 Nos.	268
-do-	-do-	5	-	Bimetallic strip (160 x 50 x 1 mm)	Each	63
-do-	1580 Sh1 (Mod.F)	1&2	1581 & 1582	Large suspension clamp 20 mm	Each	214
-do-	-do-	10	-	Flat Armour tape	KG	289
-do-	-do-	11	-	Armour tape ferrule	Set of 2 Nos.	51
-do-	1600 (Mod.C)	1&2	1601 & 1602	20 mm Strain clamp	Each	747
-do-	1610-1	1	1610-1	Compression joint	Each	282
-do-	1640	1	1640	Repair sleeve (Compression type)	Each	268
-do-	2064-1 (Mod.A)	2	2064-1	Tube cap 30 mm	Each	19
-do-	2104-1 (Mod.A)	2	2104-1	Tube cap 40 mm	Each	22
-do-	2110 (Mod.B)	1&2	2111 & 2112	Standard Catenary suspension Bracket	Each	392
-do-	2120 (Mod.B)	1&2	2121 & 2122	Standard catenary direct clamp	Each	367
-do-	-do-	3	2123	Direct Catenary clamp Grip	Each	38
-do-	2125 (Mod.B)	1	2125	Bridle wire sleeve	Each	7
-do-	2130 (Mod.B)	1&2	2131 & 2132	Large catenary suspension Bracket	Each	381
-do-	2140 (Mod.C)	1&2	2141 & 2142	Catenary direct clamp(Large)	Each	364
ETI/OHE/P	-do-	3	2123	Direct catenary clamp grip	Each	38
-do-	2345	1	2345	Steady Rod Eye piece	Each	42
-do-	2380 (Mod.C)	1&3	2112 & 2122	Standard Catenary suspension bracket top and bottom	Set	479
-do-	-do-	2&4	2131 & 2142	Large Catenary suspension bracket Top & bottom	Set	374
-do-	2390 (Mod.B)	1	2544-5	BFB Steady Arm only L = 0.69 m	Each	94
-do-	-do-	2	2544-6	BFB Steady Arm only L = 0.89 m	Each	121



1	2	3	4	5	6	7
-do-	-do-	3	2544-7	-do- L = 1.09 m	Each	149
-do-	-do-	4	2544-8	-do- L = 1.29 m	Each	176
-do-	-do-	7	-	Al. Alloy Rivet $\varnothing$ 6x35	Set of 4 Nos	17
-do-	2423-1 ( Mod.A)	1	2423-1	Tube cap 25 mm	Each	15
-do-	2520 (Mod.B)	1	2521	Normal Bent Steady arm	Each	152
-do-	-do-	5	-	Al. Alloy Rivet $\varnothing$ 6x50	Set of 4 Nos.	21
-do-	2540 (Mod.B)	1	2544-1	BFB Steady arm only L = 0.72 m.	Each.	98
-do-	-do-	2	2544-2	-do- L = 0.92 m.	Each	127
-do-	-do-	3	2544-3	-do- L = 1.12 m.	Each	153
-do-	-do-	4	2544-4	-do- L = 1.32 m.	Each	179
-do-	2540 (Mod.B)	7	-	Al. Alloy Rivet $\varnothing$ 6x35	Set of 4 Nos.	17
-do-	2540-1	1	2544-9/1	BFB Steady arm only for tramway OHE(Regulated) L = 0.92 m.	Each	127
-do-	-do-	1	2544-9/2	-do- L = 1.12 m	Each	153
-do-	-do-	1	2544-9/3	-do- L = 1.32 m	Each	179
-do-	-do-	4	1221	Contact wire swivel clip	Each	69
-do-	-do-	6	-	AL. Alloy Rivet $\varnothing$ 6x33	Set of 4 Nos.	17
ETI/OHE/P	-do-	5	1222	Contact wire swivel clip pin	Each	5
RE/33/P	2700 (MOD.E)	1&3	2701 & 4036	Vee suspension assembly (Excl. `U' Bolt of 10 mm with nut, lock nut and split pin)	Set	1144
ETI/OHE/P	2710	1 to4	-	Unequal vee suspension assembly	Each	1153
RE/33/P	2721 (Mod.C)	1	2721	Double vee suspension top.	Each.	965
ETI/OHE/P	2730 (MOD.A)	1	2731	Section Insulator support clamp part	Each.	1053
-do-	-do-	2	4036	AL. Bronze `U' bolt saddle	Set of 2 Nos	135
-do-	4001 (Mod.A)	1	4001	Span wire clip (65)	Each	42
-do-	4002 (Mod.A)	1	4002	Span wire clip (130)	Each	49
-do-	6170 (Mod.C)	1	6171	Double Contact wire parallel clamp piece.	Set	68
-do-	6310- 1(Rev.A)	1 to 4	6310-1	18 mm Bus Terminal (Multiple Bolt)	Each	888
-do-	6320 (Mod.A)	1 to 4	6320	18 mm Bus Splice	Each	980

1	2	3	4	5	6	7
RE/33/P	6330 (Mod.C)	1 to 4	6330	18 mm bus Tee Joint	Each	2664
-do-	6350 (Mod.B)	1 to 4	-	18 mm Bus Terminating Tee	Each	1804
ETI/PSI/P	6480 (Mod.C)	1, 2, 5& 6	6481 & 6482	36 mm Aluminum Bus Terminal for 25 KV Isolator(Rigid Type).	Each	832
-do-	6490 (Mod.B)	1& 2	6491 & 6482	36 mm Aluminum Bus splice	Each	973
-do-	6500 (Mod.C)	1& 2	6501 & 6482	36 mm Aluminum Bus Tee connector	Each	985
-do-	6510 (Mod.D)	1& 2	6511 & 6482	36 mm Aluminium Tee Terminal	Each	832
-do-	6520 (Mod.B)	1to 3	6521, 6482 & 6523	36/15 mm Tap Connector	Each	839
-do-	6530 (Mod.C)	1to 3	6531, 6482 & 6592	36/20mm Terminal connector.	Each	839
-do-	6550 (Mod.B)	1 to 4	6551, 6482-1 6552 & 6553	36 mm Aluminium Flexible Bus splice	Each	2901
-do-	-do-	5	-	Bimetallic strip	Set of 4Nos	423
-do-	6560 (Mod.B)	1&2	6561 & 6482	36 mm AL. Bus Splice Cum Tee connector	Each	2538
-do-	6830-1 (Mod.D)	1& 2	6831 & 6592	Terminal connector for AL. conductors (Bolted type)	Each	829
ETI/OHE/P	1009 (Mod-A)	1 to 3	1009 & 1009-1	Terminal connector (19mm) multiple hole (Bolted type)	Set	988
-do-	-do-	4	-	Phosphor bronze spring washer dia 12mm	Set of 4Nos	26
ETI/OHE/SK	123 (Mod.D)	1 & 5	AL-123	Bimetallic PG clamp (14/19)	Set of 2Nos	392
-do-	130 (Mod.D)	1	AL-130	AL. Alloy catenary dropper clip.	Each	47
-do-	134 (Mod.D)	1 to 4	AL-134	Catenary splice (cone type) Al. Alloy Catenary.	Each	1100
-do-	231 (Mod.D)	1	AL-231	Parallel groove clamp (18/14).	Set of 2Nos	558
-do-	-do-	5	-	Bimetallic ALCU strip 1 mm thick.	Set of 2Nos	118
ETI/OHE/SK	285 (Mod.C)	-	-	Crimp type Repair Sleeve for AAA Stranded catenary wire.	Each	324

-do-	333 (Mod.D)	1	-	Catenary Dropper clip	Each	54
------	----------------	---	---	-----------------------	------	----

1	2	3	4	5	6	7
-do-	436 (Mod.B)	1& 2	AL-436 AL-436/1	Envelope type end fitting assembly size 19/2.79 mm.	Each.	688
-do-	-do-	8	-	Copper split pin dia 4x32mm	Each	2
-do-	469 (Mod.A)	4& 6	-	Packing saddle and suspension clamp lock plate	Set	41
-do-	-do-	10	-	Soft Annealed Al. tape (1.25x7.7mm).	Kg.	268
BUSBAR				Tubular aluminium bus bar 36 x 28mm.	Metre	186
				Solid copper bus bar 18mm	Metre	879
<b>WIRES &amp; FLATS</b>						
19/7/1.4mm all aluminium jumper.					Metre.	100
<b>EQUIPMENTS</b>						
				Section insulator assembly	Each	14097
				Copper rivets ø 6 x 50 mm	Per 100 nos.	959
<b>RIVETS</b>						
				Copper rivets ø 6 x 55 mm	Per 100 nos.	973
				Al. Alloy snap Head rivets ø 4 x 35 mm	Per 100 nos.	409
				Al. Alloy rivets ø 6 x 45 mm	Per 100 nos.	519
				Al. Alloy rivets ø 6 x 50 mm	Per 100 nos.	522
				Al. Alloy rivets ø 6 x 35 mm	Per 100 nos.	437
				Al. Alloy rivets ø 6 x 33 mm	Per 100 nos.	423
<b>SPRING WASHERS</b>						
				Phosphor bronze spring washer ø 10 mm	Per 100 nos.	505
				Phosphor Bronze spring washer ø 16 mm	Per 100 nos.	980
				Phosphor Bronze spring washer ø 12 mm	Per 100 nos.	648
<b>Conductors</b>						
				240 sq mm Spider conductor (R.C.)	Per KM	73100
				150 sq mm copper cross feeder	Per MT	360780
				5 and 7 mm hard drawn copper dropper wire	Per MT	326174
				160 sq mm Large Jumper Wire	Per MT	360007
				20 sq mm cadmium copper Bridle Wire	Per MT	361454
				105 sq mm Large Jumper wire	Per MT	361813
				50 sq mm Small Jumper wire	Per MT	359375
				Insulated cadmium catenary wire (19/2.10), 65 sq mm	Per KM	1634550
				130 sq mm Large Span wire	Per MT	362042
<b>EQUIPMENTS</b>						
				Supply of a Ceramic/beaded Glass Fibre type (PTFE) Short Neutral section assembly	Each	223898

**SCHEDULE - 3**  
**UNIT PRICES****SECTION - 4(b) (NON-FERROUS)**

The rates given below against different items of work in different sections of this schedule are the standard schedule of rates of Jan'06. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

RAILWAY DRAWINGS			RAILWAY IDENTIFICATION	DESCRIPTION OF EQUIPMENTS COMPONENTS & MATERIALS.	UNIT OF MEASUREMENT	UNIT PRICES AT CONTRACTOR'S DEPOT (in Rs)
SERIES	DRG No & MOD	REF No.				
1	2	3	4	5	6	7
Conductors			107 Sq MM HDGC Contact Wire		Per MT	3,36,890

	65 sq mm cadmium copper catenary wire	Per MT	3,11,652
--	---------------------------------------	--------	----------

FORM - 7

Sheet-26

## SCHEDULE - 3

## UNIT PRICES

## SECTION - 5 (INSULATORS)

The rates given below against different items of work in different sections of this schedule are the standard schedule of rates of Jan'06. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with escalation of estimate (% above SOR) and loading of percentage quoted by the tenderer over advertised value of the section.

RAILWAY DRAWINGS			RAILWAY IDENTIFICATION	DESCRIPTION OF EQUIPMENTS COMPONENTS & MATERIALS.	UNIT OF MEASUREMENT	UNIT PRICES AT CONTRACTORS DEPOT IN (Rs.)
SERIES	DRG No & MOD	REF No.				
1	2	3	4	5	6	7
Stay arm Insulator Assembly				(i) Porcelain (1050 mm CD)	Each	1554.72
				(ii) Composite (1050mm CD)	Each	1498.75
				(iii) Composite (1600 mm CD)	Each	2293.56
Bracket Insulator Assembly				(i) Porcelain (1050 mm CD)	Each	1338.07
				(ii) Composite (1050mm CD)	Each	890.29
				(iii) Composite (1600 mm CD)	Each	2293.56
9 Tonne Insulator Assembly				(i) Porcelain (1050 mm CD)	Each	1962.33
				(ii) Composite (1050mm CD)	Each	1240.61
				(iii) Composite (1600 mm CD)	Each	2293.56
Solid Core 25 kV post Insulator Assembly					Each	3947.00
Sectioning Insulator Assembly					Each	4952.00
Operating Rod Insulator Assembly					Each	2397.00
ETI/OHE/P	6061-3 (Mod.A)	1 to 3	-	Disc Insulator (255 mm) clevis type	Each	423.00
-do-	6070-1	1 to 3	-	11 KV Post Insulator Assembly	Set	423.00

## NOTES:

- (1) All prices in Column-7 Schedule-3 are inclusive of all taxes & duties.
- (2) Nuts and lock nuts should be procured from the approved firms and from the same manufacturer who manufactures corresponding bolts, screws etc. The prices for bolts shall include the cost of providing a hole for split pin, wherever required.
- (3) The prices are inclusive of bolts, nuts, locknuts washer and split pins wherever included in the drawings, unless otherwise specified.
- (4) All bolts and nuts below 14 mm dia shall be stainless Steel only which are to be used in live or current carrying parts even if bolts of other material are shown in the concerned drawings.
- (5) The reference can be taken from the actual dimensions of the fasteners as per RDSO drawing No. ETI/C/0073, ETI/C/0074 and ETI/C/0075 (Latest revision as per Annexure-I).
- (6) Wherever IS:226 is referred for materials in schedule-3(OHE), it should conform to IS:2062.



**FORM - 8**

**SCHEDULE-4**

**SCHEDULE OF PRICES OF EQUIPMENTS, COMPONENTS & MATERIALS  
FOR OHE & TSS WORKS**

- DELETED -

---

**FORM - 9A**

**SCHEDULE-5**

**SCHEDULE OF PRICES OF SPECIAL TOOLS, PLANTS FOR MAINTENANCE  
FOR OHE & TSS WORKS**

- DELETED -

---

**FORM - 9B**

**SCHEDULE-5**

**SCHEDULE OF PRICES OF SPECIAL TOOLS, PLANTS FOR MAINTENANCE  
OF SCADA WORKS**

-DELETED-

**To be uploaded with Packet-A**

**FORM -10**  
**SHEET-1**

**TENDERER'S SCHEME OF WORK AND TIME SCHEDULE**

**I. FOR OVERHEAD EQUIPMENT**

- Issue of preliminary layouts and site allocations:
- Submission of layout plans for walk-outs and approvals:
- Approval of layout plans:
- Preparation and submission of Drawings for approval:
- Approval of Drawings:
- Ordering of steel work on the Purchaser:
- Bulk order for materials.
- Detailed ordering of materials.
- Foundation installation:
- Delivery of steel work.
- Steel work erection.
- Delivery of materials
- Wiring and testing
- Guarantee period.

---

MONTHS

**Note:** The above time schedule should be **uploaded** separately for each section of approximately 100 TKM and the different time schedules should be numbered as First Section, Second Section.....etc.

□□□□□

To be uploaded with Packet-A

FORM - 10  
SHEET - 2

TENDERER'S SCHEME OF WORK AND TIME SCHEDULE FOR OHE WORKS

II. SWITCHING STATIONS AND BOOSTER TRANSFORMERS STATIONS

Submission of locations plans for approval:

Approval of location plans:

Preparation and submission of general arrangement and other drawings and cross sections for foundations and steel work.

Approval of drawings :

Ordering of steel work on the Purchaser :

Bulk order for materials :

Detailed ordering of materials :

Foundation installation :

Delivery of steel work :

Steel work erection :

Delivery of materials :

Erection of equipment :

Testing and commissioning :

Guarantee period :

---

MONTHS.

**Note:** The above time schedule should be **uploaded** separately for each section of approximately 100 TKM and the different time schedules should be numbered as First Section, Second Section.....etc.

□□□□□

To be uploaded with Packet-A

**FORM - 10**  
**SHEET- 3**

**TENDERER'S SCHEME OF WORK AND TIME SCHEDULE**

**III. FOR TRACTION SUB-STATION WORKS**

1.	Submission of location plan for approval.	
2.	Approval of location plans.	
3.	Earth filling and leveling.	
4.	Preparation and submission of general arrangement and other drawings and cross-sections for foundations and drawings etc.	
5.	Building foundation.	
6.	Building roof slab.	
7.	Fixing of doors/windows etc.,	
8.	Flooring and finishing.	
9.	Approval of cross section (Foundation and steel work)	
10.	Allocation of small steel work and fittings.	
11.	Bulk order for materials.	
12.	Detailed ordering of materials.	
13.	Foundation installation.	
14.	Delivery of steel work.	
15.	Steel work erection.	
16.	Delivery of materials.	
17.	Fixing, testing and commissioning of Electrical equipments (General).	
18.	Installation, testing and commissioning of Yard light fittings.	
19.	Erection of equipment.	
20.	Guarantee period.	

Months from the date of issue of Letter of Acceptance of Tender.

0    3    6    9    12    15    18    21    24    27    30

To be uploaded with Packet-A

FORM - 10  
SHEET- 4

TENDERER'S SCHEME OF WORK AND TIME SCHEDULE

II. FOR SCADA WORKS

-DELETED-

**To be uploaded with Packet-A**

**FORM - 11(A)**

**NAME OF MANUFACTURER/S, PLACES OF MANUFACTURE & INSPECTION OF SUPPLIES  
(CORE/RDSO APPROVED SOURCES)**

Item No.	Description of item	Name & address of Manufacturer/s	Place of Manufacture	Place of Inspection
----------	---------------------	----------------------------------	----------------------	---------------------

**Declaration by the Tenderer**

We hereby confirm that all the equipments, components and materials which will be supplied by us would conform to technical and other particulars as detailed in Part-II Chapter-IV. We further confirm that the equipments, components and materials except those listed below would be procured from the approved sources/suppliers approved by CORE/RDSO.

- (i)
- (ii)
- (iii)

Technical details conforming the SOGP of the concerned specifications and the details of manufacturer for the above items are enclosed in FORM-11(B).

**NOTE:-** To be furnished on separate sheet for individual portion of OHE & TSS WORKS.

□□□□□

**To be uploaded with Packet-A**

**FORM - 11(B)**

**NAME OF MANUFACTURER/S, PLACES OF MANUFACTURE & INSPECTION OF SUPPLIES  
(OTHER THAN CORE/RDSO APPROVED SOURCES)**

Following particulars should be furnished as under :-

1. Item No.
2. Description of item
3. Name and address of manufacturer
4. Place of manufacturer
5. Place of inspection
6. Whether permitted to use ISI Standard mark (Wherever applicable)
7. Approx. turnover of this item in last 3 years (Enclose list of orders executed)

**Declaration by the Tenderer :**

We hereby confirm that -

- (i) The design approval/prototype approval of the above items will be obtained from CORE/RDSO. All cost on this account will be borne by us.
- (ii) In case of delay in prototype approval, we shall arrange the procurement of above listed items from the CORE/RDSO approved sources.
- (iii) We also clearly understand that delay on account of prototype approval shall not be claimed by us as reasonable ground for extension of completion period.

**NOTE:- To be furnished on separate sheet for individual portion of OHE & TSS WORKS.**

Signature of Tenderer

**To be uploaded with Packet-A**

**FORM - 11(C)**

**COMPLETE TECHNICAL DATA AND PARTICULARS OF THE EQUIPMENTS  
OFFERED AS SPECIFIED IN THE TENDER PAPERS TOGETHER WITH DESCRIPTIVE  
LITERATURE, LEAFLETS ETC.**

S No	Name of Equipments	System voltage	Manufacturer's name
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
--			
--			
--			
--			

**Note:** (i) *The details of equipment/ item having unit cost more than Rs.10,000.00 shall only be detailed in above proforma.*

(ii) *Necessary literature/ leaflets shall also be enclosed.*



**To be uploaded with Packet-A**

**FORM - 12**

**(TO BE uploaded WITH PACKET-A)**

**TENDERER'S CREDENTIALS FOR OHE WORKS**

Give details of your previous experience on installation of similar equipments and the details of present work load in the proforma given in **Form-12A, Sheet-1 & 12A, Sheet-2.**

Give the financial turnover for the past three years of your firm with audited balance sheet, names of your Bankers.

Details of Engineering organisation, Technical Capabilities, Design and Drawing Capabilities in **Form-12A, Sheet-3.**

Details of Technical Collaboration with any consultant for assistance, in any.

Details of construction machinery, Tools and plants, Vehicles etc in **Form-12A, Sheet-4.**

Contract amount received during the last three financial years and in the current financial year as per audited balance sheet duly certified by Chartered Accountant.

Constitution of firm along with certified copies of legal documents in support thereof and power of attorney.

Details of credential for **TSS & SCADA** works to be submitted in **Form-12B & Form-12C.**

□□□□□

(TO BE uploaded WITH PACKET-A)

**Form-12A Sheet-1**

SN	Details	To be filled up
1	Name of Contractor	
2	Description of work	
3	Section of work	
4	Total TKM of the completed work	
5	Whether the work was executed by the firm as single entity or as a Joint Venture.	
6	Percentage share of the firm if the work was executed as Joint Venture	
7	Date of award of contract (LOA)	
8	Value of contract as per LOA	
9	Date. of Actual completion of work (with extension if any) (i.e. date of issue of last PAC)	
10	Final value of completed contract	
11	Other information, if any	
12	Verifying Authority (Purchaser of the work)	Phone No.
		Cell No.
		Fax No.
		email id

Note:

- 1) If the tenderer has completed more than one work, the form shall be numbered as Form-12A Sheet-1(i), Form-12A Sheet-1(ii), Form-12A Sheet-1(iii) and so on.
- 2) Information given in above form-12A, Sheeet-1 shall be verified /countersigned by the Purchaser of the work and if it is not possible then supported by the purchaser's documents.
- 3) In absence of above information the tender offer of the tenderer are liable to be rejected.
- 4) If above work is on turnkey/composite basis the value of each work performed to be mentioned separately.

Signature of the  
Tenderer with Seal

(TO BE uploaded WITH PACKET-A)

FORM-12A, Sheet-2

<b>WORK LOAD</b>						
(Details of similar work in progress)						
<b>S.N.</b>	<b>Description</b>	<b>Work No.1</b>	<b>Work No.2</b>	<b>Work No.3</b>	<b>Work No.4</b>	<b>Work No.5</b>
I	Name of work					
ii	Purchaser					
iii	Section					
iv	TKM/ TSS					
v	Cost of work					
vi	Date of award					
vii	Stipulated date of completion					
viii	Date of actual start					
ix	Present Status of work					

NOTE: For details given in Form - 12A, Sheet-2, supportive documents / certificate from the organisation with whom they are working should be enclosed.

Signature of the  
Tenderer with Seal

(TO BE uploaded WITH PACKET-A)

**FORM-12A, Sheet-3**

<b>Engineering Organisation to be deployed in this work</b>						
(Details of Engineering / Technical organisations in hand and proposed to be engaged)						
<b>S.No.</b>	<b>Name</b>	<b>Designation</b>	<b>Qualification</b>	<b>Experience in Railway Electrification or similar work</b>	<b>On hand / Proposed to be engaged</b>	<b>Date since when working with the contractor</b>

- Note:**
- 1) The purchaser reserves the right to accept or otherwise any personnel on the project.
  - 2) Name indicated in above proforma shall be firm and work shall be executed by them only.
  - 3) Changes in above team during execution of the work, if any, should be with the approval of the purchaser.
  - 4) Apart from Electrical Engg. Organisation, Contractor should have at least one graduate civil Engineer with minimum 10 years experience and a few civil Engg. Diploma holder Inspectors to supervise the civil works.

Signature of the  
Tenderer with Seal

(TO BE uploaded WITH PACKET-A)

**FORM-12A, Sheet-4**

<b>Construction Machinery</b>			
<b>S.No.</b>	<b>Description</b>	<b>Qty in hand</b>	<b>Qty proposed to be hired</b>
1	Tirfor 5 T		
2	Tirfor 3 T		
3	Tirfor 1.5 T		
4	Pull Lift 3 T		
5	Pull Lift 1.5 T		
6	Pull Lift 0.75 T		
7	Generator Set (kVA)		
8	Generator with welding Set (kVA)		
9	5/2.5 kVA Meggear		
10	500/1000V Meggar		
11	AVO Meter		
12	Earth Tester		
13	Dynamo Meter 2 T		
14	Dynamo Meter 3 T		
15	Dynamo Meter 5 T		
16	Survey Instrument		
17	Compressor m/c (cap.)		
18	Wire Slings 1m, 2m, 3m		
19	Wire Slings 10m, 15m, 70m		
20	Come along clamps		
21	Concrete Mixer		
22	Truck		
23	Jeep		
24	Tractor		
25	Centrifuging Plant		
26	Road Cane		
27	Drilling m/c		
28	Grinding m/c		
29	Screw Jack		
30	Chain pulley Block		
31	Winch M/c (Cap)		
32	Power Hacksaw		
33	Welding M/c		
34	Dropper Cutter		
35	Contact Wire Cuter		
36	Dropper Jig		
37	Al. Ladder Ext. Type 27 feet		
38	Al. Ladder Ext. Type 36 feet		
39	Pulley Block		
40	Ladder Trolley		

It may also be certified that the Tools & Plants listed above are sufficient to execute the work covered under tender and all the above Tools & Plants shall be readily available during execution of the contract.

Signature of the

Tenderer with Seal  
(TO BE uploaded WITH PACKET-A)

(On letterhead of Auditor of Firm)

**Form-12A, Sheet-5**

SN	Financial Year	Contractual Amount Received
1.		
2.		
3.		
4.		

**Note:** In above format only Contractual Amount Received for the financial year to be filled by Auditor, if there is no Contractual Amount Received in the year, may be filled as Nil.

Seal & Signature of Auditor

(TO BE uploaded WITH PACKET-A)  
Form-12B Sheet-1

**TENDER'S CREDENTIALS FOR TSS WORKS PREQUALIFICATION BID**

- 1- Give Details of tenderer's past experience as per eligibility criteria for completed similar nature of work in the Performa below: -

SN	Details	To be filled up
1-	Location of TSS/GSS	
2-	Max. Voltage Level of TSS/GSS	
3-	Contract / Agreement No.	
4-	Contract / Agreement Value	
5-	Name of Contractor	
6 -	Description of work	
7-	No. of TSS/GSS/Similar nature of work	
8-	Complete work for a new substation or for augmentation work in the existing substations as defined in eligibility criteria.	
9-	Whether the work was executed by the firm as single entity or as a Joint Venture.	
10-	Percentage share of the firm if the work was executed as Joint Venture	
11-	Stipulated date of completion as per contract	
12-	Actual date of completion of work	
13-	Copy of the completion certificate of each similar nature of work to attached. (PAC/FAC/Completion certificate/Handing over certificate)	
14-	Completed value of substation or Augmentation portion of substation work in case composite / combined work in contract, (In money terms)	
15-	Payment made to contractor for completed value only for substation or Augmentation portion of substation work up to date of opening of instant tender	
16-	Equipment's commissioned by the Firm	
a-	Capacity of Power Transformer (MVA & KV)	
b-	Circuit Breaker (Voltage level)	
c-	No. of Control & Relay panel	
17-	Other information, if any	
18-	Verifying Authority (Purchaser of the work)	Office Address
		Phone No.
		Cell No.
		Fax No.
		Email.

**Note:**

- i) If the tenderer has completed more than one work, the form shall be numbered as Form-12B Sheet-1(i), Form-12B Sheet-1(ii), and Form-12B Sheet-1 (iii) and so on.
  - ii) Information given in above form-12B, Sheeet-1 shall be verified & countersigned by the Purchaser of the above said work and if it is not possible then supported by the purchaser's authentic documents.
  - iii) In absence of above information i.e. Form-12B the tender offer of the tenderer are liable to be rejected and will not be considered further. In case any information & details as mentioned in above Performa is found in correct or hide or overwriting than contract will be cancelled/terminated at any stage without prejudice.
  - iv) If above work is on turnkey/composite basis the value of each work performed to be mentioned separately.
2. Give details of similar works presently under execution as per above proforma.

Signature of the Tenderer/  
Authorized Representative of the firm

(TO BE uploaded WITH PACKET-A)

FORM – 12C

**TENDERER'S CREDENTIALS FOR SCADA WORKS**  
**PREQUALIFICATION BID**

**-DELETED-**



(TO BE uploaded WITH PACKET-A)

(A) DETAILS OF EXISTING COMMITMENTS & BALANCE AMOUNT OF ONGOING WORKS							
Sl. No.	Name of the Work	Work Awarded by (Name & Address of Agency/Organisation)	Date of Award of Work	Awarded Value/Latest Assessment value of the work	Date of Completion (as approved latest)	Gross Payment Received (till opening date of tender) (Rs.)	Value of Existing Commitments and Balance Amount of ongoing works to be completed in next 'N' years (Rs.)
1							
2							
3							
4							
(B) DETAILS OF THE WORKS YET TO START							
1							
2							
3							

FORM-12D

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**.

NOTE: (I) In case of JV, the above statement should be submitted for each member of JV.  
 (II) The above statement should be submitted duly verified by Chartered Accountant.  
 (III) In case of no works in hand, a 'NIL' statement should be furnished.

**FORM-13**

- D E L E T E D -

□□□□

**SUPPLEMENTARY AGREEMENT**

Articles of agreement made this day \_\_\_\_\_ in the year Two thousand and Twenty-One between the Managing Director, Haryana Rail Infrastructure Development Corporation Limited having his office at SCO 17-18-19, 3rd Floor, Sector-17A, Chandigarh-160017, herein after called HRIDC of the one part and \_\_\_\_\_ of the second part.

Whereas the party hereto of the other part executed an agreement with the party hereto of the first part being agreement Number \_\_\_\_\_ dated \_\_\_\_\_ for the performance \_\_\_\_\_ herein after called the 'Principal Agreement'.

And whereas it was agreed by and between the parties hereto that the works would be completed by the party hereto of the second part on \_\_\_\_\_ date last extended' and whereas the party hereto of the second part has executed the work to the entire satisfaction of the party hereto of the first part. And whereas the party hereto of the first part already made payment of the party hereto of the second part diverse sums from time to time aggregating to Rs. \_\_\_\_\_ including the final bill bearing voucher No. \_\_\_\_\_ dated \_\_\_\_\_ ( the receipt of which is hereby acknowledged by the party hereto of the second part in full and final settlement of all his /its claims under the principal agreement.

And whereas the party hereto of the second part have received further sum of Rs. \_\_\_\_\_ through the final bill bearing voucher No. \_\_\_\_\_ dated \_\_\_\_\_ (the receipt of which is hereby acknowledged by the party thereto of the second part) from the party hereto the first part in full and final settlement of all his/its disputed claims under principal agreement.

Now, it is hereby agreed by and between the parties in the consideration of sums already paid (by the party hereto of the first part to the party hereto of the second part against all outstanding dues and claims for, all works done under the aforesaid principal agreement including/excluding the security deposit the party hereto of the second part have no further dues of claims against the party hereto the first part under the said Principal Agreement. It is further agreed by and between the parties that the party hereto of the second part has accepted the said sums mentioned above in full and final satisfaction of all its dues and claims under the said Principal Agreement.

It is further agreed and understood by and between the parties that in consideration of the payment already made, under the agreement, the said Principal Agreement shall stand finally discharged and rescinded all the terms and conditions including the arbitration clause. It is further agreed and understood by and between the parties that the arbitration clause contained in the said principal agreement shall cease to have any effect and/or shall be deemed to be non-existent for all purposes.

Signature of the Contractor/s

For and on behalf of MD/ HRIDC

Witness

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_

ADDRESS: \_\_\_\_\_

(On Stamp Paper of Requisite Value)

**GUARANTEE BOND FOR SECURITY DEPOSIT**

(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)

In consideration of the President of India " hereinafter called "the Government" having agreed to exempt.....(hereinafter called "the said Contractor (s)" from the demand, under the terms and conditions of an Agreement dated.....made between.... and ..... for (hereinafter called "the said Agreement") of security deposit for the due fulfillment by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only). We,..... (indicate the name of Bank) hereinafter referred to as "the Bank" at the request of ..... (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We..... (indicate the name of Bank) do hereby undertake to Pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....

3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s)/ supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor (s)/supplier (s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the ..... (b) we shall be discharged from all liability under this guarantee thereafter.

5. We..... (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear

or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).

7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated : the ..... day of ..... 19  
for.....  
(indicate the name of Bank)

- 
- (a) See para 1.2.17 and 1.2.56.
  - (b) The guarantee shall be valid for a period of two months after the expiry of the guarantee period of the equipment under para 1.2.49.
  - (c) The guarantee shall be submitted in the manner prescribed in Para -22 of preamble.

□□□□□

STANDING INDEMNITY BOND FOR 'ON ACCOUNT' PAYMENTS

(On paper of requisite stamp value)

We, M/s..... hereby undertake that we hold at our stores Depot/s at ..... for and on behalf of the President of India acting in the premises through the General Manager or his successor..... Railway.....(hereinafter referred to as "The Purchaser") all materials for which 'On Account' payments have been made to us against the Contract for supply and erection of (25 KV A.C Traction overhead equipment, Switching Stations, B.T. Stations, L.T. Supply Transformer Stations, Traction Sub-Station and SCADA works) \*.on the section/s.....Railway also referred to as Group/s ..... vide letter of Acceptance of Tender No..... dated..... and materials handed over to us by the purchaser for the purpose of execution of the said Contract, until such time the materials are duly erected or otherwise handed over to him.

We shall be entirely responsible for the safe custody and protection of the said materials against all risk till they are duly delivered as erected equipment to the purchaser or as he may direct otherwise and shall indemnify the purchaser against any loss damage or deterioration whatsoever in respect of the said materials while in our possession and against disposal of surplus materials. The said materials shall at all times be open to inspection by any officer authorised by the General Manager incharge of Railway Electrification (whose address will be intimated in due course).

Should any loss, damage or deterioration of materials occur or surplus materials disposed off and refund becomes due, the Purchaser shall be entitled to recover from us the full cost as per prices included in Schedule 3, for OHE works and Supply column of Schedule-1 prices for TSS & SCADA works to the Contract (as applicable) and in respect of other materials as indicated in part I, Chapter- IV, section 1 and also compensation for such loss or damage if any long with the amount to be refunded without prejudice to any other remedies available to him by deduction from any sum due or any sum which at any time hereafter becomes due to us under the said or any other Contract.

Dated this day..... day of..... 200

for and on behalf of

M/s.....(Contractor)

Signature of witness

Name of witness in Block Letters

Address.

---

\* Strike out whichever is not applicable

EXTENSION OF PERIOD OF COMPLETION OF WORK ON CONTRACTOR'S ACCOUNT

No. \_\_\_\_\_

Dated: \_\_\_\_\_

Sub: (i) \_\_\_\_\_ (name of work).

(ii) Acceptance letter no. \_\_\_\_\_

(iii) Understanding/Agreement no. \_\_\_\_\_

Ref: \_\_\_\_\_ (Quote specific application of Contractor for extension to the date received) \_\_\_\_\_

Dear Sir,

1. The stipulated date for completion of the work mentioned above is \_\_\_\_\_. From the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date (or 'However, the work was not completed on this date').

2. Expecting that you may be able to complete the work if some more time is given, the competent authority, although not bound to do so, hereby extends the time for completion from \_\_\_\_\_ to \_\_\_\_\_.

3. Please note that an amount equal to the liquidated damages for delay in the completion of the work after the expiry of \_\_\_\_\_ (give here the stipulated date for completion with/without any penalty fixed earlier) will be recovered from you as mentioned in Clause 17-B of the Standard General Conditions of Contract for the extended period, notwithstanding the grant of this extension. You may proceed with the work accordingly.

4. The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.

5. Please intimate within a week of the receipt of this letter your acceptance of the extension of the conditions stated above.

6. Please note that in the event of your declining to accept the extension on the above said conditions or in the event of your failure after accepting or acting upto this extension to complete the work by \_\_\_\_\_ (here mention the extended date), further action will be taken in terms of Clause 62 of the Standard General Conditions of Contract.

Yours faithfully

For and on behalf of the President of India

EXTENSION OF PERIOD OF COMPLETION OF WORK ON ENGINEER'S ACCOUNT

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

To,  
.....  
.....

Dear Sirs,

Sub : (i).....(Name of work)  
(ii) Acceptance Letter No.....  
(iii) Understanding/Agreement No.....

Ref: .....(Quote specific application of the Contractor for extension to the date if received.)

-----

The stipulated date for completion of the work in ..... Group under the above contract was..... In consideration of the Contractor's Letter No..... of..... The General Manager or his successor on behalf of the President of India, is pleased to grant extension of the time for completion of works in accordance with Note 1 and/ or Notes 2 under Para 1.2.45 of the Contract, as mentioned below :-

-----

It may be noted that unless repugnant to the context all the terms and conditions of the Contract will remain unaltered during the extended period from..... to..... also, and further, no increased/additional rates and claims or recoveries which have not been already envisaged in terms of the conditions of the Contract will be leviable either by you or by the Purchaser in respect of this extended period.

Yours faithfully,

For & on behalf of the President of India.



(On Stamp Paper of Requisite Value)

GUARANTEE BOND AGAINST "ON ACCOUNT" PAYMENTS  
(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)

In consideration of the President of India " hereinafter called "the Government") having agreed to exempt.....(hereinafter called "the said Contractor (s)") from the demand, under the terms and conditions of an Agreement dated.....made between.... and ..... for (hereinafter called "the said Agreement") of "On- Account" Payments for the due fulfillment by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only).

We,..... (indicate the name of Bank)hereinafter referred to as "the Bank" at the request of ..... (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We..... do hereby undertake to Pay (indicate the name of the Bank) the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....

3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s)/ supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor (s)/supplier(s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/ Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the ..... (b) we shall be discharged from all liability under this guarantee thereafter.

5. We..... (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any

indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).

7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated : the ..... day of ..... 200  
for.....  
(indicate the name of Bank)

- 
- (a) See para 1.3.9. Part-I, Chapter-III "A" for OHE works and para 1.3.8. Part-1, Chapter-III "B" For TSS works.
  - (b) The guarantee shall be valid for a period of two months after the completion of installation and testing to the satisfaction of Engineer-in-Charge under para 1.3.9. Part-I, Chapter-III "A" for OHE works and para 1.3.8. Part-1 Chapter-III "B" For TSS works .
  - (c) The guarantee shall be submitted in the manner prescribed in Para -22 of preamble.

□□□□□

(On Stamp Paper of Requisite Value)

GUARANTEE BOND AGAINST MOBILISATION ADVANCE

(TO BE USED BY A NATIONALISED BANK IN INDIA)

In consideration of the President of India (hereinafter called "the Government") having agreed to exempt.....[hereinafter called "the said Contractor (s)"] from the demand, under the terms and conditions of an Agreement dated.....made between.... and ..... for (hereinafter called "the said Agreement") of Mobilisation Advance Payments for the due fulfillment by the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only). We,..... hereinafter referred to as "the Bank" (indicate the name of Bank) at the request of ..... (Contractor(s)) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We..... (indicate the name of Bank) do hereby undertake to Pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....

3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s)/ supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor (s)/supplier (s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the ..... (b) we shall be discharged from all liability under this guarantee thereafter.

5. We..... (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).

7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated : the ..... day of ..... 200  
for.....  
(indicate the name of Bank)

- 
- (a) See para 1.3.18 of Part-I, Chapter III “A”
  - (b) The guarantee shall be valid for a period of two months after the expiry of the completion period of the equipment.
  - (c) Bank Guarantee against “MOBILISATION ADVANCE”, to be submitted by the contractor should be sent to the concerned authorities directly by the issuing Bank under

□□□□□

**GUARANTEE BOND AGAINST PROVISIONAL ACCEPTANCE PAYMENTS**

**- DELETED -**

(On Stamp Paper of Requisite Value)

**BANK GUARRANTEE PROFORMA FOR PERFORMANCE GUARRANTEE**

**(TO BE USED BY APPROVED SCHEDULE BANKS/NATIONALISED BANKS)**

In consideration of the President of India " hereinafter called "the Government" having agreed to exempt.....(hereinafter called "the said Contractor (s)" from the demand, under the terms and conditions of Letter of Acceptance No.....Dated..... issued to M/s .....by.....(hereinafter called "the said Agreement") of Performance Guarrantee for the due performance by the said Contractor (s) of the terms and conditions contented in the said Agreement, on production of a Bank guarantee for Rs.....(Rupees.....only). We,..... (indicate the name of Bank) hereinafter referred to as "the Bank" at the request of ..... (Contractor(s) do hereby undertake to pay to the Government an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Government by reason of any breach by the said Contractor (s) of any of the terms or conditions contained in the said Agreement.

2. We..... (indicate the name of Bank) do hereby undertake to Pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the Contractor (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding.....

3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the Contractor (s)/ supplier (s) in any suit for proceeding pending before any court or Tribunal relating thereto our liability under this present contract being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor (s)/supplier (s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till..... office/Department Ministry of.....certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee. Unless a Demand or claim under this guarantee is made on us in writing on or before the ..... (b) we shall be discharged from all liability under this guarantee thereafter.

5. We..... (indicate the name of Bank) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor (s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said Contractor (s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be

relieved from our liability by reason of any such variation, or extension being granted to the said Contractor (s) or for any forbearance, act or omission on the part of the Government or any indulgence by the Government to the said Contractor (s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor (s)/ Supplier (s).

7. We..... (indicate the name of Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Dated : the ..... day of ..... 200...  
for.....  
(indicate the name of Bank)

- 
- Note:- (a) See para 19 of preamble.
- (b) 'The guarantee shall be valid for a period of 15 days after the expiry of the guarantee period of the equipments. However, initial validity of the Performance Guarantee BG shall be up to the stipulated contract completion period. The same shall be renewed from time to time till 15 days beyond guarantee period.'
- (c) The guarantee shall be submitted in the manner prescribed in Para -22 of preamble which is reproduced as below –  
***“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)” .***

□□□□□

MEMORANDUM OF UNDERSTANDING FOR JV

(The memorandum of understanding shall be submitted in following format on the non-judicial stamp of Rs.100/- duly notarized)

NOW THIS Memorandum of Understanding is executed at ..... (Name of Place) on this date ..... (DD/MM/YY) between M/s.....(Name of first constituent and address) as the first party represented by Shri .....and M/s..... (Name of 2ndconstituent and address) represented by Shri ..... as the second party and so on 3rd, 4th& 5th subsequent parties. (the expression and words of first and second and other shall mean and include their heirs successors, assigns, nominees, execution, administrators and legal representatives respectively).

WHEREAS all the parties are engaged mainly in the business of execution of Civil Engineering and general contracts for various Government Departments and organizations.

AND WHEREAS the parties herein above mentioned are desirous of entering into a joint venture for carrying out civil engineering and/or contract works in connection with Tender No. .... (Name of work)..... as mutually decided between members of Joint Venture Agreement.

1. That we M/s..... (JV firm) on behalf of all members of this joint venture agreement agreed that M/s ..... will be "Lead Partner" of this Joint Venture.

2. That under this MOU, the work will be done jointly by M/s ..... the first party and M/s ..... the second and so on .....in the name and style of .....(Name ) ( joint venture firm).

3. That we JV firm M/s ..... on behalf of all the members of JV firm shall be legally liable, severally and jointly responsible/ liable for the satisfactory/ successful execution/ completion of the works including maintenance period in all respects and in accordance with terms and conditions of the contract.

4. That we M/s JV firm..... on behalf of all the members of the JV firm to which the contract is awarded, shall be jointly and severally liable to the Employer (HRIDC) for execution of the project in accordance with General and Special Conditions of the Contract. The JV members shall also be liable jointly and severally for the loss, damages caused to HRIDC during the course of execution of the contract or due to non-execution of the contract or part thereof.

5. M/s .....(Name of Lead Firm ) of JV firm shall be the lead member of the JV firm who shall have a majority .....% share of interest in the JV firm. The other (One/Two) members shall have following share: - M/s ..... (Name of Second Firm) have ..... % and M/s ..... (Name of Third Firm if any) have .....% share of interest in the JV Firm.

6. That this JV 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.

7. That we all the Joint Venture members authorize M/s .....one of the members on behalf of the JV firm 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/ correspondence with respect to the contract would be sent to this authorized member ..... (address) of the JV firm.

8. That no member of the JV 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 Employer (HRIDC) in respect of the said tender/contract.

9. That we all the members of the JV certify that we have not been black- listed 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 in the past either in our individual capacity or as a member of the JV firm or partnership firm in which they were members/partners.

10. That this Joint Venture MOU shall in all respect be governed by and interpreted in accordance with Indian Laws.

Now the parties have joined hands to form this MOU on this date .....(DD/MM/YY) with reference to and in confirmation of their discussions and understanding brought on record on date ..... (DD/MM /YY).

In witness thereof all/both the above-named parties have set their respective hands on this MOU on the day, month and year first above mentioned, in the presence of the following witnesses:

1 First party (authorized signatory)

2 Second party (authorized signatory)

3. Third party (if any) (authorized signatory)

With Seal of parties

Witnesses with name & address:

1..... 2.....

Date.....

Place.....

Note: Should MOU be in more than one separate page; each page shall be signed by the authorized signatory.

SN	Particulars	Details
1.	Centre (City Code)	
2.	Vendor Code	
3.	Beneficiary Name	
4.	Account Type	
5.	Bank Account No.	
6.	Name & Address of Bank	
7.	Bank Telephone/Fax No. with STD Code	
8.	Bank Branch MICR Code	
9.	Bank Branch IFSC Code	
10.	Firm e-mail address	

I/We confirm that I/We will bear the charge , if any, levied by my/our bank for the credit of NEFT Accounts in my/our account.

Thanking you,

For \_\_\_\_\_  
 \_\_\_\_\_  
 (Authorised Signatory)

We confirm that we are enabled for receiving NEFT/RTGS credits and further confirm that the A/c No. of (Firm's Name). The signature of authorized signatory and the MICR and IFSC Code of our branch mentioned above are correct.

Bank's Verification

(Manager's/ Officer's Signature)  
 With Bank's Stamps

Registered Acknowledgement Due

PROFORMA OF 7 DAYS NOTICE  
\_\_\_\_\_ RAILWAY  
(Without Prejudice)

To

M/s \_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_  
In Connection with \_\_\_\_\_

In spite of repeated instructions to you by the subordinate offices as well as by this office through various letters of even no. \_\_\_\_\_, dated \_\_\_\_\_; you have failed to start work/show adequate progress and/or submit detailed programme for completing the work/ part of work (details of part of work to be mentioned).

2. Your attention is invited to this office/Chief Engineer's office letter no. \_\_\_\_\_, dated \_\_\_\_\_ in reference to your representation, dated \_\_\_\_\_.

3. As you have failed to abide by the instructions issued to commence the work /to show adequate progress of work you are hereby given 7 days' notice in accordance with Clause 62 of Standard General Conditions of Contract to commence works / to make good the progress, failing which further action as provided in Clause 62 of the Standard General Conditions of Contract viz. to terminate your Contract and complete the balance work without your participation will be taken.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the president of India

**PROFORMA OF 48 HRS. NOTICE**  
**RAILWAY/HRIDC**  
(Without Prejudice)

To

M/s \_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_  
In Connection with \_\_\_\_\_

Seven days' notice under Clause 62 of General Conditions of Contract was given to you under this office letter of even number, dated \_\_\_\_\_ but you have taken no action to commence the work / show adequate progress of the work.

2. You are hereby given 48 hours' notice in terms of Clause 62 of General Conditions of Contract to Commence works / to make good the progress of works, failing which and on expiry of this period your above contract will stand rescinded and the work under this contract will be carried out independently without your participation and your Security Deposit shall be forfeited and Performance Guarantee shall also be encashed and consequences which may please be noted.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the president of India

Registered Acknowledgement Due

**PROFORMA OF 48 HRS.NOTICE FOR PART OF THE WORK.....**

**(DETAILS OF PART OF WORK TO BE MENTIONED)**

\_\_\_\_\_ **RAILWAY**

(Without Prejudice)

To

M/s \_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_

1. Seven days' notice under Clause 62 of Standard General Conditions of Contract was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the part of work.....(details of part to be mentioned).
2. You are hereby given 48 hours' notice in terms of Clause 62 of Standard General Conditions of Contract to commence works / to make good the progress of works, failing which and on expiry of this period your above part of work..... (Details of part to be mentioned) in contract will be rescinded and the work will be carried out independently without your participation.
3. Your full Performance Guarantee for the contract shall be forfeited and you shall not be issued any completion certificate for the contract. However, no additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract.
4. The contract value of part terminated contract shall stands reduced to .....

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

Registered Acknowledgement Due

**PERFORMA OF TERMINATION NOTICE**  
**RAILWAY**  
(Without Prejudice)

No. \_\_\_\_\_

Dated \_\_\_\_\_

To

M/s \_\_\_\_\_  
\_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_  
In connection with \_\_\_\_\_

Forty eight hours (48 hrs.) notice was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the work.

Since the period of 48 hours' notice has already expired, the above contract stands rescinded in terms of Clause 62 of General Conditions of Contract and the balance work under this contract will be carried out independently without your participation. Your participation as well as participation of every member/partner in any manner as an individual or a partnership firm/JV is hereby debarred from participation in the tender for executing the balance work and your Security Deposit shall be forfeited and Performance Guarantee shall also be encashed.

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

Registered Acknowledgement Due

**PROFORMA OF TERMINATION NOTICE FOR PART OF THE WORK..... (DETAILS OF PART OF WORK TO BE MENTIONED)**

\_\_\_\_\_ RAILWAY

(Without Prejudice)

No. \_\_\_\_\_

Dated \_\_\_\_\_

To

M/s \_\_\_\_\_

\_\_\_\_\_

Dear Sir,

Contract Agreement No. \_\_\_\_\_

In connection with \_\_\_\_\_

1. Forty eight hours (48 hrs.) notice was given to you under this office letter of even no., dated \_\_\_\_\_; but you have taken no action to commence the work/show adequate progress of the part of work.....(details of part to be mentioned).
2. Your above part of work in contract .....(details of part to be mentioned) stands rescinded in terms of Clause 62 of Standard General Conditions of Contract and the same will be carried out independently without your participation. Your participation as well as participation of every member/partner in any manner as an individual or a partnership firm/JV is hereby debarred from participation in the tender for executing the balance work
3. Your full Performance Guarantee for the contract shall be forfeited and you shall not be issued any completion certificate for the contract. However, no additional Performance Guarantee shall be required for balance of work being executed through the part terminated contract.
4. The contract value of part terminated contract stands reduced to .....

Kindly acknowledge receipt.

Yours faithfully

For and on behalf of the President of India

**FORMAT FOR AFFIDAVIT TO BE SUBMITTED BY TENDERER  
ALONG WITH THE TENDER DOCUMENTS**

**(To be executed in presence of Notary public on non-judicial stamp paper of the value of  
Rs. 100/-. The stamp paper has to be in the name of the Tenderer) \***

I ..... (Name and designation) \*\* appointed as the attorney/  
authorized signatory of the Tenderer (including its constituents), M/s. \_\_\_\_\_ having its  
office at.....(hereinafter called the Tenderer) for the purpose of the Tender documents for the work  
of ( Name of work )\*\* as per the Tender No. \_\_\_\_\_ of Haryana Rail Infrastructure  
Development Corporation (HRIDC), do hereby solemnly affirm and state on behalf of the Tenderer  
including its constituents as under:

1. I/We the Tenderer (s), am/are signing this document after carefully reading the contents.
2. I/We the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from the website <https://etenders.hry.nic.in>. I/we have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with HRIDC shall be final and binding upon me/us.
4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.
6. I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.
- 7 I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.
8. I/we understand that if the contents of the affidavit submitted by us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the Bid Security besides banning of business for a period of upto five year. Further, I/we (insert name of the tenderer) \*\* \_\_\_\_\_ and all my/our constituents understand that my/our offer shall be summarily rejected
9. I/we also understand that if the certificates submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/SD and Performance guarantee besides any other action provided in the contract including banning of business for a period of up to 5 (five) years.



10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or, if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

**DEPONENT  
SEAL AND SIGNATURE  
OF THE TENDERER**

**VERIFICATION**

I/We above named Tenderer do hereby solemnly affirm and verify that the contents of my/our above affidavit are true and correct. Nothing has been concealed and no part of it is false.

**DEPONENT  
SEAL AND SIGNATURE  
OF THE TENDERER**

Place:

Dated:

Note:

- i) Should affidavit be in more than one separate page, each page shall be signed by the authorized signatory
- ii) The contents in Italics (marked with \*\*) are only for guidance purpose. Details as appropriate are to be filled in suitably by Tenderer.
- iii) This affidavit is to be given by each member of JV.

**FINAL SUPPLEMENTARY AGREEMENT**

Articles of agreement made this day \_\_\_\_\_ in the year \_\_\_\_\_ between the President of India, acting through the \_\_\_\_\_ Railway Administration having his office at \_\_\_\_\_ herein after called the Railway of the one part and \_\_\_\_\_ of the second part.

Whereas the party hereto of the second part executed an agreement with the party hereto of the first part being agreement Number \_\_\_\_\_ dated \_\_\_\_ for the performance \_\_\_\_\_ herein after called the 'Principal Agreement'.

And whereas it was agreed by and between the parties hereto that the works would be completed by the party hereto of the second part on \_\_\_\_\_ date last extended' and whereas the party hereto of the second part has executed the work to the entire satisfaction of the party hereto of the first part.

And whereas the party hereto of the first part already made payment to the party hereto of the second part diverse sums from time to time aggregating to ₹ \_\_\_\_\_ including the final bill bearing voucher No. \_\_\_\_\_ dated \_\_\_\_\_ of value \_\_\_\_\_ (the receipt of which is hereby acknowledged by the party hereto of the second part in full and final settlement of all his /its claims under the principal agreement.

And whereas the party hereto of the second part have received further sum of ₹ \_\_\_\_\_ through the final bill bearing voucher No. \_\_\_\_\_ dated \_\_\_\_\_ (the receipt of which is hereby acknowledged by the party thereto of the second part) from the party hereto of the first part in full and final settlement of all his/its disputed claims under principal agreement.

Now, it is hereby agreed by and between the parties in the consideration of sums already paid by the party hereto of the first part to the party hereto of the second part against all outstanding dues and claims for all works done under the aforesaid principal agreement including /excluding the security deposit, the party hereto of the second part have no further dues of claims against the party hereto of the first part under the said Principal Agreement. It is further agreed by and between the parties that the party hereto of the second part has accepted the said sums mentioned above in full and final satisfaction of all its dues and claims under the said Principal Agreement.

It is further agreed and understood by and between the parties that the arbitration clause contained in the said principal agreement shall cease to have any effect and/or shall be deemed to be non-existent for all purposes.

Signature of the Contractor/s

for and on behalf of the President of India

Witnesses

ADDRESS: \_\_\_\_\_

**FORM-30**

**AFFIDAVIT BY SOLE PROPRIETORSHIP FIRM**

(To be executed non judicial stamp paper of appropriate value as per law of state concerned-Non-Judicial stamp paper should be purchased in the name of proprietor of the firm)

I.....S/o Shri .....aged about .....years  
R/o.....do hereby solemnly affirm and  
declare as under:

1. That I am running a business in the name and style of M/S.....which is a sole proprietorship firm, and which has got GST registration No.....
2. That I am the sole proprietor of the said firm M/S .....
3. That the Head office of the above named firm is situated at .....

DEPONENT

Verification:

Verified at..... on this .....day of.....that the contents of my above affidavit are true and correct to the best of my knowledge and belief and nothing material has been concealed therefrom.

DEPONENT

(seal and signature of Notary Public)

- Notes: 1. The document should be notarized at its place of execution (Place of signing the document)  
2. Each page of the document should be signed by executants

POWER-OF-ATTORNEY FOR SIGNING OF BID ON BEHALF OF  
PARTNERSHIP FIRM

(To be executed non judicial stamp paper of appropriate value as per law of state concerned-Non-Judicial stamp paper should be purchased in the name of partners of the firm)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS WE

(1)..... S/o Shri.....R/o.....

(2)..... S/o Shri.....R/o.....

(3)..... S/o Shri.....R/o.....

(4)..... S/o Shri..... R/o.....

all are the partners of a partnership firm namely M/S..... (Name of firm) hereinafter referred to as 'firm', which is registered at Registration No.....by Registrar of Firms..... The firm is having its head office at..... (hereinafter to be referred as the 'Firm').

AND WHEREAS we all the above named partners have on.....(date) given our consent on behalf of firm to participate in the tender No.\_\_\_\_\_ issued by HRIDC for the work namely "\_\_\_\_\_"

We the above named partners of above named firm do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms. \_\_\_\_\_ S/o Shri \_\_\_\_\_ (address) \_\_\_\_\_ &Mr./ Ms. \_\_\_\_\_ S/o Shri \_\_\_\_\_ (address) \_\_\_\_\_ as our true and lawful attorney (hereinafter referred to as "Attorney") of the firm to jointly or severally exercise all or any of the following powers for and on behalf of M/S ..... (name of firm) in connection with aforesaid bid:

1. To sign and submit Tender and participate in the aforesaid bid of HRIDC on behalf of the firm.
2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc. on behalf of firm.
3. To negotiate, discuss, agree to make any amendments, alterations or modifications thereto and to make representations, submit papers, affidavits and to do any other act and complete requisite formalities on behalf of the firm in connection with completion of aforesaid tender work and to enter into liability against the firm.
4. To sign, execute the contract with HRIDC for and on behalf of the firm.
5. And generally to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above.

We on behalf of firm undertake that it shall not cancel or amend this power of Attorney without obtaining previous written consent of HRIDC.

We on behalf of firm hereby agree that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by the firm and we hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given.

Specimen signatures of the Attorney are appended below.

IN WITNESS WHEREOF this deed has been signed and sealed by us the under named, on this..... day of..... 20.... , in presence of:

WITNESSES:

1. Signature	Executants Partners
Name:	(Name )(Signature)
Address:	1.....
	2. ....
	3. ....
	4. ....

2. Signature  
    Name:  
    Address:

Specimen Signatures of Attorney Holder(s) in token of acceptance:

(1) Name..... Signature.....  
(2) Name..... Signature.....

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

Notes:

1. In this format space has been provided for entering details of four partners & two attorney holders however if the numbers vary details may accordingly be entered.
2. The document should be notarized at its place of execution (Place of signing the document).
3. Each page of the document should be signed by executants.
4. The power of attorney should be duly registered.

POWER-OF-ATTORNEY ON BEHALF OF THE JOINT VENTURE

(To be executed non judicial stamp paper of appropriate value as per law of state concerned-Non-Judicial stamp paper should be purchased in the name of the members of Joint Venture)

KNOW ALL MEN BY THESE PRESENTS THAT WE THE PARTIES whose details are given here under:

- 1. .... (name of constituent) ..... (address) as the first party.
- 2. .... (name of constituent) ..... (address) as the second party.

Have entered into a Joint Venture agreement for the purpose of securing the work advertised by HRIDC vide NIT No.....details of works are as under: "....."

The aforesaid Joint Venture shall be known by the name "....." (Hereinafter called the Joint Venture which Expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns.

We the above said parties, through this power of Attorney do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms. \_\_\_\_\_S/o Shri \_\_\_\_\_(address) who is presently holding the position of ..... in .....the firm/company as our true and lawful attorney (hereinafter referred to as "Attorney") of the Joint Venture to jointly or severally exercise all or any of the following powers for and on behalf of "..... (name of JV) in connection with aforesaid bid:

- 1. To sign and submit Tender and participate in the aforesaid bid of HRIDC on behalf of the Joint Venture.
- 2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc. on behalf of Joint Venture
- 3. To negotiate, discuss, agree to make any amendments, alterations or modifications thereto and to make representations, submit papers, affidavits and to do any other act and complete requisite formalities on behalf of the Joint Venture in connection with completion of aforesaid tender work and to enter into liability against the Joint Venture.
- 4. To sign, execute the contract with HRIDC for and on behalf of the Joint Venture.
- 5. And generally to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above on behalf of Joint Venture.

The Joint Venture agrees and undertakes that in the event of any change in the constitution of the Joint Venture the rights and obligations of the Joint Venture shall continue to be in full force without any effect thereof.

We all the members of Joint Venture undertake that we shall not cancel or amend this Power of Attorney unilaterally and without prior written consent of HRIDC.

AND the Joint Venture hereby agrees that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by the Joint Venture and the Company hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given.

IN WITNESS WHEREOF the members constituting the Joint Venture as aforesaid have executed these present, on this..... day of..... 20.... , under the common seal(s)/seals of their companies and/or firms(s), in presence of:

WITNESSES:

- |              |                                                    |
|--------------|----------------------------------------------------|
| 1. Signature | Signature of authorized signatories & their Seals: |
| Name:        | 1. First Party (Signature):                        |
| Address:     | Name:                                              |
|              | Seal:                                              |
| <br>         |                                                    |
| 2. Signature | 2. Second Party (Signature):                       |
| Name:        | Name:                                              |
| Address:     | Seal:                                              |

Specimen Signatures of Attorney Holder in token of acceptance:

Name.....Signature.....

Executed and Signed before me on this.....day of ..... At .....  
(place).  
(seal and signature of Notary Public)

- Notes:
1. In this format space has been provided for entering details of two constituents of the JV however if the number vary the details may accordingly be entered.
  2. The document should be notarized at its place of execution (Place of signing the document).
  3. Each page of the document should be signed by executants.

CONSENT OF PARTNERS OF PARTNERSHIP FIRM FOR SIGNING JOINT VENTURE

(To be executed on non-judicial stamp paper as per tender conditions, Non-Judicial stamp paper should be purchased in the name of partners of the firm)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS WE :

(1)..... S/o Shri..... R/o.....

(2)..... S/o Shri..... R/o.....

(3)..... S/o Shri..... R/o.....

(4)..... S/o Shri..... R/o.....

all are the partners of a partnership firm namely M/S .....(Name of firm) hereinafter referred to as 'firm', which is registered at Registration No.....by Registrar of Firms..... The firm is having its head office at.....

AND WHEREAS it has come to our knowledge that NIT No..... has been issued by HRIDC for the work namely "....."

We all the above named partners on behalf of the above named firm hereby give our consent to participate in the above tender in Joint Venture.

Further we all the above named partners on behalf of the above named firm hereby give our consent to enter in to Joint Venture agreement, with M/S..... & M/S..... (name of other constituent(s) of joint venture) and to participate in tender as Joint Venture aforesaid.

Date:

Place:

Executants Partners

(Name )( Signature)

- 1.....
2.....
3.....
4.....

(seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of four partners and two JV constituents however if the number vary details may accordingly be entered.
2. The document should be notarized at its place of execution (Place of signing the document).
3. Each page of the document should be signed by executants.



POWER-OF-ATTORNEY FOR SIGNING JOINT VENTURE AGREEMENT ON BEHALF OF PARTNERSHIP FIRM

(To be executed non judicial stamp paper of appropriate value as per law of state concerned-Non-Judicial stamp paper should be purchased in the name of partners of the firm)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS WE

- (1)..... S/o Shri..... R/o.....
(2)..... S/o Shri..... R/o.....
(3)..... S/o Shri..... R/o.....
(4)..... S/o Shri..... R/o.....

All are the partners of a partnership firm namely M/s. ....Name of firm) hereinafter referred to as 'firm', which is registered at Registration No.....by Registrar of Firms..... The firm is having its head office at..... (hereinafter to be referred as the 'Firm').

AND WHEREAS we all the above named partners have on.....(date) given our consent on behalf of firm to participate in the tender No. .... issued by HRIDC for the work namely "....." in Joint Venture with M/S..... & M/S.....

We the above named partners of above named firm do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms. .... S/o Shri..... (address)..... & Mr./ Ms. .... S/o Shri..... (address)..... as our true and lawful attorney (hereinafter referred to as "Attorney") of the firm to jointly or severally exercise all or any of the following powers for and on behalf of M/S ..... (name of firm) in connection with aforesaid bid:

- 1. To enter into and execute and sign JOINT VENTURE agreement, on behalf of our firm with M/S..... & M/S.....
2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc. in connection with aforesaid bid.
3. To negotiate, discuss, agree to make any amendments, alterations or modifications thereto and to make representations, submit papers, affidavits and to do any other act and complete requisite formalities on behalf of the firm in connection with completion of aforesaid tender work and to enter into liability against the firm.
4. To sign, execute the contract with HRIDC for and on behalf of the firm.
5. And generally to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above and to enter into liability against the firm.

We on behalf of firm undertake that it shall not cancel or amend this power of Attorney without obtaining previous written consent of HRIDC.

We on behalf of firm hereby agree that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by

the firm and we hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given.

Specimen signatures of the Attorney are appended below.

IN WITNESS WHEREOF this deed has been signed and sealed by us the under named, on this..... day of..... 20.... , in presence of:

WITNESSES:

- |              |                                         |
|--------------|-----------------------------------------|
| 1. Signature | Executants Partners                     |
| Name:        | (Name)                      (Signature) |
| Address:     | 1 .....                                 |
|              | 2 .....                                 |
|              | 3.....                                  |
|              | 4.....                                  |
| 2. Signature |                                         |
| Name:        |                                         |
| Address:     |                                         |

Specimen Signatures of Attorney Holder(s) in token of acceptance:

- (1) Name.....Signature.....
- (2) Name.....Signature.....

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of four partners, two constituents of JV and two attorney holders, however if the number vary the details may accordingly be entered.
- 2. The document should be notarized at its place of execution.
  - 3. Each page of the document should be signed by executants

AFFIDAVIT BY SOLE PROPRIETORSHIP FIRM WHEN PARTICIPATING IN JOINT VENTURE

(To be executed non judicial stamp paper of appropriate value as per law of state concerned- Non-Judicial stamp paper should be purchased in the name of proprietor of the firm)

I.....S/o Shri.....aged about .....years R/o.....do hereby solemnly affirm and declare as under:

- 1. That I am running a business in the name and style of M/s..... which is a sole proprietorship firm and which has got GST registration No.....
- 2. That I am the sole proprietor of the said firm M/S.....
- 3. That the Head office of the above named firm is situated at.....
- 4. That I through my above named firm shall participate in the tender No. .... issued by HRIDC for the work namely "....." in Joint Venture and for the purpose shall enter into and execute joint venture agreement with M/S..... & M/S..... (name of other constituent(s) of joint venture).

DEPONENT

Verification:

Verified at.....on this .....day of.....that the contents of my above affidavit are true and correct to the best of my knowledge and belief and nothing material has been concealed therefrom.

DEPONENT

(Seal and signature of Notary Public)

- Notes:
- 1. In this format space has been provided for entering details of two constituents of the JV however if the number vary details may accordingly be entered.
  - 2. The document should be notarized at its place of execution (Place of signing the document).
  - 3. Each page of the document should be signed by executants.

BOARD'S RESOLUTION OF COMPANY FOR ENTERING INTO JOINT VENTURE  
(To be printed on Company's letter head)

EXTRACT OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS OF  
(Company Name) \_\_\_\_\_  
(CIN \_\_\_\_\_) (hereinafter referred to as company) HELD ON (Date)  
\_\_\_\_\_ AT (Address) \_\_\_\_\_

Whereas the Board has been described about NIT No. \_\_\_\_\_  
issued by HRIDC for the work namely "\_\_\_\_\_".

Board discussed the matter and after discussion following resolution was passed:

RESOLVED THAT the company (company name) shall participate in the above tender in Joint Venture  
and for the purpose the company shall enter into and execute joint venture agreement, with  
M/S \_\_\_\_\_ & M/S \_\_\_\_\_ (name of other  
constituent(s) of joint venture).

Resolved further that the Board authorizes, Mr. /Ms. \_\_\_\_\_ & Mr./Ms.  
\_\_\_\_\_ (name and designation) of the company, to jointly or severally, sign  
joint venture agreement, and to sign such other documents and to do any other act and complete  
requisite formalities on behalf of the company in connection with completion of aforesaid tender work  
and to enter into liability against the company.

Resolved further that Board authorizes Mr./Ms. \_\_\_\_\_ (name and  
designation) of the company to execute Power of Attorney in terms of this resolution in favour of  
Mr./Ms. \_\_\_\_\_ & Mr./Ms. \_\_\_\_\_ the person(s)  
above named.

The acts done and documents executed by such above named authorized person(s) shall be binding on  
the company.

For the Organization,

(Seal of company & Signature of authorized person)

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Place:

Dated:

Executed and Signed before me on this.....day of .....At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two constituents of the JV and two authorized persons however if the number vary details may accordingly be entered.
2. The document should be notarized at its place of execution (Place of signing the document).
3. Each page of the document should be signed by authorized signatory(s).

POWER-OF-ATTORNEY BY A COMPANY (incorporated under companies Act) for entering into JOINT VENTURE AGREEMENT

(To be executed non judicial stamp paper of appropriate value as per law of state concerned Non-Judicial stamp paper should be purchased in the name of the company)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS M/S ..... (name of company & CIN number) is a Company registered under the Companies Act, 2013, and having its registered office at..... (Hereinafter called the 'Company').

AND WHEREAS by its resolution No..... passed in the meeting held on..... of the Board of directors of the company the company (company name) has decided to participate in the tender No. .... issued by HRIDC for the work namely "....."

in Joint Venture and for the purpose the company shall enter into and execute joint venture agreement with M/S..... & M/S.....(name of other constituent(s) of joint venture) AND THAT M/S.....(name of the lead member of joint venture) shall act as the lead member of above mentioned joint venture.

I.....(name and designation) the authorised representative of M/S ..... (name of company) duly authorized in this behalf by aforesaid resolution do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms. ....(designation).....(address).....&Mr./ Ms.Mr./ Ms. ....(designation).....(address)..... who is/are presently holding the above mentioned position in the company as our true and lawful attorney (hereinafter referred to as "Attorney") of the company to jointly or severally exercise all or any of the following powers for and on behalf of M/S ..... (Name of company & CIN number) in connection with aforesaid bid:

- 1. To enter into and execute and sign JOINT VENTURE agreement, draft of which has been approved by the company, on behalf of the company with above named constituents for participating in the aforesaid bid of the HRIDC on behalf of the company.
2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc.
3. To do any other act and complete requisite formalities on behalf of the company in connection with completion of aforesaid tender work and to enter into liability against the company.
4. And generally, to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above.

The company agrees and undertakes that in the event of any change in the constitution of the company the rights and obligations of the company shall continue to be in full force without any effect thereof.

The company undertakes that it shall not cancel or amend this power of Attorney without obtaining previous written consent of HRIDC.

AND the Company hereby agrees that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by

the Company and the Company hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given. IN WITNESS WHEREOF this deed has been signed and sealed by Shri..... (name and designation), on this..... day of..... 20... , in presence of:

WITNESSES:

- |              |                                         |
|--------------|-----------------------------------------|
| 1. Signature | Executants Signature & Seal of Company: |
| Name:        | Name:                                   |
| Address:     | Designation:                            |
| 2. Signature |                                         |
| Name:        |                                         |
| Address:     |                                         |

Specimen Signatures of Attorney Holder in token of acceptance:

- (1) Name .....Signature.....
- (2) Name .....Signature.....

Executed and Signed before me on this.....day of ..... At ..... (place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two constituents of the JV and two authorized persons/attorney holders however if the number vary the details may accordingly be entered.
- 2. The document should be notarized at its place of execution (Place of signing the document).
  - 3. Each page of the document should be signed by executants

]

POWER-OF-ATTORNEY FOR SIGNING OF BID (when Tenderer is company incorporated under Companies Act)

(To be executed non judicial stamp paper of appropriate value as per law of state concerned Non-Judicial stamp paper should be purchased in the name of the company)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS M/S ..... (name of company & CIN number) is a Company registered under the Companies Act, 2013, and having its registered office at..... (Hereinafter called the 'Company').

AND WHEREAS by its resolution No..... passed in the meeting held on..... of the Board of directors of the company the company (company name) have decided to participate in the tender No.\_\_\_\_\_ issued by HRIDC for the work namely "\_\_\_\_\_"

I.....(name and designation) the authorised representative of M/S ..... (name of company) duly authorized in this behalf by aforesaid resolution do hereby irrevocably constitute, nominate, appoint and authorize Mr./ Ms. \_\_\_\_\_(designation)\_\_\_\_\_ (address)\_\_\_\_\_ &Mr./ Ms.Mr./ Ms. \_\_\_\_\_(designation)\_\_\_\_\_ (address)\_\_\_\_\_ who is/are presently holding the above mentioned position in the company as our true and lawful attorney (hereinafter referred to as "Attorney") of the company to jointly or severally exercise all or any of the following powers for and on behalf of M/S ..... (name of company & CIN number) in connection with aforesaid bid:

- 1. To sign and submit Tender and participate in the aforesaid bid of HRIDC on behalf of the company.
2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc.
3. To negotiate, discuss, agree to make any amendments, alterations or modifications thereto and to make representations, submit papers, affidavits and to do any other act and complete requisite formalities on behalf of the company in connection with completion of aforesaid tender work and to enter into liability against the company.
4. To sign, execute the contract with HRIDC for and on behalf of the company.
5. And generally to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above.

The company agrees and undertakes that in the event of any change in the constitution of the company the rights and obligations of the company shall continue to be in full force without any effect thereof.

The company undertakes that it shall not cancel or amend this power of Attorney without obtaining previous written consent of HRIDC.

AND the Company hereby agrees that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by the Company and the Company hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given.



IN WITNESS WHEREOF this deed has been signed and sealed by Shri.....(name and designation), on this..... day of..... 20...., in presence of:

WITNESSES:

- |              |                                         |
|--------------|-----------------------------------------|
| 1. Signature | Executants Signature & Seal of Company: |
| Name:        | Name:                                   |
| Address:     | Designation:                            |
| 2. Signature |                                         |
| Name:        |                                         |
| Address:     |                                         |

Specimen Signatures of Attorney Holder(s) in token of acceptance:

(1) Name ..... Signature.....

(2) Name..... Signature.....

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two authorized persons/attorney holders however if the number vary details may accordingly be entered.  
2. The document should be notarized at its place of execution (Place of signing the document).  
3. Each page of the document should be signed by executants.

FORM-41

Board's Resolution of company incorporated under companies Act for submitting Tender by company  
(To be printed on company's letter head)

EXTRACT OF THE RESOLUTION PASSED AT THE MEETING OF THE BOARD OF DIRECTORS OF  
(Company Name) \_\_\_\_\_ (CIN \_\_\_\_\_)  
(hereinafter referred to as company) HELD ON (Date) \_\_\_\_\_ AT (Address)  
\_\_\_\_\_

Whereas the Board has been described about NIT no. \_\_\_\_\_  
issued by HRIDC for the work namely " \_\_\_\_\_ ". Board  
discussed the matter and after discussion following resolution was passed:

RESOLVED THAT the company (company name) shall participate in the above tender.

Resolved further that the Board authorizes, Mr./ Ms. \_\_\_\_\_ & Mr./ Ms.  
\_\_\_\_\_ (name and designation) of the company, to jointly or severally sign and  
submit all the necessary papers, letters, forms, quotes, bids etc, negotiate, discuss, agree to make any  
amendments, alterations or modifications thereto and to make representations, submit papers, affidavits  
and to do any other act and complete requisite formalities on behalf of the company in connection with  
completion of aforesaid tender work and to enter into liability against the company.

Resolved further that Board authorizes Mr./Ms. \_\_\_\_\_ (name and  
designation) of the company to execute Power of Attorney in terms of this resolution in favour of  
Mr./Ms. \_\_\_\_\_ & Mr./Ms. \_\_\_\_\_ the person(s)  
above named.

The acts done and documents executed by such above named authorized person(s) shall be binding on  
the company.

For the Organization,

(Seal of company & Signature of authorized person)

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Place:

Dated:

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two authorized persons however if the number vary details may accordingly be entered.
2. The document should be notarized at its place of execution (Place of signing the document).
3. Each page of the document should be signed by authorized signatory(s).

POWER-OF-ATTORNEY FOR SIGNING OF BID (when Tenderer is LLP Firm incorporated under LLP Act)

(To be executed non judicial stamp paper of appropriate value as per law of state concerned Non-Judicial stamp paper should be purchased in the name of the LLP Firm)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS M/S ..... (name of LLP & LLPIN number) is a LLP Firm registered under the LLP Act, 2008, and having its registered office at..... (hereinafter called the 'LLP').

AND WHEREAS by its resolution No..... passed in the meeting held on..... of the Partners of the LLP the LLP..... (LLP name) have decided to participate in the tender No..... issued by HRIDC for the work namely "....."

I.....name and designation) the authorised representative of M/S ..... (name of LLP) duly authorized in this behalf by aforesaid resolution do hereby irrevocably constitute, nominate, appoint and authorize Mr./Ms. ....(designation).....(address).....&Mr./Ms./Mr./Ms. ....(designation).....(address)..... who is/are presently holding the above mentioned position in the LLP as our true and lawful attorney (hereinafter referred to as "Attorney") of the LLP to jointly or severally exercise all or any of the following powers for and on behalf of M/S ..... (name of LLP & LLPIN number) in connection with aforesaid bid:

- 1. To sign and submit Tender and participate in the aforesaid bid of HRIDC on behalf of the LLP.
2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc.
3. To negotiate, discuss, agree to make any amendments, alterations or modifications thereto and to make representations, submit papers, affidavits and to do any other act and complete requisite formalities on behalf of the LLP in connection with completion of aforesaid tender work and to enter into liability against the LLP.
4. To sign, execute the contract with HRIDC for and on behalf of the LLP.
5. And generally to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above.

The LLP agrees and undertakes that in the event of any change in the constitution of the LLP, the rights and obligations of the LLP shall continue to be in full force without any effect thereof.

The LLP undertakes that it shall not cancel or amend this power of Attorney without obtaining previous written consent of HRIDC.

AND the LLP hereby agrees that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by the LLP and the LLP hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given.

IN WITNESS WHEREOF this deed has been signed and sealed by Shri.....(name and designation), on this..... day of..... 20...., in presence of:

WITNESSES:

1. Signature  
Name:  
Address:  
Signatures of authorized representative & Seal of LLP:  
Name of authorized representative (Executant):  
Designation:

2. Signature  
Name:  
Address:

Specimen Signatures of Attorney Holder(s) in token of acceptance:

(1)Name ..... Signature.....

(2)Name).....Signature.....

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two authorized persons/attorney holders however if the number vary details may accordingly be entered.  
2. The document should be notarized at its place of execution (Place of signing the document).  
3. Each page of the document should be signed by executants.

Partner's Resolution of LLP Firm for entering into Joint Venture (To be printed on LLP Firm's letter head)

EXTRACT OF THE RESOLUTION PASSED AT THE MEETING OF THE PARTNERS OF \_\_\_\_\_ (LLP Name) having LLPIN \_\_\_\_\_ of 20.....)(hereinafter referred to as LLP) HELD ON (Date)\_\_\_\_\_ AT (Address) \_\_\_\_\_

Whereas the Partners have been described about NIT No. \_\_\_\_\_ issued by HRIDC for the work namely " \_\_\_\_\_".

Partners discussed the matter and after discussion following resolution was passed:

RESOLVED THAT the LLP..... (LLP name) shall participate in the above tender in Joint Venture and for the purpose the LLP shall enter into and execute joint venture agreement, with M/s \_\_\_\_\_ & M/s \_\_\_\_\_ (name of other constituent(s) of joint venture).

Resolved further that the LLP/Partners authorize(s), Mr./ Ms. \_\_\_\_\_ & Mr./ Ms. \_\_\_\_\_ (name and designation) of the LLP, to jointly or severally, sign joint venture agreement, and to sign such other documents and to do any other act and complete requisite formalities on behalf of the LLP in connection with completion of aforesaid tender work and to enter into liability against the LLP.

Resolved further that LLP/Partners authorize(s) Mr./Ms. \_\_\_\_\_ (name and designation) of the LLP to execute Power of Attorney in terms of this resolution in favour of Mr./Ms. \_\_\_\_\_ & Mr./Ms. \_\_\_\_\_ the person(s) above named.

The acts done and documents executed by such above named authorized person(s) shall be binding on the LLP.

For the Organization,

(Seal of LLP & Signature of authorized person)

Name of authorized person: \_\_\_\_\_

Designation: \_\_\_\_\_

Place:

Dated:

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two constituents of the JV and two authorized persons however if the number vary details may accordingly be entered.
2. The document should be notarized at its place of execution (Place of signing the document).
3. Each page of the document should be signed by authorized signatory(s).

POWER of ATTORNEY BY AN LLP Firm (incorporated under LLP Act) for entering into JOINT VENTURE AGREEMENT

(To be executed non judicial stamp paper of appropriate value as per law of state concerned Non-Judicial stamp paper should be purchased in the name of the LLP)

KNOW ALL MEN BY THESE PRESENTS: WHEREAS M/S ..... (name of LLP & LLPIN number) is a LLP registered under the LLP Act, 2008, and having its registered office at..... (Hereinafter called the 'LLP')

AND WHEREAS by its resolution No..... passed in the meeting held on..... of the Partners of the LLP, the LLP..... (LLP name) has decided to participate in the tender No. .... issued by HRIDC for the work namely "....."

in Joint Venture and for the purpose the LLP shall enter into and execute joint venture agreement with M/S..... & M/S..... (name of other constituent(s) of joint venture) AND THAT M/S..... (name of the lead member of joint venture) shall act as the lead member of above mentioned joint venture.

I.....(name and designation) the authorised representative of M/S ..... (name of LLP) duly authorized in this behalf by aforesaid resolution do hereby irrevocably constitute, nominate, appoint and authorize Mr./Ms. .... (designation)..... (address)..... & Mr./Ms. .... (designation)..... (address)..... who is/are presently holding the above mentioned position in the LLP as our true and lawful attorney (hereinafter referred to as "Attorney") of the LLP to jointly or severally exercise all or any of the following powers for and on behalf of M/S ..... (Name of LLP & LLPIN number) in connection with aforesaid bid:

- 1. To enter into and execute and sign JOINT VENTURE agreement, draft of which has been approved by the LLP, on behalf of the LLP with above named constituents for participating in the aforesaid bid of HRIDC on behalf of the LLP.
2. To sign and submit all the necessary papers, letters, forms, quotes, bids etc.
3. To do any other act and complete requisite formalities on behalf of the LLP in connection with completion of aforesaid tender work and to enter into liability against the LLP.
4. And generally to do all such acts, deeds or things as may be necessary or proper for the purposes mentioned above.

The LLP agrees and undertakes that in the event of any change in the constitution of the LLP, the rights and obligations of the LLP shall continue to be in full force without any effect thereof.

The LLP undertakes that it shall not cancel or amend this power of Attorney without obtaining previous written consent of HRIDC.

AND the LLP hereby agrees that all acts, deeds or things lawfully done by the said Attorneys or either of them under the authority of this power shall be construed as acts, deeds and things done by the LLP

and the LLP hereby undertakes to confirm and ratify all and whatsoever the said Attorneys or either of them shall lawfully do or cause to be done by virtue of the powers hereby given.

IN WITNESS WHEREOF this deed has been signed and sealed by Shri.....(name and designation), on this..... day of..... 20... , in presence of:

Specimen Signatures of Attorney Holder in token of acceptance:

(1) Name ..... Signature.....

(2) Name ..... Signature.....

Executed and Signed before me on this.....day of ..... At .....(place).

(Seal and signature of Notary Public)

- Notes: 1. In this format space has been provided for entering details of two constituents of the JV and two authorized persons/attorney holders however if the number vary the details may accordingly be entered.
2. The document should be notarized at its place of execution (Place of signing the document).
3. Each page of the document should be signed by executants.



PERFORMA  
DECLARATION

I/We hereby solemnly declare that I/We visited the site of the work (as on top sheet) personally and have made myself/ourselves fully conversant of the conditions therein and particular the following:

1. Topography of area.
2. Soil strata at site of work.
3. Sources and availability of construction materials.
4. Rates for construction of material, water, electricity including all local taxes, royalties, octrois etc.
5. Availability of local labour (both skilled and unskilled) and relevant labour rates and labour laws.
6. The existing roads and approaches to the site of work and requirements for further service roads/approaches to be constructed by me/us.
7. The availability and rates of private land etc. that shall be required by me/us for various purposes.
8. Climatic conditions and availability of working days.

I/We have quoted my/our rates for various items in the schedule of items, quantities and rates taking into account all the above factors also.

Signatures of the Tenderer/s

INSTRUCTIONS REGARDING ELECTRONIC TENDERING SYSTEM

These conditions will over-rule the conditions stated in the tender documents, wherever relevant and applicable.

1. Registration of bidders on e-tendering Portal:  
All the bidders intending to participate in the tenders process online are required to get registered on the centralized e-tendering Portal i.e. <https://etenders.hry.nic.in>. Please visit the website for more details.
2. Obtaining a Digital Certificate:
  - 2.1. The Bids submitted online should be encrypted and signed electronically with a Digital Certificate to establish the identity of the bidder bidding online. These Digital Certificates are issued by an Approved Certifying Authority, by the Controller of Certifying Authorities, Government of India.
  - 2.2. A Digital Certificate is issued upon receipt of mandatory identity (i.e. Applicant's PAN Card) and Address proofs and verification form duly attested by the Bank Manager/ Postmaster/ Gazetted Officer. Only upon the receipt of the required documents, a digital certificate can be issued. For more details please visit the website– <https://etenders.hry.nic.in>.
  - 2.3. The bidders may obtain Class-II or III digital signature certificate from any Certifying Authority or Sub-Certifying Authority authorized by the Controller of Certifying Authorities or may obtain information and application format and documents required for the issue of digital certificate from.
  - 2.4. The bidder must ensure that he/she comply by the online available important guidelines at the portal <https://etenders.hry.nic.in> for Digital Signature Certificate (DSC) including the e-Token carrying DSCs.  
  
Ms. Manju Aggarwal  
Technical Director,  
Scientist-E, NIC.  
Panchkula.  
E - mail: [a.manju@nic.in](mailto:a.manju@nic.in)  
Help Desk: 0172 – 584257, 94170-69017.
  - 2.5. Bid for a particular tender must be submitted online using the digital certificate (Encryption & Signing), which is used to encrypt and sign the data during the stage of bid preparation. In case, during the process of a particular tender, the user loses his digital certificate (due to virus attack, hardware problem, operating system or any other problem) he will not be able to submit the bid online.  
Hence, the users are advised to keep a backup of the certificate and also keep the copies at safe place under proper security (for its use in case of emergencies).
  - 2.6. In case of online tendering, if the digital certificate issued to the authorized user of a firm is used for signing and submitting a bid, it will be considered equivalent to a no-objection certificate/power of attorney /lawful authorization to that User. The firm has to authorize a specific individual through an authorization certificate signed by all partners to use the digital certificate as

per Indian Information Technology Act 2000. Unless the certificates are revoked, it will be assumed to represent adequate authority of the user to bid on behalf of the firm in the department tenders as per Information Technology Act 2000. The digital signature of this authorized user will be binding on the firm.

2.7. In case of any change in the authorization, it shall be the responsibility of management/ partners of the firm to inform the certifying authority about the change and to obtain the digital signatures -7- of the new person / user on behalf of the firm / company. The procedure for application of a digital certificate however will remain the same for the new user.

2.8. The same procedure holds true for the authorized users in a private/Public limited company. In this case, the authorization certificate will have to be signed by the directors of the company.

3. Opening of an Electronic Payment Account:

For purchasing the tender documents online, bidders are required to pay the tender documents fees online using the electronic payments gateway service shall be integrated with the system very soon till then it will be submitted manually. For online payments guidelines, please refer to the Home page of the e-tendering Portal <https://etenders.hry.nic.in>

4. Pre-requisites for online bidding:

In order to operate on the electronic tender management system, a user's machine is required to be set up. A help file on system setup/Pre-requisite can be obtained from National Informatics Center or downloaded from the home page of the website - <https://etenders.hry.nic.in> the link for downloading required java applet & DC setup are also available on the Home page of the e-tendering Portal.

5. Online Viewing of Detailed Notice Inviting Tenders:

The bidders can view the detailed N.I.T and the time schedule (Key Dates) for all the tenders floated through the single portal e-tendering system on the Home Page at <https://etenders.hry.nic.in>

6. Download of Tender Documents:

The tender documents can be downloaded free of cost from the e-tendering portal <https://etenders.hry.nic.in>

7. Key Dates:

The bidders are strictly advised to follow dates and times as indicated in the online Notice Inviting Tenders. The date and time shall be binding on all bidders. All online activities are time tracked and the system enforces time locks that ensure that no activity or transaction can take place outside the start and end dates and the time of the stage as defined in the online Notice Inviting Tenders.

8. Online Payment of Tender Document Fee, eService fee & EMD fees & Bid Preparation & Submission (Technical & Commercial/ Financial Bid):

8.1. Online Payment of Tender Document Fee + e-Service fee: The online payment for Tender document fee, eService Fee & EMD can be done using the secure electronic payment gateway. The Payment for Tender Document Fee and eService Fee shall be made by bidders/ Vendors online directly through Debit Cards & Internet Banking Accounts and the Payment for EMD shall be made online directly through RTGS / NEFT & OTC.

The secure electronic payments gateway is an online interface between Contractors and Debit card/ online payment authorization networks.

8.2. Preparation & Submission of online Applications/Bids:

- i. Detailed Tender documents may be downloaded from e-tendering website (<https://etenders.hry.nic.in>) from 22.01.2021 at 03:00 PM to 15.02.2021 upto 03:00 PM and tender mandatorily be submitted online following the instructions appearing on the screen.
- ii. Scan copy of Documents to be submitted/uploaded for Technical& Commercial bid under online Technical Envelope: The required documents as indicated in this tender document shall be prepared and scanned in different file formats (in PDF /JPEG/MS WORD format such that file size is not exceed more than 10 MB) and uploaded during the on-line submission of PQQ or Technical Envelope.

**A.** Only Electronic Form (Refer Tender document).

Financial or Price Bid shall be submitted mandatorily online under Commercial Envelope and original not to be submitted manually.

**NOTE:-**

- (A) Bidders participating in online tenders shall check the validity of his/her Digital Signature Certificate before participating in the online Tenders at the portal <https://etenders.hry.nic.in>.
- (B) For help manual please refer to the 'Home Page' of the e-tendering website at <https://etenders.hry.nic.in>, and click on the available link 'How to...?' to download the file.

In the first instance, the online payment details of tender document fee + e-Service and EMD & PQQ/Technical Envelope shall be opened. Henceforth financial bid quoted against each of the item by the shortlisted bidder/ Agency wherever required shall be opened online in the presence of such bidders/ agency who either themselves or through their representatives choose to be present.

The bidder can submit online their bids as per the dates mentioned in the schedule/Key Dates above.

**Other Information:**

1. The Tenderers shall fill in the item rate in the online BOQ templates of the tender.
2. Duly accepted copy of notarized or registered power of Attorney along with its two certified copies in the name of tenderer or authorized representative to act on behalf of the agency.
3. Bidder must strictly abide by the stipulations set forth in detailed notice inviting tenders while tendering for the work.
4. In case any tenderer does not comply with procedure given in the tender document, it will be presumed that the tenderer is not interested in work and the work shall not be let out to him. Further he may be de-barred without further notice to him for failing to abide by the approved terms of detailed notice inviting tenders for this work.
5. The tenders which are not accompanied by the earnest money or do not strictly follow the technical requirement, are liable to be summarily rejected without arising any reason and no claim whatsoever on their account will be considered.
6. Tenders quotations which are dependent upon the quotations of another tender shall be summarily rejected.

## Constitution of Firm

S.No.	Particular	Response
1	Constitution of the Firm (Tick as applicable)	Sole Proprietorship Firm/ Partnership Firm/ Company/ JV/ LLP/ Registered Society or Trust
2	Full name of the Sole Proprietorship Firm/ Partnership Firm/ Company/ JV/ LLP/ Registered Society or Trust (as the case may be)	
3	Year of formation/ incorporation	
4	PAN No.	
5	Registered Office Address	
6	Address on which correspondence regarding this tender should be done	
7	Names of the proprietor/ partners/ JV members etc.	

## Undertaking:

We have uploaded along with the tender, all the requisite documents pertaining to the constitution of the firm/ concern/company. etc, as specified in clause 2.4.1 of "General Tender Conditions & Instructions to tenderers". I/We understand that in the absence of these documents, offer shall be considered incomplete and shall be summarily rejected.

Date:

Signature of Tenderer/s with Seal

Details of Plant and Machinery already available with the firm

S.No	Particulars of equipment, plant/ machinery	No. of Unit	Kind and make	Capacity	Date by which the plant/ machinery would be available for use on this work	Age & Conditions
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Date:

Signature of Tenderer/s with Seal

LIST OF ENGINEERS/PERSONNEL ALREADY AVAILABLE/ PROPOSED TO BE EMPLOYED FOR DEPLOYMENT ON THIS WORK:

S. No	Name & Designation	Qualification	Professional experience	Organization with whom working	Date by which personnel will be available for this work.
(1)	(2)	(3)	(4)	(5)	(6)

Date:

Signature of Tenderer/s with Seal

STATEMENT OF WORKS EXECUTED/COMPLETED BY THE CONTRACTORS DURING LAST 7 (SEVEN) YEARS ENDING LAST DAY OF MONTH PREVIOUS TO THE ONE IN WHICH TENDER IS INVITED

(Details of works of similar nature physically completed in all respect as per contract agreement during last seven years, ending last day of month previous to the one in which tender is invited)

S. No	Name and place of work	Authority /agency for which work was carried out	Date of award & agreement No.	Date of completion (original /actual)	Agreement al cost/ completion cost.	Principal / Technic al features work in brief	S.No. at which relevant certificate /documents are attached
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Date:

Signature of Tenderer/s with Seal



STATEMENT OF WORKS BEING EXECUTED/IN HAND BY THE CONTRACTOR/S

S . N o	Name and place of work	Authority /agency for which work was carried out	Date of award & agreement No.	Date of completion	Agreement Cost	Principal / Technic al features work in brief	S.No. at which relevant certificate /docume nts are attached	Paymen t taken till date
( 1 )	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

Date:

Signature of Tenderer/s with Seal

Detail of contractual payment received in last 3 (three) financial year and current financial year

S. No	Name and place of work	Name of employer	Detail of payment.	For the financial year	Total contract amount received
(1)	(2)	(3)	(4)	(5)	(6)

Date:  
Seal

Signature of Tenderer/s with

Real Time Gross Saving (RTGS)/National Electronic Fund Transfer (NEFT)  
Model Mandate Form

(Investor/customer's option to receive payments through RTGS/NEFT)

1. Investor/customer's name
  
2. Particulars of Bank Account:
  - A) Name of the Bank:
  - B) Name of the Branch.  
Address  
Telephone No.
  - C) RTGS/NEFT IFS Code.
  - D) Type of the account (S.B. Current or Cash Credit)  
With code (10/11/13).
  - E) Ledger and Ledger folio number.
  - F) Account number (as appearing on the Cheque book) in lieu of the bank certificate to be obtained as under, please attach a blank cancelled cheque or a photocopy of a cheque or front page of your savings bank passbook issued by your bank for verification of the above particulars)

3. Date of effect  
I hereby declare that the particulars given above are correct and complete. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold the user institution responsible. I have read the option invitation letter and agree to discharge the responsibility expected of me as a participant under the scheme.

(.....)  
Signature of the Investor/ Customer

Date:

Certified that the particulars furnished above are correct as per our records.

Bank's Stamp

COMPLETION CERTIFICATE

The work of "----- (Full name of the work) -----" has been Completed with following details:

1	Name & complete address of the Contractor.	
2	Nature of entity (sole prop/partnership firm/company / JV)	
3	a) In case of Sole proprietorship, the name of sole proprietor	
	b) In case of partnership firm/JV, the names & shares of various partners/members.	
4	Date of Acceptance/LOA	
5	Agreement No. & date	
6	i) Original Agreement Cost ii) Final Agreement Cost	
7	Total payment made along with financial year-wise break-up	
8	Original date of completion (DOC)	
9	a) Actual date of completion (b) Whether extension to DOC given with penalty or without penalty	
10	Brief description of nature & scope of work	
11	Performance of Contractor (Satisfactory/unsatisfactory)	

It is certified that the above work has been completed successfully in accordance with provisions of contract.

(-----)  
Name & Signature  
Issuing authority with seal

Date of issue of certificate: -----

Case File No.: -----

DECLARATION/UNDERTAKING

I/We, \_\_\_\_\_ (name and Designation) on behalf of \_\_\_\_\_ (Name of the tendering firm) do hereby declare/undertake that I/We have not employed any retired Engineer or retired gazette officer, nor made any Partner/Director etc. in our firm who retires from Government of India/ Government of Haryana Service in last one year as on the date of opening of tender in terms of Clause 2.2.12 of "General Tender Conditions and Instructions to Tenderer(s)" of tender document.

(authorized signatory)  
Name of the tendering firm

Place:

Dated:

Each Bidder or each member of a JV must fill in this form separately:

NAME OF BIDDER/JV PARTNER:

Annual Contractual Turnover Data for the Previous 3/4 Years (Contractual Payment only)			
Year	Amount Currency	Exchange Rate	Indian National Rupees Equivalent
Average Annual Contractual Turnover for last 3 years			

1. The average annual contractual turnover shall be calculated as an average of “total contractual payments” in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
2. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
3. Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

SEAL AND SIGNATURE OF THE BIDDER

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor’s reports. \_\_\_\_\_

(Signature of Chartered Accountant)  
 Name of CA: \_\_\_\_\_  
 Registration No: \_\_\_\_\_  
 (Seal)



Individual BOQ's of

- (i) Electrification of Maruti Siding work.
- (ii) Electrification of Manesar-Patli Single Line connectivity including modification of Patli Yard.

are attached here with Tender document for information purpose only.

Note: The Tenderer has to quote their rate, considering the BOQ (Combine BOQ of Both the Work) attached on Pg. No. 5009 to 5024 in this tender document.



Abstract of 25 kV single Phase Overhead Equipment In C/w Proposed Maruti Siding HORB Line ( 7.2 TKM)								
Schedule 1		HIGH RISE OHE & SP EQUIPMENTS						
S N.	Sub-section	Supply	Percentage (%) above SOR Rates as per average of LAR	Amount	Erection	Percentage(%) above SOR Rates as per average of LAR	Amount	Grand Total Supply+Erection
1	Section-1	1110299.00	145.11%	2721453.88	268541.80	129.77%	617028.49	3338482.37
2	Section-2	1601854.00	231.65%	5312548.79	644249.00	211.08%	2004129.79	7316678.58
3	Section-3	10379315.34	160.06%	26992447.47	512636.46	141.45%	1237760.73	28230208.21
4	Section-4(a)	2511178.00	132.77%	5845269.03	183587.40	124.87%	412832.99	6258102.02
5	Section-4(b)	9193200.00	132.77%	21399011.64	0.00	0.00%	0.00	21399011.64
6	Section-5	1453159.81	158.38%	3754674.32	0.00	0.00%	0.00	3754674.32
7	Section-6 NS ITEMS							3866809.32
8	Section-7-SCADA Work							1946160.24
9	Section-12-Tools & Plants (OHE & PSI)							615887.70
<b>TOTAL</b>		<b>26249006.15</b>		<b>66025405.13</b>	<b>1609014.66</b>		<b>4271752.00</b>	<b>76726014.39</b>
Schedule 2		General Services Work						
10	Section-1 (General Services work)							<b>26386378.97</b>
11	<b>Grand Total (Including GST @18%)</b>							<b>103112393.36</b>
12	<b>Round Off</b>							<b>103112393.00</b>

**Quantity Schedule of OHE In C/w Proposed Maruti Siding HORC Line ( 7.2 TKM)**

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 1 (GENERAL)**

**This schedule shall be read in conjunction with its explanatory notes in tender document for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.**

Item No.	Description	Unit	(All prices are in Rs.)						
			SOR Rate		Qty.	Total Prices			
			Materials	Erection		Materials	Erection	Total (M+E)	
1	2	3	4	5	6	7	8	9	
1(a)	Preparation of designs and drawings for overhead equipment.	Track km.	0	9344	7.2	0.00	67,276.80	67,276.80	
1(b)	Preparation of designs and drawings for switching stations (FP/SP/SSP)	Each	0	16051	1	0.00	16,051.00	16,051.00	
5(a)(i)	Supply without insulator and erection of mounting arrangements for span wire.	Each	3199	434	1	3,199.00	434.00	3,633.00	
8(a) (xii)	Marking/painting of temperature & 'Y'- Measurement of OHE mast at BWA locations	Each	0	62	21	0.00	1,302.00	1,302.00	
8(b)(i)	Supply without insulator and erection of material for termination of Single conductor of Over head equipment or terminating wire.	Each	2411	408	8	19,288.00	3,264.00	22,552.00	
8(b) (iii)	Supply without Insulator and erection of material for termination of all aluminium 25KV Feeder / return conductor (Single SPIDER)	Each	3043	408	4	12,172.00	1,632.00	13,804.00	
8(b) (vi)	Supply without insulator and erection of materials for termination of tramway type OHE (Regulated)	Each	1816	408	0	0.00	0.00	0.00	
8(b) (ix)	Supply without insulator and erection of materials for termination of copper cross feeder with gantries.	Set	2895	408	6	17,370.00	2,448.00	19,818.00	
9(dz)	Supply without insulator and erection of anti-creep with Cadmium copper catenary wire in polluted area	Each	2,792	1317	0	0.00	0.00	0.00	
9(ez)	Supply without insulator and erection of anti-creep with Cadmium copper catenary wire suitable for tramway type OHE (Regulated) in polluted area	Each	2,719	1317	0	0.00	0.00	0.00	
<b>Page Total</b>							<b>52,029.00</b>	<b>92,407.80</b>	<b>1,44,436.80</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	
11(a)(i)	Supply without Insulator and erection of cut-in (9Tonne) Insulator	Each	688	283	10	6,880.00	2,830.00	9,710.00	
11(a)(ii)	Supply without Insulator and erection of a suspension (9 Tonne) Insulator	Each	713	168	2	1,426.00	336.00	1,762.00	
11(b)	Supply without Insulator and erection of 25 kV Post Insulator	Each	515	130	14	7,210.00	1,820.00	9,030.00	
11(c)	Supply without Insulator and erection of 3 kV Disc Insulator	Each	922	132	0	0.00	0.00	0.00	
11(d)	Supply without Insulator and erection of 11 kV Post Insulator	Each	133	108	0	0.00	0.00	0.00	
17(b)	Extra for special embedment of earth electrode.	Each	0	679	0	0.00	0.00	0.00	
18(a)	Supply & Erection of 25KV SF-6 Gas filled Interrupters	Each	2,05,019	1,913	0	0.00	0.00	0.00	
18(b)	Supply & Erection of 25KV Vacuum type Interrupter	Each	1,73,491	1,913	3	5,20,473.00	5,739.00	5,26,212.00	
19	Supply and Erection of 25KV Potential Transformers Type-I	Each	44,466	429	4	1,77,864.00	1,716.00	1,79,580.00	
20(a)	Supply and Erection of 42KV Lightning Arrestors (station class)	Each	15,119	278	2	30,238.00	556.00	30,794.00	
20(b)	Supply and Erection of 7.5 KV Lightning Arrestors	Each	705	145	0	0.00	0.00	0.00	
21	Supply and Erection of Terminal Boards in control cubicles.	Each	5,061	204	1	5,061.00	204.00	5,265.00	
22(a)	Supply and Erection of an Iron clad 110 V.D.C Fuse Box.	Each	1,593	47	1	1,593.00	47.00	1,640.00	
22 (b)	Supply and erection of an Iron clad 230 V.A.C Fuse Box.	Each	1,762	47	1	1,762.00	47.00	1,809.00	
23	Supply and Erection of Lead Acid Batteries.	Each	42,715	3,065	1	42,715.00	3,065.00	45,780.00	
24	Supply and Erection of Battery chargers.	Each	41,587	418	1	41,587.00	418.00	42,005.00	
25(a)	Supply and Installation of cables for Control and indication circuit	Metre	201	7	170	34,170.00	1,190.00	35,360.00	
25(b)	Supply and Installation of cables for Heater supply	Metre	95	7	150	14,250.00	1,050.00	15,300.00	
25(c)	Supply and Installation of cables for Catenary indication	Metre	137	7	150	20,550.00	1,050.00	21,600.00	
25(d)	Supply and Installation of cables for L.T. Power supply	Metre	217	10	50	10,850.00	500.00	11,350.00	
25(e)	Supply and Installation of cables for 110V D.C. supply	Metre	137	10	50	6,850.00	500.00	7,350.00	
27(a)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (10 kVA).	Each	27,426	4,572	1	27,426.00	4,572.00	31,998.00	
27(b)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (5 kVA).	Each	22,971	4,572	0	0.00	0.00	0.00	
	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (25 kVA).	Each	93,611	4,572	1	93,611.00	4,572.00	98,183.00	
<b>Page Total</b>						<b>10,44,516.00</b>	<b>30,212.00</b>	<b>10,74,728.00</b>	
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	
27(d)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (50 kVA).	Each	1,21,643	4,572	0	0.00	0.00	0.00	
28	Supply without Insulator & erection of 25 kV D.O. fuse switch.	Each	4,934	239	2	9,868.00	478.00	10,346.00	
29(a)	Erection, oil filtration, testing & commissioning of Booster transformer.	Each	59	8,466	0	0.00	0.00	0.00	
31	Modification to erected equipments :					0.00	0.00	0.00	
31(a)	Transfer of equipment from one mast or support to another.	Each	804	1,179	4	3,216.00	4,716.00	7,932.00	
31(b)	Provision of an additional bracket assembly/ assemblies on a mast or support.	Each	0	1,047	4	0.00	4,188.00	4,188.00	
31(c)	Re-adjustment of head-span	Each	0	1,156	1	0.00	1,156.00	1,156.00	
31(d)	Dismantling of overhead equipment.	Km	0	6,222	0	0.00	0.00	0.00	
31(e)	Dismantling of Feeder/ Return Conductor	Km	0	2,697	0	0.00	0.00	0.00	
31(f)	Splicing & extension of an anchored overhead equipment.	Each	0	1,156	1	0.00	1,156.00	1,156.00	
31(gz)	Dismantling of a Section Insulator Assembly	Each	670	1,156	1	670.00	1,156.00	1,826.00	
31(h)	Slewing and putting back of OHE in original shape	Span	0	937	1	0.00	937.00	937.00	
31(i)	Dismantling of an Isolator	Each	0	627	1	0.00	627.00	627.00	
31(j)	Dismantling of a Post/ Pedestal Insulator.	Each	0	204	1	0.00	204.00	204.00	
31(m)(i)	Manning of Switching stations (SP/SSP)	Each per month	0	19,148	6	0.00	1,14,888.00	1,14,888.00	
31(m) (ii)	Manning of Traction Sub-stations	Each per month	0	30,878	0	0.00	0.00	0.00	
35	Supply and Erection of materials for internal and external lighting of Switching Station Building (SP/SSP).	Each	0	16,416	1	0.00	16,416.00	16,416.00	
36 (a)	Unloading of all type of Steel Structures.	MT	0	61	0	0.00	0.00	0.00	
36 (b)	Loading of all type of Steel Structures.	MT	0	113	0	0.00	0.00	0.00	
37 (a)	Unloading of all type of Copper & Aluminium conductors.	MT	0	55	0	0.00	0.00	0.00	
37 (b)	Loading of all type of Copper & Aluminium conductors.	MT	0	55	0	0.00	0.00	0.00	
<b>Page Total</b>						<b>13,754.00</b>	<b>1,45,922.00</b>	<b>1,59,676.00</b>	
<b>Total for Section-1 (GENERAL) =</b>						<b>11,10,299.00</b>	<b>2,68,541.80</b>	<b>13,78,840.80</b>	

**NOTE:-** for 31(m)(i) & 31(m) (ii): In case Feeding post is situated in adjacent to TSS, same will also be included for manning alongwith TSS.

**SCHEDULE - 1  
SCHEDULE OF PRICES & TOTAL PRICES**

**Section-2 (Concrete)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)						
			SOR Rate		Qty.	Total Prices			
			Materials	Erection		Materials	Erection	Total (M+E)	
1	2	3	4	5	6	7	8	9	
2(a)	Concrete for foundation and plinth								
	(i) In hard soil:	Cum	2,056	749	14	28,784	10,486	39,270	
	(ii) In rocky soil	Cum	2,120	977	5	10,600	4,885	15,485	
2(az)	Concrete for foundation and plinth								
	(i) In hard soil:	cum	2,359	749	0	0	0	0	
	(ii) In rocky soil	cum	2,423	977	0	0	0	0	
2(b)	In other than hard soil and rock	Cum.	2,140	566	700	14,98,000	3,96,200	18,94,200	
2(c)	Reinforced concrete	Cum.	2,852	676	18	51,336	12,168	63,504	
2(e)	Extra for supply & sinking of concrete shells	Cum.	2,225	314	1	2,225	314	2,539	
2(f)	Casting of foundations using mechanized Augur.	Cum	2,629	389	1	2,629	389	3,018	
34(a)	Supply of materials and construction of Super Structure of SP/SSP building (Control cubicles)	Each	0	81,393	1	0	81,393	81,393	
34(b)	Cement concrete for foundation with stone ballast 40mm nominal size	Cum.	0	1,360	40	0	54,400	54,400	
34(c)	RCC work for foundation and plinth in ratio 1:1½:3.	Cum.	0	2,211	1	0	2,211	2,211	
34(d)	Brick work in foundation plinth, retaining walls and drainage.	Cum.	0	1,203	60	0	72,180	72,180	
34(e)	Construction of retaining wall with random rubble masonry in cement & sand..	Cum.	0	931	5	0	4,655	4,655	
34(f)	Earth work in excavation and filling including compaction								
	(i) In normal soil	Cum.	0	26	80	0	2,080	2,080	
	(ii) In hard soil	Cum.	0	33	10	0	330	330	
34(g)	Earth work, excavation for foundation								
	(i) In normal soil	Cum.	0	25	30	0	750	750	
	(ii) In hard soil	Cum.	0	32	10	0	320	320	
34(h)	Excavation of pile of 100 mm to 200 mm dia upto 3.5M deep.	Metre	0	43	0	0	0	0	
34(i)	Plastering of retaining wall with 1:4 cement & sand mortar.	Sqm	0	36	40	0	1,440	1,440	
34(j)	Supply & Spreading of Ballast/Gravel in the Switch Yard.	Sqm	345	2	24	8,280	48	8,328	
<b>Total for Section-2 (Concrete) =</b>						<b>16,01,854.00</b>	<b>6,44,249</b>	<b>22,46,103.00</b>	

**SCHEDULE - 1  
SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION -3 (FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials(S)	Erection(E)	Total (M+E)
1	2	3	4	5	6	7	8	9
3(a)(i)	Supply and erection of traction masts fabricated from Rolled mild steel beam (BFB) of size 152mm x152mm x 37.1 Kg/m and galvanised in length 9.5 m or 8.5 m long.	MT	45,259	1,037	0	0.00	0.00	0.00
3(a)(ii)	Supply and erection of traction masts, main masts of switching stations, Booster transformer station, fabricated from Rolled mild steel joist (RSJ) of size 203mm x 152 mm x 52.0 Kg/m and galvanised in lengths 9.5 m or 8.5 m long.	MT	42,491	1,037	2	84,982.00	2,074.00	87,056.00
3(b)(i)	Supply and erection of fabricated and galvanised structures (O,N & R type portals) with all necessary components other than masts.	MT	53,854	3,546	35	18,84,890.00	1,24,110.00	20,09,000.00
3(b)(ii)	Supply and erection of Structure steel (traction masts) fabricated and galvanised of all Type : B-Series Mast.	MT	45,423	1,037	71.9	32,65,913.70	74,560.30	33,40,474.00
3(b)(iii)	Supply & Erection of special fabricated and galvanised steel structures other than Portals & traction- Masts not covered under items 3(b)(i) & 3(b)(ii).	MT	47,703	3,546	13.5	6,43,990.50	47,871.00	6,91,861.50
3(c)	Supply only of fabricated steel other than masts	MT	66,257	0	10.5	6,95,698.50	0.00	6,95,698.50
3(e)(i)	Supply and erection of a Guy Rod Assembly	Each	4,086	473	35	1,43,010.00	16,555.00	1,59,565.00
3(g)	Supply of steel reinforcement for RCC	MT	42,171	0	8	3,37,368.00	0.00	3,37,368.00
3(e)(ii)	Supply and erection of Anchoring Arrangement of traction mast with Galvanised steel stranded wire	Each	6,472	473	0	0.00	0.00	0.00
3(i)	Supply and erection of 25KV Caution Boards/Plates.	Each	131	42	0	0.00	0.00	0.00
4(a)(i)	Supply without insulator and erection of Single bracket assembly.	Each	5,734	429	315	18,06,210.00	1,35,135.00	19,41,345.00
4(a)(ii)	Extra on 4 (a)(i) for supporting two OHEs.	Each	1,268	129	0	0.00	0.00	0.00
<b>Page Total</b>						<b>88,62,062.70</b>	<b>4,00,305.30</b>	<b>92,62,368.00</b>

1	2	3	4	5	6	7	8	9
4(a)(iii)	Supply without Insulator and erection of Single bracket assembly suitable for tramway type OHE (Regulated)	Each	4,705	429	0	0.00	0.00	0.00
4(a)(iv)	Extra on item 4(a)(iii) for supporting two tramway type OHE (Regulated)	Each	1,424	129	0	0.00	0.00	0.00
4(a)(v)	Supply without insulator and erection of Single bracket assembly for composite OHE	Each	5,741	429	0	0.00	0.00	0.00
4(b)(i)	Supply without Insulator and erection of a pull off arrangement for one OHE	Each	4,848	267	1	4,848.00	267.00	5,115.00
4(b)(ii)	Extra for each additional equipment pulled.	Each	2,664	267	1	2,664.00	267.00	2,931.00
4(b)(iii)	Supply without Insulator and erection of a pull off arrangement for regulated tramway type OHE.	Each	2,744	212	0	0.00	0.00	0.00
4(b)(iv)	Supply without Insulator and erection of a pull off arrangement for one composite OHE.	Each	4,848	267	0	0.00	0.00	0.00
5(b)	Supply without insulator and erection of suspension of conventional/ composite OHE from Head Span.	Each	3,852	461	0	0.00	0.00	0.00
8(a)(v)	Supply and erection of Regulating Equipment (3-Pulley type) with counter weight assembly for conventional/ composite OHE.	Each	32,186	1,764	21	6,75,906.00	37,044.00	7,12,950.00
8(a)(vi)	Supply and erection of Regulating Equipment (3-Pulley type) with counter weight assembly for tramway type OHE (Regulated)	Each	24,282	1,485	0	0.00	0.00	0.00
8(a)(x)	Same as 8(a)(v) but excluding stainless steel wire rope.	Each	29,189	1,764	0	0.00	0.00	0.00

8(a) (xi)	Same as 8(a)(vi) but excluding stainless steel wire rope.	Each	21,611	1,485	0	0.00	0.00	0.00
8(b)(ii)	Supply without Insulator and erection of materials for termination of Double conductor.	Each	4,185	469	21	87,885.00	9,849.00	97,734.00
8(b)(v)	Supply without Insulator and erection of materials for termination of Earth wire	Each	2,244	195	0	0.00	0.00	0.00
<b>Total</b>						<b>7,71,303.00</b>	<b>47,427.00</b>	<b>8,18,730.00</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
8(b) (vii)	Supply without Insulator and erection of materials for termination of double conductors for composite OHE.	Each	4,081	469	0	0.00	0.00	0.00
9(a)	Supply without Insulator and erection of anticreep with galvanized steel wire.	Each	10,740	1,317	10	1,07,400.00	13,170.00	1,20,570.00
9(b)	Supply without Insulator and erection of anticreep with galvanized steel wire suitable for tramway type Overhead equipment (Regulated)	Each	9,204	1,317	0	0.00	0.00	0.00
9(c)	Supply without Insulator and erection of anticreep for composite OHE with galvanized Steel wire.	Each	11,345	1,317	0	0.00	0.00	0.00
13(e)	Extra on item 13(a), (b) or (c) for an inter-locking device	Each	916	108	0	0.00	0.00	0.00
14	Supply & erection of a connection between return conductor and rail.	Each	5,031	1,645	0	0.00	0.00	0.00
16(a) (i)	Supply and erection of a structure bond.	Each	528	131	195	1,02,960.00	25,545.00	1,28,505.00
16(a)(ii)	Supply and erection of a Galvanised steel stranded wire structure bond	each	1,511	131	2	3,022.00	262.00	3,284.00
16(b)	Supply and erection of a longitudinal bond	Each	298	117	20	5,960.00	2,340.00	8,300.00
16(c)	Supply & erection of a transverse and special bond.	Each	679	140	15	10,185.00	2,100.00	12,285.00
17(a)	Supply & erection of a single earth electrode.	Each	1,191	498	15	17,865.00	7,470.00	25,335.00
17(c)	Supply and erection of earth bus	Metre	126	35	100	12,600.00	3,500.00	16,100.00
17(e)	Supply and erection of 8 SWG G.I. wire for earthing	Metre	11	9	15.24	167.64	137.16	304.80
30(a) (i)	Supply and erection of fencing panels at switching stations.	Metre	2,298	39	150	3,44,700.00	5,850.00	3,50,550.00
30(a) (ii)	Supply and erection of fencing uprights	MT	63,551	1,869	2	1,27,102.00	3,738.00	1,30,840.00
30(b) (i)	Supply and erection of anticlimbing device for Switching stations	Metre	153	4	50	7,650.00	200.00	7,850.00
30(b) (ii)	Supply and erection of anticlimbing device for B.T. stations.	Each	1,448	250	0	0.00	0.00	0.00
30(b) (iii)	Supply and erection of anticlimbing device for L.T. Supply Transformer	Each	635	148	2	1,270.00	296.00	1,566.00
30(b) (iv)	Supply and erection of anti monkey menace.	Each	2,534	148	2	5,068.00	296.00	5,364.00
<b>Page Total</b>						<b>7,45,949.64</b>	<b>64,904.16</b>	<b>8,10,853.80</b>
<b>Total for Section-3</b>						<b>1,03,79,315.34</b>	<b>5,12,636.46</b>	<b>1,08,91,951.80</b>

**SCHEDULE - 1**  
**SCHEDULE OF PRICES & TOTAL PRICES**  
**SECTION -4 (a) (NON-FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
5az(ii)	supply and erection of span wire	Metre	498	23	35	17430	805.00	18235
5(c)	Supply of without insulator and erection of Suspension/ registration of contact wire only.	Each	1,196	183	2	2,392.00	366.00	2,758.00
6(az)	Supply and erection of Over Head equipment only	Km	46,757	13,521	8	3,74,056.00	1,08,168.00	4,82,224.00
6(bz)	Supply & Erection of contact wire only	Km	2,828	6,048	0	0.00	0.00	0.00
6(cz)	Supply and Erection of contact wire only (Regulated with bridle wire)	Km	27,230	7,944	0	0.00	0.00	0.00
7(a)	Supply and Erection of all aluminium 25KV Feeder/ Return conductor (Single Spider)	Km	87,846	1,584	0.5	43,923.00	792.00	44,715.00
7(c)	Supply and erection of earth wire.	Km.	43,213	1,208	0	0.00	0.00	0.00
7(d)	Supply and Manual Erection of all aluminium 25KV Feeder/ Return conductor (Single Spider)	Km	87,846	2,476	0.5	43,923.00	1,238.00	45,161.00
7(e)	Supply and Erection of copper cross feeder wires (37/2.25 mm HDBC)	Km	5,77,320	1,584	0.1	57,732.00	158.40	57,890.40
10(az)	Extra on item 6(a) for supply and erection of additional fittings at a turnout, diamond crossing or overlap	Each	3,096	541	20	61,920.00	10,820.00	72,740.00
10(bz)	Extra on item 6(b) for supply and erection of additional fittings required at a turnout, diamond crossing or overlap.	Each	2,603	431	0	0.00	0.00	0.00
10(cz)	Extra on item 6(c) & (d) for supply and erection of additional fittings required at a turnout, diamond crossing or overlap.	Each	5,552	541	0	0.00	0.00	0.00
12(az)	Supply without Insulator & erection of a section insulator assembly	Each	16,405	1,406	10	1,64,050.00	14,060.00	1,78,110.00
12(b)	Supply without insulators.& erection of a double wire section insulator assembly	Each	16,612	1,412	0	0.00	0.00	0.00
<b>Page Total</b>						<b>7,65,426.00</b>	<b>1,36,407.40</b>	<b>9,01,833.40</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
12(cz)	Supply without Insulator & erection of a section insulator assembly suitable for tramway type OHE (Regulated)	Each	16,295	1,249	0	0.00	0.00	0.00
12(d)	Supply & Erection of a Ceramic/beaded Glass Fibre type (PTFE) Short Neutral section assembly	Each	2,63,409	2,174	2	5,26,818.00	4,348.00	5,31,166.00
13(a)	Supply without Insulator and erection of a 25 KV single pole isolator	Each	18,104	1,302	10	1,81,040.00	13,020.00	1,94,060.00
13(b)	Supply without Insulators & erection of two 25 kV Single Pole Isolator gang operated without earth contact assembly.	Each	36,148	1,377	0	0.00	0.00	0.00
13(c)	Supply without Insulators & erection of 25kV Double Pole Isolator.	Each	29,523	1,438	4	1,18,092.00	5,752.00	1,23,844.00
13(d)	Extra for supply & erection of an earth contact assembly in an Isolator.	Each	6,025	150	1	6,025.00	150.00	6,175.00
15(a)(i)	Supply & erection of large copper jumpers	Each	2,508	236	16	40,128.00	3,776.00	43,904.00
15(a)(ii)	Supply & erection of small copper jumpers	Each	294	236	5	1,470.00	1,180.00	2,650.00
15(az)(iii)	Supply & erection of copper jumpers	Each	92	236	2	184.00	472.00	656.00
15(a)(iv)	Supply & erection of a copper jumper (5mm dia droper wire).	Each	804	236	2	1,608.00	472.00	2,080.00
15(b)	Supply and erection of an aluminum jumper.	Each	1,286	109	2	2,572.00	218.00	2,790.00
15(c)	Supply and erection of insulated catenary cable in the span under over-line structures.	Each	2,621	217	0	0.00	0.00	0.00
15(d)	Supply of materials and erection of Large copper jumper 160 Sq. mm between Aluminium bus and cross feeders	Each	3,154	236	1	3,154.00	236.00	3,390.00
15(e)	Supply of materials and erection of Large copper jumper 160 Sq. mm between cross feeder and OHE	Each	4,801	236	1	4,801.00	236.00	5,037.00
17(d)	Supply and erection of copper strips for equipment earthing.	Metre	271	32	10	2,710.00	320.00	3,030.00
26(a) (i)	Supply & erection of : Aluminum bus-bars 36mm x 28mm.	Metre	195	31	150	29,250.00	4,650.00	33,900.00
<b>Page Total</b>						<b>9,17,852.00</b>	<b>34,830.00</b>	<b>9,52,682.00</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
26(a) (ii)	Supply & erection of Solid copper bus-bars 18mm.:	Metre	879	44	50	43,950.00	2,200.00	46,150.00
26(b) (i)	Supply and erection of Aluminum bus-bar connectors:- Bus terminal (6480)	Each	1,341	19	50	67,050.00	950.00	68,000.00
26(b) (ii)	Supply and erection of Aluminum bus-bar connectors:- Bus splice (6490)	Each	1,482	19	50	74,100.00	950.00	75,050.00

26(b) (iii)	Supply and erection of Aluminum bus-bar connectors:- Bus tee connector (6500)	Each	1,495	17	50	74,750.00	850.00	75,600.00
26(b) (iv)	Supply and erection of Aluminum bus-bar connectors:- Terminal connector 36/20 (6530)	Each	1,349	17	50	67,450.00	850.00	68,300.00
26(b) (v)	Supply and erection of Aluminum bus-bar connectors:- Tap connector (6520)	Each	1,349	19	50	67,450.00	950.00	68,400.00
26(b) (vi)	Supply and erection of Aluminum bus-bar connectors:- Flexible bus splice (6550)	Each	3,924	19	50	1,96,200.00	950.00	1,97,150.00
26(b) (vii)	Supply and erection of Aluminum bus-bar connectors:- Terminal connector Bolted Type (6830-1)	Each	1,067	17	50	53,350.00	850.00	54,200.00
26(c) (i)	Supply & erection of solid copper bus-bar connectors: Bus terminal (6310)	Each	888	19	50	44,400.00	950.00	45,350.00
26(c) (ii)	Supply & erection of solid copper bus-bar connectors: Bus splice (6320)	Each	980	19	50	49,000.00	950.00	49,950.00
26(c) (iii)	Supply & erection of solid copper bus-bar connectors: Bus tee joint (6330)	Each	2,664	19	50	0.00	950.00	950.00
26(c) (iv)	Supply & erection of solid copper bus-bar connectors: Bus terminating tee (6351)	Each	1,804	19	50	90,200.00	950.00	91,150.00
<b>Page Total</b>						<b>8,27,900.00</b>	<b>12,350.00</b>	<b>8,40,250.00</b>
<b>Total for Section-4(a)</b>						<b>25,11,178.00</b>	<b>1,83,587.40</b>	<b>26,94,765.40</b>

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 4(b) (Non-Ferous)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be

(All prices are in Rs.)

Item No.	Description	UOM	SOR Rate		Qty	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
6(ax)(i)	Supply 107 sqmm 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(qz)	MT	652000	0	8.6	5607200	0	5607200
6(ax)(ii)	Supply 65 Sqmm, 19/2.10 mm Cadmium copper catenary wire required for item nos. 5(az)(ii), 6(az), 9(dz), 9(ez), 10(az), 10(cz), 12(cz), 15(az)(iii), and 31(qz)	MT	652000	0	5.5	3586000	0	3586000
<b>Total for Section -4(b)</b>						<b>9193200</b>	<b>0</b>	<b>9193200</b>

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 5 ( INSULATORS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

(All prices are in Rs.)

Item No.	Description	UOM	SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
4(ax)	<b>Supply of Insulators for item 4(a)(i)&amp;4(a)(iii)</b>							
4(ax)(i)	Stay Arm Porcelain (CD-1050 mm)	Each	1554.72	0.00	315	4,89,736.80	0	4,89,736.80
4(ax)(ii)	Stay Arm Composite (CD-1050 mm)	Each	1498.75	0.00	3	4,496.25	0	4,496.25
4(ax)(iii)	Stay Arm Composite (CD-1600 mm)	Each	2293.56	0.00	3	6,880.68	0	6,880.68
4(ax)(iv)	Bracket Porcelain (CD-1050 mm)	Each	1338.07	0.00	315	4,21,492.05	0	4,21,492.05
4(ax)(v)	Bracket Composite (CD-1050 mm)	Each	890.29	0.00	3	2,670.87	0	2,670.87
4(ax)(vi)	Bracket Composite (CD-1600 mm)	Each	2293.56	0.00	3	6,880.68	0	6,880.68
4(bx)	<b>Supply of 9-Tonne Insulators for items 4(b)(i) &amp; 4(b)(iii)</b>					0.00	0	0.00
4(bx)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	1	1,962.33	0	1,962.33
4(bx)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	1	1,240.61	0	1,240.61
4(bx)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00
5(ax)	<b>Supply of 9-Tonne Insulators for item 5(a)(i), 5(b) &amp; 5(c)</b>					0.00	0	0.00
5(ax)(i)	Porcelain (CD-1050 mm)	Set	3924.66	0.00	0	0.00	0	0.00
5(ax)(ii)	Composite (CD-1050 mm)	Set	2481.22	0.00	0	0.00	0	0.00
5(ax)(iii)	Composite (CD-1600 mm)	Set	4587.12	0.00	0	0.00	0	0.00
8(bx)	<b>Supply of 9-Tonne Insulators for item 8(b)(i), (ii), (iii), (vi), (vii), (viii) &amp; (ix)</b>					0.00	0	0.00
8(bx)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	21	41,208.93	0	41,208.93
8(bx)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	0	0.00	0	0.00
8(bx)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00
9(ax)	<b>Supply of 9-Tonne Insulators for item 9(a), (b), (c), (d) &amp; (e)</b>					0.00	0	0.00
9(ax)(i)	Porcelain (CD-1050 mm)	Set	3924.66	0.00	10	39,246.60	0	39,246.60
9(ax)(ii)	Composite (CD-1050 mm)	Set	2481.22	0.00	1	2,481.22	0	2,481.22
9(ax)(iii)	Composite (CD-1600 mm)	Set	4587.12	0.00	1	4,587.12	0	4,587.12
11(ax)	<b>Supply of 9-Tonne Insulator for item 11(a)(i) &amp; 11(a)(ii)</b>					0.00	0	0.00
11(ax)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	10	19,623.30	0	19,623.30
11(ax)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	0	0.00	0	0.00
11(ax)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00
11(bx)	Supply of 25 kV Post Insulator for Item 11 (b)	Each	3947.24	0.00	14	55,261.36	0	55,261.36
11(cx)	Supply of 3 kV Disc Insulator for Item 11 (c)	Each	422.92	0.00	0	0.00	0	0.00
11(dx)	Supply of 11 kV Post Insulator for Item 11 (d)	Each	422.92	0.00	0	0.00	0	0.00
12(ax)	<b>Supply of 9 Tonne and Sectioning Insulators for item No.12(a)</b>					0.00	0	0.00
12(ax)(i)	Porcelain 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	6614.43	0.00	10	66,144.30	0	66,144.30
12(ax)(ii)	Composite 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	5892.71	0.00	1	5,892.71	0	5,892.71
<b>Page Total</b>						<b>11,69,805.81</b>	<b>0.00</b>	<b>11,69,805.81</b>
1	2	3	4	5	6	7	8	9
12(ax)(iii)	Composite 9-Tonne (CD-1600 mm) & Sectioning Insulator	Set	6945.66	0.00	0	0.00	0	0.00
12(bx)	<b>Supply of 9 Tonne and Sectioning Insulators for item No.12(b)</b>							
12(bx)(i)	Porcelain 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	11266.53	0.00	0	0.00	0	0.00
12(bx)(ii)	Composite 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	10544.81	0.00	0	0.00	0	0.00
12(bx)(iii)	Composite 9-Tonne (CD-1600 mm) & Sectioning Insulator	Set	11597.76	0.00	0	0.00	0	0.00
12(cx)	Supply of Sectioning Insulators for 12(c) and 12(cz)	Each	4652.00	0.00	0	0.00	0	0.00
13(ax)	Supply of Post & Operating rod insulators for item 13(a)	Set	10291.00	0.00	10	1,02,910.00	0	1,02,910.00
13(bx)	Supply of Post & Operating rod insulators for item 13(b)	Set	20582.00	0.00	0	0.00	0	0.00
13(cx)	Supply of Post & Operating rod insulators for item 13(c)	Set	20582.00	0.00	8	1,64,656.00	0	1,64,656.00
28(x)	Supply of Post insulators for item 28	Set	7894.00	0.00	2	15,788.00	0	15,788.00
<b>Page Total</b>						<b>2,83,354.00</b>	<b>0.00</b>	<b>2,83,354.00</b>
<b>Total for section-5</b>						<b>14,53,159.81</b>	<b>0.00</b>	<b>14,53,159.81</b>

**Note :** Earlier, Item nos. 11(a)(i), 11(a)(ii), 11(b), 11(c) & 11(d) include supply as well as erection both. For similarity with other items, supply and erection have been separated. Supply portion is under section-5 (Insulators) and erection portion included in Section-1 (General).

Quantity of Non-Schedule Items in Connection with Proposed Maruti Siding (7.2 TKM)					
Schedule-1, Section-6					
Item No.	Brief Description of Items	Unit	Qty	Unit Rate of Supply & Erection	Total Amt.
NS-1(a)	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution clearance to OHE near by rectified" Board Size 400mmx270mmx2mm	Nos.	10	758.27	7582.69
NS-1(b)	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Power block working limit" Board Size 450mmx450mmx2mm	Nos.	5	1072.84	5364.22
NS-1(c)	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution unwired turnout" Board Size 900mmx600mmx2mm	Nos.	10	2859.55	28595.46
NS-1(d)	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Electric Engine Stop Board" Board Size 900mmx600mmx2mm	Nos.	5	2852.915	14264.58
NS-1(e)	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Caution live wire" Board Size 400mmx270mmx2mm	Nos.	20	521.125	10422.5
NS-2	Design,Manufacturing supply of retro reflective type sigma board as per RDSO drawing no. T1/DRG/OHE/PLTBRD/RDSO/00036/12/0 (Sixe-450mmx60mm) And RDSO Specification No. ET1/OHE/33A(12/97) Rev.8	Set	5	1485.208	7426.04
NS-3(a)	Fabrication, developing and supply of sectioning diagram, schematic and TSWR board Fabrication and supply of pre compressed particle laminated board white in colour with Aluminium beading 1/2" x 1/2" on all around the board and an arrangement of fixing/hanging on wall of adequate strength of top of board as required	Square foot	100	81.73	8173.48
NS-3(b)	Fabrication, developing and supply of sectioning diagram, schematic and TSWR board developing the sectioning diagram, schematic diagram & TSWR diagram with computerised digital printing on adhesive vinyl of adequate size as required.	Square foot	100	548.369	54836.93
NS-4(a)	Dismantling of Mast/Gantry	MT	0	4587.125	0
NS-4(b)	Extra on erection under power block for Item No. NS-4a	MT	0	4587.125	0
NS-5(a)	Dismantling of Portal	MT	0	6426	0
NS-5(b)	Extra on erection under power block for Item No. NS-5a	MT	0	6426	0
NS-6(a)	Dismantling of a Copper/Aluminium Jumper	Each	0	360	0
NS-6(b)	Extra on erection under power block for Item No. NS-6a	Each	0	360	0
NS-7(a)	Shifting of OHE Termination (fixed) location from one mast/support to another.	Each	2	2871.25	5742.5
NS-7(b)	Extra on erection under power block for Item No. NS-7a	Each	2	2871.25	5742.5
NS-8(a)	Shifting of OHE Termination (Regulated) from one mast/support to another.	Each	2	3091.3	6182.6
NS-8(b)	Extra on erection under power block for Item No. NS-8a	Each	2	3091.3	6182.6
NS-9(a)	Adjustment on bracket assemblies for assemblies for lowering/raising the height of contact and catenary wire where Encumbrance is changed.	Each	10	2093.82	20938.18
NS-9(b)	Extra on erection under power block for Item No. NS-9a	Each	10	2093.82	20938.18
NS-10(a)	Adjustment on bracket assemblies for assemblies for lowering/raising the height of contact and catenary wire where Encumbrance is not changed.	Each	10	1914.7715	19147.72
NS-10(b)	Extra on erection under power block for Item No. NS-10a	Each	10	1914.772	19147.715
NS-11	Loading, leading, Transportation, unloading and stacking of steel structure & Conductor etc from Dismatling site to Concern Engineer Incharge Store.	MT	0	3343.502	0

<b>NS-12(a)</b>	Hiring & operating of 01 Nos. MUV (Multi Utility Vehicle) of loading capacity of one MT, Sitting capacity of 4 person 4 stroke, 4 Cylinder engine, factory build metal body cargo box type- Mahindra, TATA or similar type multi utility vehicle (with 24 Hours available) including major minor repairs, cost of lubricant, fuels, salary of driver, toll taxes and all other taxes complete operation & maintenance for running of 1200 KM in a month for the use of Electrical Department of HRIDC for supervision of work & for transportation of material/machines & other usage. The Vehicle shall run on pucca/latcha road and along the track. The Contractor shall have road permit for use vehicle in the state of Haryana.	Months	12	25643.600	307723.2
<b>NS-12(b)</b>	Extra on Item NS-12a for more than 1200 KM (1x12x1500=18000)	Per KM	18000	5.460	98280
<b>NS-13</b>	Hiring of 1 No vehicle (Maruti Dzire or similar) on daily basis including all maintenance, major/minor repairs, cost of lubricants, fuels, driver, GST, taxes etc. complete (only extra hours, Night halt charges, Toll tax and parking charges will be paid extra) for the use of HRIDC officers.				
<b>NS-13 (a)</b>	Fix Charges up to Km 100 per day	Per Day	50	1169.000	58450
<b>NS-13 (b)</b>	Extra charges beyond Km 100 per day per vehicle	Per Km	2000	8.290	16580
<b>NS-14</b>	Setting up of earthing Station at Switching post	Job	1	65313	65313
<b>NS-15a</b>	Supply & Erection of Safety item with supply of fixing material (Plastic/wooden/gitti & Screw) for supply & erection of electric shock treatment chart (Glass framed) size 22"x28" complete with aluminium angle beading 1"x1" all around	Nos.	10	736.02	<b>7360.2</b>
<b>NS-15b</b>	Supply & Erection of Safety item with supply of fixing material (Plastic/wooden/gitti & Screw) for supply & erection of electric shock treatment chart & its first aid coloured calendar in Hindi & English Size 550mm x 900mm with plastic at top & bottom.	Nos.	10	55.332	<b>553.32</b>
<b>NS-16</b>	Route Mapping of OHE mast by Oliver G kit with use of GPS System in 25 KV AC OHE System of all siding of XXXX Division.	Km	7.2	2103.015	<b>15141.708</b>
<b>NS-17</b>	Lowering/Raising the height of OHE Termination on same Mast/support	Each	5	1468	<b>7340</b>
<b>NS-18</b>	Provision of Buried Rail	Job	1	65175	<b>65175</b>
<b>NS-19</b>	Supply of 25 KV single pole Vacuum Circuit breaker.	Each	1	507423	<b>507423</b>
<b>NS-20</b>	Erection, testing & commissioning of 25 KV single pole Vacuum Circuit breaker.	Each	1	6764	<b>6764</b>
<b>NS-21</b>	Supply of 25 kV Potential Transformer (Type-II)	Each	1	100910	<b>100910</b>
<b>NS-22</b>	Erection of 25 kV Potential Transformer (Type-II)	Each	1	945	<b>945</b>
<b>NS-23</b>	Supply of 25 kV Current Transformer (1500/750/5A)	Each	1	131428	<b>131428</b>
<b>NS-24</b>	Erection of 25 kV Current Transformer (1500/750/5A)	Each	1	922	<b>922</b>
<b>NS-25</b>	Supply, Erection, Testing & commissioning of control & relay panel as per RDSO specification no. TI/SPC/PSI/PROTCT/6071 or latest suitable for one feeder CB & 2 BM	Nos.	1	2192702	<b>2192702</b>
<b>NS-26</b>	Provision of First Aid staff & nearest doctor name board/nearest fire fighting name and address board	Nos.	1	650	<b>650</b>
<b>NS-27</b>	Provision of First Aid box and stretcher with wooden box and hanging arrangement etc.	Nos.	1	11869	<b>11869</b>
<b>NS-28</b>	Provision of Wooden key box with glass front in frame with hinges and locking arrangement 18x24x6 inch.	Nos.	1	2701	<b>2701</b>
<b>NS-29</b>	Supply of hand Gloves (Tested for 25 kV AC)	Nos.	5	1155	<b>5775</b>
<b>NS-30</b>	Provision of Portable fire fighting Dry Chemical powder 5 Kg ISI mark	Nos.	1	3270	<b>3270</b>
<b>NS-31</b>	Provision of Portable fire fighting- CO2 fire extinguisher 10 Kg	Nos.	1	14527	<b>14527</b>
<b>NS-32</b>	Provision of Portable fire fighting- Fire bucket 10 Ltrs	Nos.	5	320	<b>1600</b>
<b>NS-33</b>	Provision of Portable fire fighting- Fire bucket Stand	Nos.	1	2139	<b>2139</b>
<b>NS-34</b>	Supply & Erection of Electric Shock treatment chart & its first aid coloured calendar in Hindi & English Size-550mm x 900mm with plastic at top & bottom	Nos.	10	58	<b>580</b>
		<b>Total Amount</b>			<b>3866809.32</b>

**Quantity Schedule of SCADA Work in C/w Proposed Maruti siding (7.2 TKM)**

**Schedule-1, Section -7**

S.No.	SOR Item No.	Description	Unit	Qty.	Basic Rate		Rate		Total
					Material	Erection	Material	Erection	
	1	2	3	4	5	6	7	8	9
1	1010101	Design and Drawings	Lumsum	1	197332.55	0	197332.55	0.00	197332.55
2	1010201 & 1010202	Supply, Erection, Testing & Commissioning of Supervisory Control and Data Acquisition (SCADA) equipments at the Remote Control Centre for required work Station.	Lumsum	0	5684749.27	500744.61	0.00	0.00	0.00
3	1010301 & 1010302	Supply , installation & testing of standerd SCADA software	Lumsum	0	2941372.43	333298.37	0.00	0.00	0.00
4	1010501 & 1010502	Supply, Erection, Testing and Commissioning of GPS Receiver	Lumsum	0	327396.44	19757.82	0.00	0.00	0.00
5	1010801 & 1010802	Supply, Erection, Testing & Commissioning of Remote Station Equipments at remote stations:- For Sectioning Posts (SP)	Lumsum	1	908444.86	57013.38	908444.86	57013.38	965458.24
6	1010901	Modification/ Up gradation, testing and commissioning in existing standerd SCADA software at RCC Equipment for configuration integration/ hooking up of additional RTUs of adject section with master station.	Lumsum	1	0	783369.45	0.00	783369.45	783369.45
7	1011001 & 1011002	Supply, Erection, Testing & Commissioning of 2 X 5 KVA dual redundant hot standby UPS System	Lumsum	0	414747.73	30954.19	0.00	0.00	0.00
8	1011101 & 1011102	Supply, Erection, Testing & Commissioning of Low maintainance lead acid battery Sets	Lumsum	0	1347687.13	85618.55	0.00	0.00	0.00
9	1011201 & 1011202	Supply & Erection of Furniture at RCC	Lumsum	0	366165.64	26343.97	0.00	0.00	0.00
								<b>Total Amount</b>	<b>1946160.24</b>



**Qty Schedule of Tools & Plants (OHE & PSI) In C/w Proposed Maruti Siding**

**Schedule-1 Section -12**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

RVNL SOR Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
28002	Tirfor 5T /3 T ISI marked as per IS :5604/1984 or latest (Make TRACTEL /TIRFOR or equivalent as approved by Engineer)	Nos	19,651	0	1	19651	0	19651
28004	Pull lift 0.75 T/0.8 T ISI mark (Make TRACTEL or equivalent as approved by engineer)	Nos	7,909	0	1	7909	0	7909
28005	Fibre/light weight winch type Ladder Trolley suitable to move on railway track for maintenance of 25KV AC OHE. (SUMER make or equivalent as approved by engineer) .	Nos	70,560	0	1	70560	0	70560
28007	Earthing discharge rod complete suitable for working voltage of 25KV AC traction, fibre glass body screw type in a suitable carry bag as per RDSO specification no ETI/OHE/51(9/87) or latest and as approved by engineer.	Each	14,495	0	5	72475	0	72475
28008	Aluminium Straight ladder extendable type (11mtr), Closed height 6mtr Extended height 11 mtr .(SUMER make Ref-AL100/8809 or equivalent as approved by engineer) .	Nos	17,024	0	2	34048	0	34048
28009 (a)	Portable electric drill suitable for drilling holes of 12-23mm dia, working on single phase, 230V AC supply alongwith 2 nos suitable spare drill bits. (Make: Railli wolf model WDH-12 or equivalent model of Hitachi/Black & Decker as approved by Engineer).	Nos	14914	0	1	14914	0	14914
28010	First aid box made of GI/AL sheet, ISI marked, filled with medicines as per concerned HRIDC/zonal Railway standard with suitable locking arrangement and as approved by Engineer Inchrge.	Nos	2397	0	1	2397	0	2397
28011	Stretcher two fold type, made of high quality aluminium alloy tubes. Aprox. Dimensions: unfolded 2100x560x150mm and folded 1100x200x110mm, max weight 8kg, suitable for load weight upto 150kg, to be supplied with sturdy carry case as approved by Engineer	Nos	3,105	0	1	3105	0	3105

28017	Stainless steel Digital micro meter suitable for measuring 0-25 mm dia, resolution 0.001mm and accuracy of (+/-)1µm. Mitutoyo make or equivalent as approved by engineer.	Nos	9957	0	1	9956.7	0	9956.7
28020	Portable 5KVA Silent diesel Gen Set with battery push button start. Make: KOEL/Honda/Mahindra or as approved by Engineer	Set	1,84,000	0	2	368000	0	368000
28022	Vernier Calipers Digital, range 0-200 mm Mitutoyo make Model 500-197-30 or equivalent as approved by Engineer	Nos	12,872	0	1	12872	0	12872
<b>Total for Tools &amp; Plants (OHE &amp; PSI)</b>						<b>615887.7</b>		<b>615887.7</b>

**Quantity Schedule of Electrical wiring and Other General Electrical works in C/w Proposed Maruti Siding**

**Schedule-2 , Section -1**

<b>S NO.</b>	<b>ITEM Discription</b>	<b>Item Code</b>	<b>Item Qty</b>	<b>Qty Unit</b>	<b>Unit Rate (Rs)</b>	<b>Amount</b>
<b>NS 1- Recessed/Surface conduit wiring system - Supply of material and wiring of LP/TP/FP/Ex.Fan point and other point with 1.5 sqmm PVC single core multistranded copper wire insulated concealed in stone/brick masonry wall in19/20 mm PVC conduit with 1.5sqmm PVC wire insulated copper for earth wire 1-way/2-way switch 5/6A as required and good quality of ceiling rose including connection(with modular switch,socket &amp; ceiling rose) As per specification.</b>						<b>Amount</b>
1	Recessed/Surface conduit wiring system - Supply of material and wiring of LP/TP/FP/Ex.Fan point and other point with 1.5 sqmm PVC single core multistranded copper wire insulated concealed in stone/brick masonry wall in19/20 mm PVC conduit with 1.5sqmm PVC wire insulated copper for earth wire 1-way/2-way switch 5/6A as required and good quality ceiling rose including connection(with modular switch,socket & ceiling rose) As per specification.	1	260	Numbers	353.59	91933.40
<b>NS 2- Supply and fixing 5/6Amp plug,(modular 5-pin 230V socket) including modular switch and with modular board and wiring with 2.5 sqmm PVC CU cable as per spec.</b>						
2	Supply and fixing 5/6A plug,modular 5-pin 230V socket including modular switch and with modular board and wiring with 2.5sqmm PVC CU cable as per spec.	2	120	Numbers	212.00	25440.00
<b>NS 3- Supply and fixing 15/16Amp plug, (modular 5-pin 230V power socket) including modular switch and with modular board and wiring with 04.0 sqmm PVC CU cable as per spec.</b>						
3	Supply and fixing 15/16A plug, modular 5-pin 230V socket including modular switch and with modular board and wiring with 04.0 sqmm PVC CU cable as per spec.	3	55	Numbers	234.51	12898.05
<b>NS 4- Supply and fixing 2 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.</b>						
4	Supply and fixing 2 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.	4	55	Numbers	91.14	5012.70
<b>NS 5 - Supply and fixing 4 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm,good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.</b>						
5	Supply and fixing 4 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.	5	80	Numbers	125.96	10076.8
<b>NS 6- Supply and fixing 8 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm, good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.</b>						
6	Supply and fixing 8 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm good quality and standerd size ,concealed fixing of MS /PVC as per site engineer. As per specification.	6	42	Numbers	217.10	9118.20
<b>NS 7- Supply and fixing 12 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thicness 2/3 mm, good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.</b>						
7	Supply and fixing 12 module modular switch board plate for fixing of modular switches -plug with GI sheet metal box of thickness 2/3 mm ,good quality and standerd size ,concealed fixing of MS /PVC as per site engineer.	7	25	Numbers	233.5	5837.25
<b>NS 8- Supply, laying, connection and commission of sub- main 2x2.5 Sqmm with PVC insulated single core copper conductor cable and same size(2.5 Sqm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI marked PVC conduit in recessed/ on surface as per site requirement and As per specification.</b>						
8	Supply, laying, connection and commission of sub- main 2x2.5 Sqmm with PVC insulated single core copper conductor cable and same size(2.5 Sqm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification..	8	1400	meter	70.90	99260.00
<b>NS 9- Supply, laying, connection and commission of sub- main 2x4 Sqmm with PVC insulated single core copper conductor cable and same size(4 sqmm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.</b>						
9	Supply, laying, connection and commission of sub- main 2x4 Sqmm with PVC insulated single core copper conductor cable and same size(4 sqmm) PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.	9	800	Meter	118.49	94792.00
<b>NS 10- Supply, laying, connection and commission of sub- main 2x6 Sqmm with PVC insulated single core copper conductor cable and same size PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.</b>						
10	Supply, laying, connection and commission of sub- main 2x6 Sqmm with PVC insulated single core copper conductor cable and same size PVC insulated copper conductor for earthing wire in 19/20 mm ISI PVC conduit in recessed/ on surface as per site requirement and As per specification.	10	600	Meter	120.00	72000.00
<b>NS 11- Supply,installation ,testing and connection of 1200/1400mm ceiling fans ISI marked 5 star rated reputed make and as per specification.</b>						
11	Supply,installation ,testing and connection of 1200/1400mm ceiling fans ISI marked 5 star rated.	11	50	Numbers	1271.93	63596.50
<b>NS 12- Supply and fixing of ceiling fan regulator electronic type 5-step (modular type) as per specification.</b>						
12	Supply and fixing of ceiling fan regulator electronic type 5-step(modular type) as per specifications.	12	50	Numbers	344.10	17205.00
<b>NS 13 - Supply of 4 Core 16 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988 or latest 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable as per specification.</b>						
13	Supply of 4 Core 16 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable.	13	1500	Numbers	209.25	313875.00
<b>NS 14- Supply of 4 Core 35 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1)1988 or latest 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable and s per specification.</b>						
14	Supply of 4 Core 35 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable.	14	1000	Numbers	360.0	360000.00

<b>NS 15- Supply of 4 Core 70 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988 or latest 1.1 KV grade LT XLPE insulated armoured cable and as per specification.</b>						
15	Supply of 4 Core 70 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable.	15	4200	Meter	643.5	2702700.00
<b>NS 16- Supply of 4 Core 120 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured cable as per specification.</b>						
16	Supply of 4 Core 120 Sqmm PVC/XLPE Armoured Cable with Aluminium Conductor 650/1100 V grade conforming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured,aluminium conductor cable.	16	500	Numbers	997.5	498750.00
<b>NS 17- Supply and laying of HDPE pipe conforming to IS 4984:1995, 75/80 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.</b>						
17	Supply and laying of HDPE pipe conforming to IS 4984:1995, 75/80 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification	17	2000	Meter	86.90	173800.00
<b>NS 18- Supply and laying of HDPE pipe conforming to IS 4984:1995, 50 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.</b>						
18	Supply and laying of HDPE pipe conforming to IS 4984:1995, 50 mm dia wall thickness 3 mm PN-4 under the road/air. The work involves laying of HDPE pipe. As per specification.	18	3200	Meter	88.89	284448.00
<b>NS 19- Supply and laying of HDPE pipe, dia 160mm(OD) under road/ground/ floor/railway track or as per site requirement already excavated trench. Wall the material grade PE-80 and class of pipe should be PN-4 IS-4984/1995 thickness between 6.2mm to 7.1 mm As per specification.</b>						
19	Supply and laying of HDPE pipe, dia 160mm under road/ground/ floor/railway track or as per site requirement already excavated trench. As per specification.	19	300	Meter	450.47	135141.00
<b>NS 20- Supply and fixing of 50mm internal dia G.I. pipe medium " B " class as per IS 1239 for cable laying with pole/wall/under road/floor As per specification.</b>						
20	Supply and fixing of 50mm dia G.I. pipe medium B class for cable laying. As per specification	20	45	Meter	217.77	9799.65
<b>NS 21- Laying of LT/HT cables in Air/pipe/cable tray/trench etc. with suitable fixing arrangement and As per specification.</b>						
21	Laying of LT/HTcables in Air/pipe/cable tray/trench etc. As per specification.	21	7500	Meter	19.80	148500.00
<b>NS 22- Excavation &amp; Refilling of trench of size 0.5 mtr wide x 1.2 mtr deep as per specification. trench work may be on kuchha/pucca land and all type of soil as per site requirement and without protective layer of brick. Surface of trench shall be made good in all respect and satisfaction of site engineer includes suitable protection of loop cable and As per specification.</b>						
22	Excavation & Refilling of trench of size 0.5 mtr wide x 1.2 mtr deep as per specification. trench work may be on kuchha/pucca land and all type of soil as per site requirement and without protective layer of brick. Surface of trench shall be made good in all respect and satisfaction of site engineer includes suitable protection of loop cable and As per specification.	22	5200	Metre	117.69	611988.00
<b>NS 23- Supply, fixing &amp; commissioning of 300 mm sweep ISI marked exhaust fan with louver shutter. As per specification.</b>						
23	Supply, fixing & commissioning of 300 mm sweep ISI marked exhaust fan with louver shutter. As per specification.	23	30	Numbers	1166.91	35007.30
<b>NS 24- Supply and fixing of Double Door MCB TPN DB 8 mdules 4 row,neutral and earth link,with one no four pole MCB 40 amp, one no FP RCCB 40 amp 30 mA and twenty four no SP MCB 40/32/25/16/10/6amp. 'C' series.Breaking capacity notless than 10 kA. MCB,RCCB and DB should be as per tech spec. and of same make.</b>						
24	Supply and fixing of Double Door MCB TPN DB 8 mdules 4 row,neutral and earth link,with one no four poleMCB 40 amp, one no FP RCCB 40 amp 30 mA and twenty four no SP MCB 40/32/25/16/10/6amp. 'C' series	24	5	Numbers	16345.62	81728.10
<b>NS 25- Supply and fixing of Double Door MCB DB SP 12 way (10+ 2 module),neutral and earth link,with one no DP MCB 40amp, one no DP RCCB 40 amp 30 mA and eight no SP MCB 32/25/16/10/6 amp. 'C'series. Breaking capacity not less than 10 kA. MCB, RCCB and DB should be as per tech spec. and of same make.</b>						
25	Supply and fixing of Double Door MCB DB SP 12 way (10+ 2 module),neutral and earth link,with one no DP MCB 40amp, one no DP RCCB 40 amp 30 mA and eight no SP MCB 32/25/16/10/6 amp. 'C'series	25	4	Numbers	7438.01	29752.04
<b>NS 26- Supply, fixing, testing and commissioning of 22 W Energy efficient LED tubular lamp four feet with its driver and Luminaire of CRCA steel sheet enclosure , IP-20 for indoor application, operating voltage (140-270)V, minimum 2000 Lumens, color temperature 6500°K, CRI&gt;65, as per specification of reputed make and as per tech spec.</b>						
26	Supply, fixing, testing and commissioning of 22 W Energy efficient LED tubular lamp four feet with its driver and Luminaire of CRCA steel sheet enclosure , IP-20 for indoor application, operating voltage (140-270)V, minimum 2000 Lumens, color temperature 6500°K, CRI>65 of reputed make..	26	140	Numbers	611.14	85559.60
<b>NS 27- Supply,Transportation,erection,testing,Installation &amp; commissioning of self contained drinking water cooler with all connected standard fitting,accessories etc and 5 Kva wall mounted IC controlled electronic auto voltage corrector with time delay relay. Supply and erection of earth electrode and connection to earthing system etc as required.</b>						
27	Supply,Transportation and Installation of water cooler 150 ltrs. With all connected standerd fitting and accessories.	27	2	Numbers	80805.73	161611.46
<b>NS 28- Supply, fabrication, erection, testing and commissioning of G.I. octagonal pole 6 meters long with top dia 70 mm, bottom dia 130 mm, base plate size 220x220x12mm and sheet thickness 3 mm , single arm/double arm suitable for street light fixture including digging of pit, making foundation and muffing with cement, concrete ratio M-20 as relevant IS code and As per specification.</b>						
28	Supply, fabrication, erection, testing and commissioning of G.I. octagonal pole 6 meters long with top dia 70 mm, bottom dia 130 mm, base plate size 220x220x12mm and sheet thickness 3 mm , single arm/double arm suitable for street light fixture including digging of pit, making foundation and muffing with cement, concrete ratio M-20 As per specificationAs per specification.	28	40	Numbers	11434.00	457360.00
<b>NS 29- Supply, fixing and commissioning of street light fitting accessories i.e. GI pipe of suitable bore/size as per fitting, clamps, nuts, bolts, cable/wire etc. as per site Engineer. As per specification.</b>						
29	Supply, fixing and commissioning of street light fitting accessories i.e GI pipe of suitable size.	29	30	Numbers	142.85	4285.50
<b>NS 30- Supply,Erection,testing &amp; commissioning of 40 Watt LED Energy efficient LED based street light fitting with pressure die cast aluminium housing with driver &amp; suitable fixing arrangement, IP-65 for outdoor application, operating voltage (140-270)V, System efficacy more than 100 lm/W, color temperature 6500K, CRI&gt;65, of reputed make as per reference list and as per tech specification.</b>						
30	Supply,Erection,testing & commissioning of 40 Watt LED Energy efficient LED based street light fitting with pressure die cast aluminium housing with driver & suitable fixing arrangement, IP-65 for outdoor application, operating voltage (140-270)V, System efficacy more than 100 lm/W, color temperature 6500K, CRI>65, of reputed make and as per tech.	30	70	Numbers	4041.05	282873.50

<b>NS 31- Supply, fixing testing and commissioning of (OFF delay) modular digital timers for operation of platforms and circulating area street light. As per specification.</b>						
31	Supply, fixing testing and commissioning of (OFF delay) modular digital timers for operation of platforms and circulating areas, street light. As per specification.	31	2	Numbers	5059.61	10119.22
<b>NS 32- Supply, fixing, testing and commissioning of Supply, testing and commissioning of feeder pillar of size 900x600x300 mm and bus bar capacity 200 Amp 3 phase and neutral with box. As per specification</b>						
32	Supply, fixing, testing and commissioning of Supply, testing and commissioning of feeder pillar of size 900x600x300 mm and bus bar capacity 200 Amp 3 phase and neutral with box. As per specification.	32	5	Numbers	3586.04	17930.20
<b>NS 33- Drilling of horizontal bore below Rly track or in all types of soil / rock by pushing method for laying of HDPE/SPUN/DWC/CI/GI pipe of various sizes up to 450 mm dia. As per Specification.</b>						
33	Drilling of horizontal bore below Rly track or in all type od soil by pushing method for laying of HDPE/SPUN/DWC/CI/GI pipe of various sizes up to 450 mm dia. As per Specification	33	350	Meter	2788.83	976090.50
<b>NS 34- Supply installation Testing &amp; Commissioning of rechargeable batten type Emergency light, 60 LEDs 4 watt or higher with one hour minimum backup make as per reference list. As per specification.</b>						
34	Supply installation Testing & Commissioning of rechargeable batten type Emergency light 60 LED 4 watt or higher with one hour minimum backup.	34	20	Numbers	2720.28	54405.60
<b>NS 35- Supply / preparing of drawing in AutoCAD (Original + 2 copies) showing electrical installation being done through this contract for station/ yard and As per specification.</b>						
35	Supply / preparing of drawing in AutoCAD (Original + 2 copies) showing electrical installation being done through this contract for station/ yard As per specification	35	2	Numbers	3418.03	6836.06
<b>NS-36 Supply, installation, testing and commissioning of Single sided LED signage board with pictogram/symbol. As per specification.</b>						
36	Supply, installation, testing and commissioning of single sided LED signage board with symbol. As per specification.	36	80	Square Foot	2018.28	161462.40
<b>NS 37- Supply, installation, testing and commissioning of double sided LED signage board with pictogram/symbol. As per specification.</b>						
37	Supply, installation, testing and commissioning of double sided LED signage board with symbol. As per specification.	37	88	Square Foot	2503.21	220282.48
<b>NS 38- Supply and fixing of Rubber mat (ISI marked) nonstick type suitable for 11 kv AC size 2000x1000x25mm. As per specification.</b>						
38	supply and fixing of Rubber mat (ISI marked) nonstick type suitable for 11 kv AC size 2000x1000x25mm. As per specification.	38	8	Numbers	900.85	7206.80
<b>NS 39- Supply, installation, testing and commissioning of LT neat shrinkable straight through joint with required accessories complete in all respect suitable for LT XLPE 4 core cable as per site requirement.make as per reference list. complete work will be as per instruction and satisfaction of HRIDC site engineer and as per specification.</b>						
39	Supply, installation, testing and commissioning of LT heat shrinkable straight through joint. As per specification.	39	3	Numbers	1947.99	5843.97
<b>NS 40- Supply and erection of MS cable route marker of size not less than 200x150x3mm thick M.S.Plate. for HT / LT Elect. underground cable as per Drawing and specification.</b>						
40	Supply and erection of MS cable route marker of size not less than 200x150x3mm thick M.S.Plate. for HT / LT Elect.	40	50	Numbers	402.00	20100.00
<b>NS 41- Dismantling of Rail/cable tray Pole &amp; Over head line, EFT's, cable tray complete, As per specification.</b>						
41	Dismantling of Rail/cable tray Pole & Over head line, EFT's, cable tray complete, As per specification.	41	20	Numbers	500.53	10010.60
<b>NS 42- Supply, installing,testing andcommissioning earth electrode complete in all respect with perforatedGI pipe medium "B" class (Blue) confirmingto IS 1239 part-I length of 3 mtr., bore50mm with all accessories like nut bolt, reducer nipple, wire meshed funnel and CC finished chamber covered by CI/RCC frame etc. Digging pit and refilling it with charcoal and salt in successive layers and connection with 8 SWG GI wire and as per IS:3043 and drawing and testing of earth resistance as reqd.</b>						
42	Supply, installing,testing andcommissioning earth electrode complete in all respect with perforatedGI pipe medium "B" class (Blue) confirmingto IS 1239 part-I lengthof 3 mtr., bore50mm with all accessories like nut bolt, reducer nipple,wire meshed funnel and CC finished chambercovered by CI/RCC frame etc.	42	10	Numbers	1127.18	11271.80
<b>NS 43- Design,manufacture,Supply,testing ,erection and commissioning of indoor type LT PANEL ,Medium voltage switch board front operated type will have digital ammeter,voltmeter,multifunction energy meter of reputed make on all the main and 3 phase.LED type indication lamps on all the mains,digital ammeter &amp; 3 phase flush type mounted electronic energy meter counter display in every outgoing MCCB's copper bus bar and accessories as per spec with following features. (A) incoming 2x250 amp 4 pole MCCB's with change over provision (if required) with microprocessor release having integral overload,short circuit, earth fault and neutral protection and breaking capacity 60 KA (Ics=100%Icu). (B)outgoing 2x125 amps, 2x100 amps and 2x63 amp 4 poles MCCB's with adjustable overload and adjustable short trip unit and breaking capacity 36KA (Ics=100%Icu).the panel is to be provided with over voltage protection with suitable relay. work includes formation for panel foundation and other civil work with suitable trench up to the satisfaction of the site engineer(technical specification enclosed). panel shall be manufactured from CPRI tested firm.all the material should be of reputed make and as per tech spec.General arrangement, single line diagram and technical detail (make &amp; model no)of the equipment and electrical accessories to be used in panel shall be supplied by the successful tenderer for approval of HRIDC OFFICERS and record before fabrication of panel.copies of test certificates for switch gers and original routines test along with factory inspection report of panel for approval and acceptance of panel.</b>						
43	Design,manufacture,Supply installation ,testing and commissioning of LT panel as per specification. It consist of two separate incoming 4 Pole 250 Amp MCCB 60 KA(Ics100%Icu) with chngover provision(if required) and 02 nos,O/P of 63 Amp, 2 nos O/P of 100 amp and 02 nos O/P of 125 amp MCCB's as per specification.	43	1	Numbers	157841.00	157841.00
<b>NS 44- Supply, erection, testing and commissioning of phase change over distribution board (phase selector box) size 610x450x190 mm fabricated from 1.6mm thick CRCA sheet power coated with 01 no 100 Amp FP MCCB at the incomer and 01 no 100 amp SPN MCCB as outgoing and 01 no 63 amp phase selector switch with multi LED indication lamps &amp; by pass arrangement. As per specification.</b>						
44	Supply, erection, testing and commissioning of phase change over distribution board (phase selector box) size 610x450x190 mm fabricated from 1.6mm thick CRCA sheet power coated with 01 no 100 Amp FP MCCB at the incomer and 01 no 100 amp SPN MCCB as outgoing and 01 no 63 amp phase selector switch with multi LED indication lamps & by pass arrangement	44	1	Numbers	9688.00	9688.00
<b>NS 45- Supply and fixing of PVC cable duct 40 x 60 (w x h) slot greenish gray of standard make As per specification.</b>						
45	Supply and fixing of PVC cable duct 40 x 60 (w x h) slot greenish gray of standard make As per specification.	45	600	Meter	90.02	54012.00

<b>NS 46- Arrangement of electrification of gunties at the time of NI work . As per specification.</b>						
46	Arrangement of electrification of gunties at the time of NI work. As per specification.	46	1	Numbers	19361.75	19361.75
<p><b>NS 47- Supply erection, testing and commissioning of 30 mtrs high mast tower/shaft totally hot dip galvanized and suitable for wind velocity as per IS 875 part-3. system with the help of suitable equipment including accessories , control panel housing suitable timer contactor circuit for automatic ON &amp; OFF of the mast lights at a pre-set time high mast system Each high mast shall also have 12 Nos Light Arrangement and one twin dome led based aviation obstruction light with 2 nos 30-50 w lamp similar to BJAOL-2 suitable for luminaires NOTE:- Accessories includes 3 point suspension head frame steel wire rope of suitable dia double drum winch galvanised lantern carriage &amp; other arrangement for each high mast shall have one feeder pillar box as per specification Control panel includes the control circuit for lowering/ raising operation of mast integral detachable power tool with motor including torque limiter time switch and lighting final including lines required for switching .</b></p> <p><b>Design/casting of shallow foundation of mast /panel shall be with M-20 concrete. Considering safe soil bearing capacity at site as 10T/SQ MTR at 2 mtr depth. Foundation bolt, nuts washers anchors plate templates should be made of spl steel Amendment/ modification may be done as per site/tech specification requirement to the satisfaction of HRIDC representative at the cost of firm as per tech specification ,ISS/IE rules and site requirement Make Philips,GE, Bajaj, C&amp;G or eqvt approved make.</b></p>						
47	Supply, erection, testing and commissioning of 30 M high mast tower/shaft with help of Suitable equipment including Accessories,control panel,12 Nos light arrangement,1 twin domw aviation obstruction light with 2 nos 30-50 watt lamp Note: Accessories includes 3 point suspension head frame steel wire rope of suitable dia double drum winch galvanised lantern carriage & other arrangement for each high mast shall have one feeder pillar box as per specification Control panel includes the control circuit for lowering/ raising operation of mast integral detachable power tool with motor including torque limiter time switch and lighting final including lines required for switching . Design/casting of shallow foundation of mast /panel shall be with M-20 concrete . Considering safe soil bearing capacity at site as 10T/SQ MTR at 2 mtr depth . Foundation bolt, nuts washers anchors plate templates should be made of spl steel Amendment/ modification may be done as per site/tech specification requirement to the satisfaction of rly representative at the cost of firm as per tech specification .ISS/IE rules and site requirment Make Philips,GE, Bajaj, C&G or eqvt approved make	47	17	Job	454382.4	7724500.63
<p><b>NS 48- Laying of cable undre the road/Railway track recessing in platform /wall along with Railway Track. in laid HDPE /GI pipe as required 1.1 KV grade LT XLPE insulated armored, aluminum conductor cable including making chase &amp; plastering after laying of cable/digging of cable trench, sand cushioning, protective covering with second class bricks, provision of cable route marker as per tech. spec. including end terminations with Al. Crimping socket/lugs testing and commissioning of following sizes. NOTE:- I) All cable connection shall be made with proper size of crimping socket /grandest by the contractor at his own cost and labour ii) Road/floor where cable is to be laid shall be made good as original by the firm at his own cost and to the satisfaction of HRIDC Engineer.</b></p>						
48	Laying of cable undre the road/Railway track,recessing in platform /wall along with Railway Track. in laid HDPE /GI pipe as required 1.1 KV grade LT XLPE insulated armored, aluminum conductor cable including making chase & plastering after laying of cable/digging of cable trench, sand cushioning, protective covering with second class bricks, provision of cable route marker as per tech. spec. including end terminations with Al. Crimping socket/lugs testing and commissioning of following sizes. NOTE:- I) All cable connection shall be made with proper size of crimping socket /grandest by the contractor at his own cost and labour ii) Road/floor where cable is to be laid shall be made good as original by the firm at his own cost and to the satisfaction of HRIDC engineer.	48	200	Meter	48.53	9706.00
<p><b>NS 49- Supply, fixing, testing and commissioning of LED type flood light luminaries wattage 400 Watt made up of pressure die cast housing and heat sink in aluminium extrusion with IP- 66 protection as per CEE/NR/121-Elect/PS/2018 (Rev-03) dt 28/06/18 &amp; CEE/NR/121- Elect/PS/2019(Rev-04) dt 04 /11/19 or latest specification and as per site requirement. Guarantee five years from date of commissioning and as per specification.</b></p>						
49	Supply, fixing, testing and commissioning of LED type flood light luminaries wattage 400 Watt made up of pressure die cast housing and heat sink in aluminium extrusion with IP- 66 protection as per CEE/NR/121-Elect/PS/2018 (Rev-03) dt 28/06/18 & CEE/NR/121- Elect/PS/2019(Rev-04) dt 04 /11/19 or latest specification and as per site requirement. Guarantee five years from date of commissioning and as per specification.	49	204	Numbers	22250.00	4539000.00
<b>NS 50- SITC of mono-block submersible pump 2.0 HP complete with all assesaries in all respect. As per specification.</b>						
50	SITC of mono-block submersible pump 2.0 HP complete in all respect. As per specification.	50	2	Numbers	13294.87	26589.74
<b>NS 51- Supply and fixing of MS Jali 1"x1" welded on MS angle .As per specification.</b>						
51	Supply and fixing of MS jali 1"x1" welded on MS angle .As per specification.	51	250	Kg	56.95	14237.50
<b>NS 52- Supply &amp; fixing of G.I. pipe 50 MM dia B class with flanges, sockets and welding as per IS 1239 for delivery pipe. As per specification.</b>						
52	Supply & fixing of G.I. pipe 50 MM dia B class with flanges, sockets and welding as per IS 1239 for delivery pipe. As per specification.	52	30	Meter	204.12	6123.60
<b>NS 53- Supply and fixing pipe fitting bends, sockets, flanges, delivery valve, Non Return valve and supporting clamps (2 set). As per specification.</b>						
53	Supply and fixing pipe fitting bends, sockets, flanges, delivery valve, Non Return valve and supporting clamps (2 set). As per specification.	53	2	Numbers	3654.70	7309.40
<b>NS 54- Supply, fixing, testing, commissioning of 3 core 6.00 Sq.mm. size PVC insulated PVC sheathed multi strand flat copper cable conductor. As per specification.</b>						
54	Supply, fixing, testing, commissioning of 3 core 6.00 Sq.mm. size PVC insulated PVC sheathed multi strand flat copper cable conductor. As per specification.	54	200	Meter	70.49	14098.00
<b>NS 55- Supply of Submersible mono block pump (150 mm dia) 5 HP, 415 V. Complete with accessories at site. As per specification.</b>						

55	Supply of Submersible mono block pump (150 mm dia) 5 HP, 415 V. as per spec.	55	2	Numbers	19866.69	39733.38
<b>NS 56- Supply, fixing, testing and commissioning of automatic control panel with DOL starter for 5 HP three-phase pump including connections and providing cable from main board to control. As per specification.</b>						
56	Supply, fixing, testing and commissioning of automatic control panel with DOL starter for 5 HP three-phase pump including connections and providing cable from main board to control.As per specification.	56	2	Numbers	10106.21	20212.42
<b>NS 57- Lowering, testing and commissioning of monoblock submersible pump set. As per specification.</b>						
57	Lowering, testing and commissioning of horizontal monoblock submersible pump set. As per specification.	57	2	Numbers	1472.26	2944.52
<b>NS 58- Supply, installation, testing and commissioning of 32 Amp. SPN DP MCB, 10 kA, 'C' series with metal enclosure. As per specification.</b>						
58	Supply, installation, testing and commissioning of 32 Amp. SPN DP MCB, 10 kA, 'C' curve with metal enclosure. As per specification.	58	10	Numbers	1470.82	14708.20
<b>NS 59- Supply,Fixing, testing &amp; commissioning of 1.5 Ton heavy duty Split inverter type Airconditionar with including petty hardwares, gas charging along with the cost of refrigerant with LCD display cordless remote , 5 star rating suitable for 1 phase, 230 Volts &amp; IC controlled electronic auto voltage corrector.</b>						
59	Supply,Fixing, testing & commissioning of 1.5 Ton heavy duty Split Airconditionar with including petty hardwares, gas charging along with the cost of refrigerant with LCD display cordless remote , 5 star rating suitable for 1 phase, 230 Volts & IC controlled electronic auto voltage corrector.	59	15	Numbers	56990.00	854850.00
<b>NS 60- Supply and fixing of Metal Clad Plug Socket 20A single phase with 32A MCB including fixing and sheet metal enclosure box with one 20A plug top (Ray roll type) to be supplied with board as per spec . As per specification.</b>						
60	Supply and fixing of Metal Clad Plug Socket 20A single phase with 32A MCB including fixing and sheet metal enclosure box with one 20A plug top (Ray roll type) to be supplied with board as per spec . As per specification.(Item Directory - Not Applicable)	60	35	Set	915.55	32044.25
<b>NS 61- Supply, fixing, testing and commissioning of storage geyser 25 liter capacity from reference list. The geyser shall be 5 star rated or above . As per specification.</b>						
61	Supply, fixing, testing and commissioning of storage geyser 25 liter capacity from reference list. The geyser shall be 5 star rated or above. As per specification.	61	5	Numbers	3651.76	18258.80
<b>NS 62- Supply, installation, testing and commissioning of 100 LPD solar water heating system with evacuated tube collector and wire mesh cover, insulated hot water stainless steel tank, air vent and drainage, interconnections, circulating piping in between the system, collectors and hot water tank stand, control valve, temperature gauge and other accessories and electrical back up as per technical specification &amp; MNRE approved.</b>						
62	Supply, installation, testing and commissioning of 100 LPD solar water heating system with evacuated tube collector.	62	4	Numbers	23056.03	92224.12
<b>NS 63- Supply and fixing of cold 3/4 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps etc. complete Material should be of good quality of reputed make and as per Tech. Spec.</b>						
63	Supply and fixing of cold 3/4 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps etc. complete. Material should be of good quality of reputed make and as per Tech. Spec.	63	40	Meter	136.87	5474.80
<b>NS 64- Supply and fixing of 50 mm thick rock wool insulated hot water 1 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps, wire mesh and aluminum cladding with self tapping cocks. Material should be of good quality of reputed make and as per Tech. Spec.</b>						
64	Supply and fixing of 50 mm thick rock wool insulated hot water 1 inch dia. pipe line GI "B" class ISI marked with GI fittings, gun metal brass valve and clamps, wire mesh and aluminum cladding with self tapping cocks. Material should be of good quality of reputed make and as per Tech. Spec.	64	40	Meter	348.32	13932.80

<b>NS 65- Supply, fixing, testing and commissioning of cold water tank with gun metal brass valves . Stand and full bottom 's support for 200 Ltrs. Tank. As per specification.</b>						
65	Supply, fixing, testing and commissioning of cold water tank with gun metal brass valves. Stand and full bottom 's support for 200 Ltrs. Tank. As per specification.	65	4	Meter	1803.73	7214.92
<b>NS 66- Supply, installation,testing and commissioning of 125 KVA Capacity radiator cooled Silent DG Set with AMF panel and Complete with all accessories like-exhaust fan system, diesel engine, capable of delivering continuous power output at 3 phase 4 wire 415 Volts AC Supply with control panel, electronic energy meter, digital Ammeter, Voltmeter, Power factor meter, Digital frequency meter, clustered LED Type indication light, cable glands, earthing terminal maintenance free battery set mounted on wooden frame and plank, Anti-Vibration pad and all other accessories equipment, protective device, Exhaust fan shall be installed as per latest CPCB norms. as per specification.</b>						
66	Supply, installation, testing,commissioning of 125 KVA Capacity radiator cooled Silent DG Set with AMF panel and Complete with exhaust fan system, diesel engine, capable of delivering continuous power output at 3 phase 4 wire 415 Volts AC Supply with control panel, electronic energy meter, digital Ammeter, Voltmeter, Power factor meter, Digital frequency meter, clustered LED Type indication light, cable glands, earthing terminal maintenance free battery set mounted on wooden frame and plank, Anti-Vibration pad and all other accessories equipment, protective device, Exhaust fan shall be installed as per latest CPCB norms.	66	0	Numbers	885000.00	0.00
<b>NS 67- Supply and providing of Maintenance Free Earthing with primary MS conductor 40 mm dia 3000 mm long and secondary MS Electrode 80 mm dia 3000 mm long including digging pit of size 5ft.x5ft.x10ft. and using earth enhancement chemical compound minimum 75 kg. Per pit suitable for 40 KA current capacity and as per RDSO specification No. RDSO/PE/SPEC/PS/0109(REV-0)-2008</b>						
67	Supply and providing of Maintenance Free Earthing with primary MS conductor 40 mm dia 3000 mm long and secondary MS Electrode 80 mm dia 3000 mm long including digging pit of size 5ft.x5ft.x10ft. and using earth enhancement chemical compound minimum 75 kg. Per pit suitable for 40 KA current capacity and as per RDSO specification No. RDSO/PE/SPEC/PS/0109(REV-0)-2008	67	5	Numbers	18969.1	94845.50
<b>NS 68- Supply of material,fabrication ,insalltion and commissioning of rolling in Examination light MS box of suitable dimension comprising of sheet steel 1.6 mm thick,60 micron power coating -gray shed, gland plates neoprene EDPM/rubber gasket padlock arrangement,zinc passivated earth bolt canopy etc.all the material should be good quality.</b>						
68	Supply of material,fabrication insalltion and commissioning of rolling in Examination light MS box of suitable dimension comprising of sheet steel 1.6 mm thick 60 micron power coating -gray shed, gland plates neoprene EDPM/rubber gasket padlock arrangement.Zinc passivated earth bolt canopy etc.all the material should be good quality.	68	15	Numbers	4914.64	73719.60
<b>NS 69- Supply,Fixing, testing &amp; commissioning of LED light 30 Watt pressure dia cast housing and heat sink in aluminium extrusion with IP-66 protection suitable for rolling examination MS box to work on 220-240 V AC supply.</b>						
69	supply,fixing testing and commissioning of LED light 30 watt suitable for rolling light examination box.	69	30	Numbers	1500.0	45000.00
<b>NS 70- Supply, fixing, testing and commissioning of recess mounted LED foot/step light fitting indirect type, complete with driver and all accessories, operating voltage 230 VAC model no. PE-12-D-L-5X00B of Pyrotech or similar of reputed make and as per tech. spec.</b>						
70	Supply, fixing, testing and commissioning of recess mounted LED foot/step light fitting indirect type, complete with driver and all accessories, operating voltage 230 VAC model no. PE-12-D-L-5X00B of Pyrotech or similar of reputed make and as per tech. spec	70	12	Numbers	1430.93	17171.16
<b>NS-71 Supply &amp; fixing of flexible stand type LED reading bed side light fitting of suitable watt having adjustable movement for reading in a finished used on/off switch complete with LED lamp. .</b>						
71	Supply & fixing of flexible stand type LED reading bed side light fitting of suitable watt having adjustable movement for reading in a finished used on/off switch complete with LED lamp. .	71	20	Numbers	671.46	13429.20
<b>NS 72- Supply and fixing of junction box size 390x305x170mm comprising of SMP/FRP material with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. similar to Sintex model no. GSJB 3525 or similar with 4 no. aluminium busbar cap 200 Amp., suitable for 415 volt supply requirement. The box shall be fixed robustly with clamps at pole wall as per requirement. All the material should be of good quality and as per tech. spec.</b>						
72	Supply and fixing of junction box size 390x305x170mm comprising of SMP/FRP material with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. similar to Sintex model no. GSJB 3525 or similar with 4 no. aluminium busbar cap 200 Amp., suitable for 415 volt supply requirement.	72	10	Numbers	2406.0	24060.00
<b>NS 73- Supply,fixing and installation of perforated cable Tray of size 300x75 mm made out of MS sheet and hot dip galvanized (85 microns) 2 mm thick. All the material should be of good quality and satisfaction of HRIDC Officers.</b>						
73	Supply ,fixing and installtion of Perforated Cable Tray of size 100x50 mm made out of MS sheet and hot dip galvanized (85 microns) 1.6 mm thick with suitable fixing Arrangement.	73	1800	Meter	1346.0	2422800.00
<b>NS 74- Supply ,fixing and installtion of Perforated Cable Tray of size 150x50 mm made out of MS sheet and hot dip galvanized (85 microns) 1.6 mm thick. All the material should be of good quality and satisfaction of HRIDC Officers.</b>						
74	Supply ,fixing and installtion of Perforated Cable Tray of size 150x50 mm made out of MS sheet and hot dip galvanized (85 microns) 1.6 mm thick with suitable fixing Arrangement.	74	1200	Meter	653.0	783600.00
<b>NS-75 Supply, erection, testing &amp; commissioning of control and distribution panel for colour light signalling for 5 to 25 kva AT supply in 25 kV AC traction system as per RSDO technical specifications No.TI/SPC/PSI/CLS/ 0020 (12/02) With A&amp;C slips No. 1 to 4 or latest, connections as required.</b>						
75	Supply, erection, testing & commissioning of control and distribution panel for colour light signalling for 5 to 10 kva AT supply in 25 kV AC traction system as per RSDO technical specifications No.TI/SPC/PSI/CLS/ 0020 (12/02) With A&C slips No. 1 to 4 or latest, connections as required.	75	2	Numbers	94590.0	189180.0



<b>NS -76 Supply,fixing commissioning ,installation and testing of 2 Kva pure sine wave 24 volt online inverter consist of intelligent battery charging mechnisum with adaptive battery chraging and 150 AH tubular battery of voltage 12 volt suitable for heavy duty application. warranty of inverter is 24 months and for Battery - 36 months. and as per specification.</b>						
76	Supply,fixing commissioning ,installation and testing of 2 Kva pure sine wave 24 volt online inverter consist of intelligent battery charging mechnisum with adaptive battery chraging and 150 AH tubular battery of voltage 12 volt suitable for heavy duty application. warranty of inverter is 24 months and for Battery - 36 months. and as per specification.	76	1	Numbers	40079.0	40079.0
<b>NS -77 Supply, installing,testing and commissioning earthing system complete in all respect with 600mmx600mmx8mm thick G.I earth plate, adding of charcoal or coke and salt,providing concrete enclosure and MS cover platewith lifting arrangement, watering pipe etc. as required and as per specification.</b>						
77	Supply, installing,testing and commissioning earthing system complete in all respect with 600mmx600mmx8mm thick G.I earth plate, adding of charcoal or coke and salt,providing concrete enclosure and MS cover platewith lifting arrangement, watering pipe etc. as required and as per specification.	77	30	Numbers	4202.0	126060.0
<b>NS-78 -Supply and laying 25mm x6mm G.I. strip for earth connection at not less than 0.50 meter below ground or in recess as required.</b>						
78	Supply and laying 25mm x6mm G.I. strip for earth connection at not less than 0.50 meter below ground or in recess as required.	78	110	Meter	86.0	9460.0
<b>NS-79 Supply and fixing of suitable GI angle for fixing support for cable tray with suitable foundation arrangement as per specification and satisfaction of site engineer.</b>						
79	Supply and fixing of suitable GI angle for fixing support for cable tray with suitable foundation arrangement as per specification and satisfaction of site engineer.	79	200	kg	111.00	22200.0
<b>NS-80 Supply of 4 Core 185 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured cable and as per specification.</b>						
80	Supply of 4 Core 185 Sqmm PVC/XLPE Insulated PVC outer sheathed Armoured Cable with Aluminium Conductor 650/1100 V grade confirming to IS 7098 (Part-1) 1988, 1.1 KV grade LT XLPE insulated armoured cable and as per specification.	80	300	Meter	1516.0	454800.0
<b>TOTAL</b>						<b>26386378.97</b>

**Abstract of 25 kV single Phase Overhead Equipment In C/w Electrification of Manesar- Patli Single Line Connectivity and Modification of Patli Yard HORC Line ( 10.3 TKM)**

Schedule 1		HIGH RISE OHE EQUIPMENT						
S N.	Sub-section	Supply	Percentage (%) above SOR Rates as per average of LAR	Amount	Erection	Percentage(%) above SOR Rates as per average of LAR	Amount	Grand Total Supply+Erection
1	Section-1	265631.00	145.11%	651088.14	202888.70	129.77%	466177.37	1117265.51
2	Section-2	1772114.00	231.65%	5877216.08	503129.00	211.08%	1565133.69	7442349.77
3	Section-3	12162617.39	160.06%	31630102.78	530522.41	141.45%	1280946.36	32911049.14
4	Section-4(a)	1293945.00	132.77%	3011915.78	197639.80	124.87%	444432.62	3456348.39
5	Section-4(b)	12948720.00	132.77%	30140735.54	0.00	0.00%	0.00	30140735.54
6	Section-5	1365808.42	158.38%	3528975.80	0.00	0.00%	0.00	3528975.80
7	Section-6 NS ITEMS							402700.16
<b>TOTAL</b>		<b>29808835.81</b>		<b>74840034.13</b>	<b>1434179.91</b>		<b>3756690.04</b>	<b>78999424.32</b>
8	<b>Grand Total (Including GST @18%)</b>							<b>78999424.32</b>
9	<b>Round Off</b>							<b>78999425.00</b>

**Quantity Schedule of OHE In C/w Electrification of Manesar- Patli Single Line Connectivity and Modification of Patli Yard HOREC Line ( 10.3 TKM)**

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 1 (GENERAL)**

This schedule shall be read in conjunction with its explanatory notes in tender document for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
1(a)	Preparation of designs and drawings for overhead equipment.	Track km.	0	9344	10.3	0.00	96,243.20	96,243.20
1(b)	Preparation of designs and drawings for switching stations (FP/SP/SSP)	Each	0	16051	1	0.00	16,051.00	16,051.00
5(a)(i)	Supply without insulator and erection of mounting arrangements for span wire.	Each	3199	434	3	9,597.00	1,302.00	10,899.00
8(a) (xii)	Marking/paintig of temperature & 'Y'- Measurement of OHE mast at BWA locations	Each	0	62	34	0.00	2,108.00	2,108.00
8(b)(i)	Supply without insulator and erection of material for termination of Single conductor of Over head equipment or terminating wire.	Each	2411	408	12	28,932.00	4,896.00	33,828.00
8(b) (iii)	Supply without Insulator and erection of material for termination of all aluminium 25KV Feeder / return conductor (Single SPIDER)	Each	3043	408	4	12,172.00	1,632.00	13,804.00
8(b) (vi)	Supply without insulator and erection of materials for termination of tramway type OHE (Regulated)	Each	1816	408	0	0.00	0.00	0.00
8(b) (ix)	Supply without insulator and erection of materials for termination of copper cross feeder with gantries.	Set	2895	408	5	14,475.00	2,040.00	16,515.00
9(dz)	Supply without insulator and erection of anti-creep with Cadmium copper catenary wire in polluted area	Each	2,792	1317	0	0.00	0.00	0.00
9(ez)	Supply without insulator and erection of anti-creep with Cadmium copper catenary wire suitable for tramway type OHE (Regulated) in polluted	Each	2,719	1317	0	0.00	0.00	0.00
<b>Page Total</b>						<b>65,176.00</b>	<b>1,24,272.20</b>	<b>1,89,448.20</b>

1	2	3	4	5	6	7	8	9
11(a)(i)	Supply without Insulator and erection of cut-in (9Tonne) Insulator	Each	688	283	12	8,256.00	3,396.00	11,652.00
11(a)(ii)	Supply without Insulator and erection of a suspension (9 Tonne) Insulator	Each	713	168	6	4,278.00	1,008.00	5,286.00
11(b)	Supply without Insulator and erection of 25 kV Post Insulator	Each	515	130	2	1,030.00	260.00	1,290.00
11(c)	Supply without Insulator and erection of 3 kV Disc Insulator	Each	922	132	0	0.00	0.00	0.00
11(d)	Supply without Insulator and erection of 11 kV Post Insulator	Each	133	108	0	0.00	0.00	0.00
17(b)	Extra for special embedment of earth electrode.	Each	0	679	0	0.00	0.00	0.00
18(a)	Supply & Erection of 25kV SF-6 Gas filled Interrupters	Each	2,05,019	1,913	0	0.00	0.00	0.00
18(b)	Supply & Erection of 25kV Vacuum type Interrupter	Each	1,73,491	1,913	1	1,73,491.00	1,913.00	1,75,404.00
19	Supply and Erection of 25kV Potential Transformers Type-I	Each	44,466	429	0	0.00	0.00	0.00
20(a)	Supply and Erection of 42KV Lightning Arrestors (station class)	Each	15,119	278	0	0.00	0.00	0.00
20(b)	Supply and Erection of 7.5 KV Lightning Arrestors	Each	705	145	0	0.00	0.00	0.00
21	Supply and Erection of Terminal Boards in control cubicles.	Each	5,061	204	0	0.00	0.00	0.00
22(a)	Supply and Erection of an Iron clad 110 V.D.C Fuse Box.	Each	1,593	47	0	0.00	0.00	0.00
22 (b)	Supply and erection of an Iron clad 230 V.A.C Fuse Box.	Each	1,762	47	0	0.00	0.00	0.00
23	Supply and Erection of Lead Acid Batteries.	Each	42,715	3,065	0	0.00	0.00	0.00
24	Supply and Erection of Battery chargers.	Each	41,587	418	0	0.00	0.00	0.00
25(a)	Supply and Installation of cables for Control and indication circuit	Metre	201	7	0	0.00	0.00	0.00
25(b)	Supply and Installation of cables for Heater supply	Metre	95	7	0	0.00	0.00	0.00
25(c)	Supply and Installation of cables for Catenary indication	Metre	137	7	0	0.00	0.00	0.00
25(d)	Supply and Installation of cables for L.T. Power supply	Metre	217	10	0	0.00	0.00	0.00
25(e)	Supply and Installation of cables for 110V D.C. supply	Metre	137	10	0	0.00	0.00	0.00
27(a)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (10 kVA).	Each	27,426	4,572	0	0.00	0.00	0.00
27(b)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (5 kVA).	Each	22,971	4,572	0	0.00	0.00	0.00
	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (25 kVA).	Each	93,611	4,572	0	0.00	0.00	0.00
<b>Page Total</b>						<b>1,87,055.00</b>	<b>6,577.00</b>	<b>1,93,632.00</b>

1	2	3	4	5	6	7	8	9
27(d)	Supply, Erection, oil- filtration, testing and commissioning of L.T. supply transformers (50 kVA).	Each	1,21,643	4,572	0	0.00	0.00	0.00
28	Supply without Insulator & erection of 25 kV D.O. fuse switch.	Each	4,934	239	0	0.00	0.00	0.00
29(a)	Erection, oil filtration, testing & commissioning of Booster transformer.	Each	59	8,466	0	0.00	0.00	0.00
31	Modification to erected equipments :					0.00	0.00	0.00
31(a)	Transfer of equipment from one mast or support to another.	Each	804	1,179	10	8,040.00	11,790.00	19,830.00
31(b)	Provision of an additional bracket assembly/ assemblies on a mast or support.	Each	0	1,047	10	0.00	10,470.00	10,470.00
31(c)	Re-adjustment of head-span	Each	0	1,156	1	0.00	1,156.00	1,156.00
31(d)	Dismantling of overhead equipment.	Km	0	6,222	4	0.00	24,888.00	24,888.00
31(e)	Dismantling of Feeder/ Return Conductor	Km	0	2,697	0.5	0.00	1,348.50	1,348.50
31(f)	Splicing & extension of an anchored overhead equipment.	Each	0	1,156	3	0.00	3,468.00	3,468.00
31(gz)	Dismantling of a Section Insulator Assembly	Each	670	1,156	8	5,360.00	9,248.00	14,608.00
31(h)	Stewing and putting back of OHE in original shape	Span	0	937	5	0.00	4,685.00	4,685.00
31(i)	Dismantling of an Isolator	Each	0	627	6	0.00	3,762.00	3,762.00
31(j)	Dismantling of a Post/ Pedestal Insulator.	Each	0	204	6	0.00	1,224.00	1,224.00
31(m)(i)	Manning of Switching stations (SP/SSP)	Each per month	0	19,148	0	0.00	0.00	0.00
31(m) (ii)	Manning of Traction Sub-stations	Each per	0	30,878	0	0.00	0.00	0.00
35	Supply and Erection of materials for internal and external lighting of Switching Station Building (SP/SSP).	Each	0	16,416	0	0.00	0.00	0.00
36 (a)	Unloading of all type of Steel Structures.	MT	0	61	0	0.00	0.00	0.00
36 (b)	Loading of all type of Steel Structures.	MT	0	113	0	0.00	0.00	0.00
37 (a)	Unloading of all type of Copper & Aluminium conductors.	MT	0	55	0	0.00	0.00	0.00
37 (b)	Loading of all type of Copper & Aluminium conductors.	MT	0	55	0	0.00	0.00	0.00
<b>Page Total</b>						<b>13,400.00</b>	<b>72,039.50</b>	<b>85,439.50</b>
<b>Total for Section-1 (GENERAL) =</b>						<b>2,65,631.00</b>	<b>2,02,888.70</b>	<b>4,68,519.70</b>

**NOTE:-** for 31(m)(i) & 31(m) (ii): In case Feeding post is situated in adjacent to TSS, same will also be included for manning alongwith TSS.

SCHEDULE - 1									
SCHEDULE OF PRICES & TOTAL PRICES									
Section-2 (Concrete)									
This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.									
Item No.	Description	Unit	(All prices are in Rs.)						
			SOR Rate		Qty.	Total Prices			
			Materials	Erection		Materials	Erection	Total (M+E)	
1	2	3	4	5	6	7	8	9	
2(a)	Concrete for foundation and plinth								
	(i) In hard soil:	Cum	2,056	749	20	41,120	14,980	56,100	
	(ii) In rocky soil	Cum	2,120	977	5	10,600	4,885	15,485	
2(az)	Concrete for foundation and plinth								
	(i) In hard soil:	cum	2,359	749	0	0	0	0	
	(ii) in rocky soil	cum	2,423	977	0	0	0	0	
2(b)	In other than hard soil and rock	Cum.	2,140	566	775	16,58,500	4,38,650	20,97,150	
2(c)	Reinforced concrete	Cum.	2,852	676	20	57,040	13,520	70,560	
2(e)	Extra for supply & sinking of concrete shells	Cum.	2,225	314	1	2,225	314	2,539	
2(f)	Casting of foundations using mechanized Augur.	Cum	2,629	389	1	2,629	389	3,018	
34(a)	Supply of materials and construction of Super Structure of SP/SSP building (Control cubicles)	Each	0	81,393	0	0	0	0	
34(b)	Cement concrete for foundation with stone ballast 40mm nominal size	Cum.	0	1,360	0	0	0	0	
34(c)	RCC work for foundation and plinth in ratio 1:1½:3.	Cum.	0	2,211	1	0	2,211	2,211	
34(d)	Brick work in foundation plinth, retaining walls and drainage.	Cum.	0	1,203	20	0	24,060	24,060	
34(e)	Construction of retaining wall with random rubble masonry in cement & sand.	Cum.	0	931	0	0	0	0	
34(f)	Earth work in excavation and filling including compaction								
	(i) In normal soil	Cum.	0	26	95	0	2,470	2,470	
	(ii) In hard soil	Cum.	0	33	10	0	330	330	
34(g)	Earth work, excavation for foundation								
	(i) In normal soil	Cum.	0	25	40	0	1,000	1,000	
	(ii) In hard soil	Cum.	0	32	10	0	320	320	
34(h)	Excavation of pile of 100 mm to 200 mm dia upto 3.5M deep.	Metre	0	43	0	0	0	0	
34(i)	Plastering of retaining wall with 1:4 cement & sand mortar.	Sqm	0	36	0	0	0	0	
34(j)	Supply & Spreading of Ballast/Gravel in the Switch Yard.	Sqm	345	2	0	0	0	0	
<b>Total for Section-2 (Concrete) =</b>						<b>17,72,114.00</b>	<b>5,03,129</b>	<b>22,75,243.00</b>	

SCHEDULE - 1									
SCHEDULE OF PRICES & TOTAL PRICES									
SECTION - 3 (FERROUS)									
This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.									
Item No.	Description	Unit	(All prices are in Rs.)						
			SOR Rate		Qty.	Total Prices			
			Materials	Erection		Materials(S)	Erection(E)	Total (M+E)	
1	2	3	4	5	6	7	8	9	
3(a)(i)	Supply and erection of traction masts fabricated from Rolled mild steel beam (BFB) of size 152mm x152mm x 37.1 Kg/m and galvanised in length 9.5 m or 8.5 m long.	MT	45,259	1,037	0	0.00	0.00	0.00	
3(a)(ii)	Supply and erection of traction masts, main masts of switching stations, Booster transformer station, fabricated from Rolled mild steel joist (RSJ) of size 203mm x 152 mm x 52.0 Kg/m and galvanised in lengths 9.5 m or 8.5 m long.	MT	42,491	1,037	2	84,982.00	2,074.00	87,056.00	
3(b)(i)	Supply and erection of fabricated and galvanised structures (O,N & R type portals) with all necessary components other than masts.	MT	53,854	3,546	25	13,46,350.00	88,650.00	14,35,000.00	
3(b)(ii)	Supply and erection of Structure steel (traction masts) fabricated and galvanised of all Type : B-Series Mast.	MT	45,423	1,037	134.21	60,96,220.83	1,39,175.77	62,35,396.60	
3(b)(iii)	Supply & Erection of special fabricated and galvanised steel structures other than Portals & traction- Masts not covered under items 3(b)(i) & 3(b)(ii).	MT	47,703	3,546	12	5,72,436.00	42,552.00	6,14,988.00	
3(c)	Supply only of fabricated steel other than masts	MT	66,257	0	10	6,62,570.00	0.00	6,62,570.00	
3(e)(i)	Supply and erection of a Guy Rod Assembly	Each	4,086	473	45	1,83,870.00	21,285.00	2,05,155.00	
3(g)	Supply of steel reinforcement for RCC	MT	42,171	0	10	4,21,710.00	0.00	4,21,710.00	
3(e)(ii)	Supply and erection of Anchoring Arrangement of traction mast with Galvanised steel stranded wire	Each	6,472	473	0	0.00	0.00	0.00	
3(i)	Supply and erection of 25KV Caution Boards/Plates.	Each	131	42	0	0.00	0.00	0.00	
4(a)(i)	Supply without insulator and erection of Single bracket assembly.	Each	5,734	429	270	15,48,180.00	1,15,830.00	16,64,010.00	
4(a)(ii)	Extra on 4 (a)(i) for supporting two OHEs.	Each	1,268	129	0	0.00	0.00	0.00	
<b>Page Total</b>						<b>1,09,16,318.83</b>	<b>4,09,566.77</b>	<b>1,13,25,885.60</b>	
1	2	3	4	5	6	7	8	9	
4(a)(iii)	Supply without Insulator and erection of Single bracket assembly suitable for tramway type OHE (Regulated)	Each	4,705	429	0	0.00	0.00	0.00	
4(a)(iv)	Extra on item 4(a)(iii) for supporting two tramway type OHE (Regulated)	Each	1,424	129	0	0.00	0.00	0.00	
4(a)(v)	Supply without insulator and erection of Single bracket assembly for composite OHE	Each	5,741	429	0	0.00	0.00	0.00	
4(b)(i)	Supply without Insulator and erection of a pull off arrangement for one OHE	Each	4,848	267	2	9,696.00	534.00	10,230.00	
4(b)(ii)	Extra for each additional equipment pulled.	Each	2,664	267	2	5,328.00	534.00	5,862.00	
4(b)(iii)	Supply without Insulator and erection of a pull off arrangement for regulated tramway type OHE.	Each	2,744	212	0	0.00	0.00	0.00	
4(b)(iv)	Supply without Insulator and erection of a pull off arrangement for one composite OHE.	Each	4,848	267	0	0.00	0.00	0.00	
5(b)	Supply without insulator and erection of suspension of conventional/ composite OHE from Head Span.	Each	3,852	461	0	0.00	0.00	0.00	
8(a)(v)	Supply and erection of Regulating Equipment (3-Pulley type) with counter weight assembly for conventional/ composite OHE.	Each	32,186	1,764	25	8,04,650.00	44,100.00	8,48,750.00	
8(a)(vi)	Supply and erection of Regulating Equipment (3-Pulley type) with counter weight assembly for tramway type OHE (Regulated)	Each	24,282	1,485	0	0.00	0.00	0.00	
8(a)(x)	Same as 8(a)(v) but excluding stainless steel wire rope.	Each	29,189	1,764	0	0.00	0.00	0.00	
8(a)(xi)	Same as 8(a)(vi) but excluding stainless steel wire rope.	Each	21,611	1,485	0	0.00	0.00	0.00	

8(b)(ii)	Supply without Insulator and erection of materials for termination of Double conductor.	Each	4,185	469	25	1,04,625.00	11,725.00	1,16,350.00
8(b)(v)	Supply without Insulator and erection of materials for termination of Earth wire	Each	2,244	195	0	0.00	0.00	0.00
	<b>Total</b>					<b>9,24,299.00</b>	<b>56,893.00</b>	<b>9,81,192.00</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
8(b) (vii)	Supply without Insulator and erection of materials for termination of double conductors for composite OHE.	Each	4,081	469	0	0.00	0.00	0.00
9(a)	Supply without Insulator and erection of anticreep with galvanized steel wire.	Each	10,740	1,317	14	1,50,360.00	18,438.00	1,68,798.00
9(b)	Supply without Insulator and erection of anticreep with galvanized steel wire suitable for tramway type Overhead equipment (Regulated)	Each	9,204	1,317	0	0.00	0.00	0.00
9(c)	Supply without Insulator and erection of anticreep for composite OHE with galvanized Steel wire.	Each	11,345	1,317	0	0.00	0.00	0.00
13(e)	Extra on item 13(a), (b) or (c) for an inter-locking device	Each	916	108	0	0.00	0.00	0.00
14	Supply & erection of a connection between return conductor and rail.	Each	5,031	1,645	0	0.00	0.00	0.00
16(a) (i)	Supply and erection of a structure bond.	Each	528	131	210	1,10,880.00	27,510.00	1,38,390.00
16(a)(ii)	Supply and erection of a Galvanised steel stranded wire structure bond	each	1,511	131	5	7,555.00	655.00	8,210.00
16(b)	Supply and erection of a longitudinal bond	Each	298	117	30	8,940.00	3,510.00	12,450.00
16(c)	Supply & erection of a transverse and special bond.	Each	679	140	20	13,580.00	2,800.00	16,380.00
17(a)	Supply & erection of a single earth electrode.	Each	1,191	498	15	17,865.00	7,470.00	25,335.00
17(c)	Supply and erection of earth bus	Metre	126	35	100	12,600.00	3,500.00	16,100.00
17(e)	Supply and erection of 8 SWG G.I. wire for earthing	Metre	11	9	19.96	219.56	179.64	399.20
30(a) (i)	Supply and erection of fencing panels at switching stations.	Metre	2,298	39	0	0.00	0.00	0.00
30(a) (ii)	Supply and erection of fencing uprights	MT	63,551	1,869	0	0.00	0.00	0.00
30(b) (i)	Supply and erection of anticlimbing device for Switching stations	Metre	153	4	0	0.00	0.00	0.00
30(b) (ii)	Supply and erection of anticlimbing device for B.T. stations.	Each	1,448	250	0	0.00	0.00	0.00
30(b) (iii)	Supply and erection of anticlimbing device for L.T. Supply Transformer	Each	635	148	0	0.00	0.00	0.00
30(b) (iv)	Supply and erection of anti monkey menace.	Each	2,534	148	0	0.00	0.00	0.00
					<b>Page Total</b>	<b>3,21,999.56</b>	<b>64,062.64</b>	<b>3,86,062.20</b>
	<b>Total for Section-3</b>					<b>1,21,62,617.39</b>	<b>5,30,522.41</b>	<b>1,26,93,139.80</b>

**SCHEDULE - 1**  
**SCHEDULE OF PRICES & TOTAL PRICES**  
**SECTION - 4 (a) (NON-FERROUS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	Unit	(All prices are in Rs.)					
			SOR Rate		Qty.	Total Prices		
			Materials	Erection		Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9
5az(ii)	supply and erection of span wire	Metre	498	23	200	99600	4,600.00	104200
5(c)	Supply of without insulator and erection of Suspension/ registration of contact wire only.	Each	1,196	183	2	2,392.00	366.00	2,758.00
6(az)	Supply and erection of Over Head equipment only	Km	46,757	13,521	11	5,14,327.00	1,48,731.00	6,63,058.00
6(bz)	Supply & Erection of contact wire only	Km	2,828	6,048	0	0.00	0.00	0.00
6(cz)	Supply and Erection of contact wire only (Regulated with bridle wire)	Km	27,230	7,944	0	0.00	0.00	0.00
7(a)	Supply and Erection of all aluminium 25KV Feeder/ Return conductor (Single Spider)	Km	87,846	1,584	0.5	43,923.00	792.00	44,715.00
7(c)	Supply and erection of earth wire.	Km.	43,213	1,208	0	0.00	0.00	0.00
7(d)	Supply and Manual Erection of all aluminium 25KV Feeder/ Return conductor (Single Spider)	Km	87,846	2,476	0.5	43,923.00	1,238.00	45,161.00
7(e)	Supply and Erection of copper cross feeder wires (37/2.25 mm HDBC)	Km	5,77,320	1,584	0.2	1,15,464.00	316.80	1,15,780.80
10(az)	Extra on item 6(a) for supply and erection of additional fittings at a turnout, diamond crossing or overlap	Each	3,096	541	20	61,920.00	10,820.00	72,740.00
10(bz)	Extra on item 6(b) for supply and erection of additional fittings required at a turnout, diamond crossing or overlap.	Each	2,603	431	0	0.00	0.00	0.00
10(cz)	Extra on item 6(c) & (d) for supply and erection of additional fittings required at a turnout, diamond crossing or overlap.	Each	5,552	541	0	0.00	0.00	0.00
12(az)	Supply without Insulator & erection of a section insulator assembly	Each	16,405	1,406	10	1,64,050.00	14,060.00	1,78,110.00
12(b)	Supply without insulators.& erection of a double wire section insulator assembly	Each	16,612	1,412	0	0.00	0.00	0.00
					<b>Page Total</b>	<b>10,45,599.00</b>	<b>1,80,923.80</b>	<b>12,26,522.80</b>

1	2	3	4	5	6	7	8	9
12(cz)	Supply without Insulator & erection of a section insulator assembly suitable for tramway type OHE (Regulated)	Each	16,295	1,249	0	0.00	0.00	0.00
12(d)	Supply & Erection of a Ceramic/beaded Glass Fibre type (PTFE) Short Neutral section assembly	Each	2,63,409	2,174	0	0.00	0.00	0.00
13(a)	Supply without Insulator and erection of a 25 KV single pole isolator	Each	18,104	1,302	5	90,520.00	6,510.00	97,030.00
13(b)	Supply without Insulators & erection of two 25 kV Single Pole Isolator gang operated without earth contact assembly.	Each	36,148	1,377	0	0.00	0.00	0.00
13(c)	Supply without Insulators & erection of 25kV Double Pole Isolator.	Each	29,523	1,438	4	1,18,092.00	5,752.00	1,23,844.00
13(d)	Extra for supply & erection of an earth contact assembly in an Isolator.	Each	6,025	150	2	12,050.00	300.00	12,350.00
15(a)(i)	Supply & erection of large copper jumpers	Each	2,508	236	5	12,540.00	1,180.00	13,720.00
15(a)(ii)	Supply & erection of small copper jumpers	Each	294	236	5	1,470.00	1,180.00	2,650.00
15(az)(iii)	Supply & erection of copper jumpers	Each	92	236	2	184.00	472.00	656.00
15(a)(iv)	Supply & erection of a copper jumper (5mm dia dropper wire).	Each	804	236	2	1,608.00	472.00	2,080.00
15(b)	Supply and erection of an aluminum jumper.	Each	1,286	109	2	2,572.00	218.00	2,790.00
15(c)	Supply and erection of insulated catenary cable in the span under over-line structures.	Each	2,621	217	0	0.00	0.00	0.00
15(d)	Supply of materials and erection of Large copper jumper 160 Sq. mm between Aluminium bus and cross feeders	Each	3,154	236	1	3,154.00	236.00	3,390.00
15(e)	Supply of materials and erection of Large copper jumper 160 Sq. mm between cross feeder and OHE	Each	4,801	236	1	4,801.00	236.00	5,037.00
17(d)	Supply and erection of copper strips for equipment earthing.	Metre	271	32	5	1,355.00	160.00	1,515.00
26(a) (i)	Supply & erection of : Aluminum bus-bars 36mm x 28mm.	Metre	195	31	0	0.00	0.00	0.00
					<b>Page Total</b>	<b>2,48,346.00</b>	<b>16,716.00</b>	<b>2,65,062.00</b>

1	2	3	4	5	6	7	8	9
26(a) (ii)	Supply & erection of Solid copper bus-bars 18mm.:	Metre	879	44	0	0.00	0.00	0.00
26(b) (i)	Supply and erection of Aluminum bus-bar connectors:- Bus terminal (6480)	Each	1,341	19	0	0.00	0.00	0.00
26(b) (ii)	Supply and erection of Aluminum bus-bar connectors:- Bus splice (6490)	Each	1,482	19	0	0.00	0.00	0.00
26(b) (iii)	Supply and erection of Aluminum bus-bar connectors:- Bus tee connector (6500)	Each	1,495	17	0	0.00	0.00	0.00

26(b) (iv)	Supply and erection of Aluminum bus-bar connectors:- Terminal connector 36/20 (6530)	Each	1,349	17	0	0.00	0.00	0.00
26(b) (v)	Supply and erection of Aluminum bus-bar connectors:- Tap connector (6520)	Each	1,349	19	0	0.00	0.00	0.00
26(b) (vi)	Supply and erection of Aluminum bus-bar connectors:- Flexible bus splice (6550)	Each	3,924	19	0	0.00	0.00	0.00
26(b) (vii)	Supply and erection of Aluminum bus-bar connectors:- Terminal connector Bolted Type (6830-1)	Each	1,067	17	0	0.00	0.00	0.00
26(c) (i)	Supply & erection of solid copper bus-bar connectors: Bus terminal (6310)	Each	888	19	0	0.00	0.00	0.00
26(c) (ii)	Supply & erection of solid copper bus-bar connectors: Bus splice (6320)	Each	980	19	0	0.00	0.00	0.00
26(c) (iii)	Supply & erection of solid copper bus-bar connectors: Bus tee joint (6330)	Each	2,664	19	0	0.00	0.00	0.00
26(c) (iv)	Supply & erection of solid copper bus-bar connectors: Bus terminating tee (6351)	Each	1,804	19	0	0.00	0.00	0.00
<b>Page Total</b>						<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Total for Section-4(a)</b>						<b>12,93,945.00</b>	<b>1,97,639.80</b>	<b>14,91,584.80</b>

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 4(b) (Non-Ferrous)**

This schedule shall be read in conjunction with its explanatory notes in Part-I Chapter-IV "A" for detailed description for various items included therein. The rates at which payments are to be

Item No.	Description	UOM	SOR Rate			Qty	Total Prices		
			Materials	Erection			Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9	
6(ax)(i)	Supply 107 sqmm 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(az)	MT	652000	0	12.36	8058720	0	8058720	
6(ax)(ii)	Supply 65 Sqmm, 19/2.10 mm Cadmium copper catenary wire required for item nos. 5(az)(ii), 6(az), 9(dz), 9(ez), 10(az), 10(cz), 12(cz), 15(az)(iii), and 31(qz)	MT	652000	0	7.5	4890000	0	4890000	
<b>Total for Section -4(b)</b>						<b>12948720</b>	<b>0</b>	<b>12948720</b>	

**SCHEDULE - 1**

**SCHEDULE OF PRICES & TOTAL PRICES**

**SECTION - 5 ( INSULATORS)**

This schedule shall be read in conjunction with its explanatory notes in tender documents for detailed description for various items included therein. The rates at which payments are to be made shall be arrived at by loading these rates uniformly for each item with the percentage quoted by the tenderer for this section.

Item No.	Description	UOM	SOR Rate			Qty.	Total Prices		
			Materials	Erection			Materials	Erection	Total (M+E)
1	2	3	4	5	6	7	8	9	
4(ax)	<b>Supply of Insulators for item 4(a)(i) &amp; 4(a)(iii)</b>								
4(ax)(i)	Stay Arm Porcelain (CD-1050 mm)	Each	1554.72	0.00	270	4,19,774.40	0	4,19,774.40	
4(ax)(ii)	Stay Arm Composite (CD-1050 mm)	Each	1498.75	0.00	6	8,992.50	0	8,992.50	
4(ax)(iii)	Stay Arm Composite (CD-1600 mm)	Each	2293.56	0.00	6	13,761.36	0	13,761.36	
4(ax)(iv)	Bracket Porcelain (CD-1050 mm)	Each	1338.07	0.00	270	3,61,278.90	0	3,61,278.90	
4(ax)(v)	Bracket Composite (CD-1050 mm)	Each	890.29	0.00	6	5,341.74	0	5,341.74	
4(ax)(vi)	Bracket Composite (CD-1600 mm)	Each	2293.56	0.00	6	13,761.36	0	13,761.36	
4(bx)	<b>Supply of 9-Tonne Insulators for items 4(b)(i) &amp; 4(b)(iii)</b>					0.00	0	0.00	
4(bx)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	1	1,962.33	0	1,962.33	
4(bx)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	1	1,240.61	0	1,240.61	
4(bx)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00	
5(ax)	<b>Supply of 9-Tonne insulators for item 5(a)(i), 5(b) &amp; 5(c)</b>					0.00	0	0.00	
5(ax)(i)	Porcelain (CD-1050 mm)	Set	3924.66	0.00	0	0.00	0	0.00	
5(ax)(ii)	Composite (CD-1050 mm)	Set	2481.22	0.00	0	0.00	0	0.00	
5(ax)(iii)	Composite (CD-1600 mm)	Set	4587.12	0.00	0	0.00	0	0.00	
8(bx)	<b>Supply of 9-Tonne insulators for item 8(b)(i), (ii), (iii), (vi), (vii), (viii) &amp; (ix)</b>					0.00	0	0.00	
8(bx)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	25	49,058.25	0	49,058.25	
8(bx)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	2	2,481.22	0	2,481.22	
8(bx)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	2	4,587.12	0	4,587.12	
9(ax)	<b>Supply of 9-Tonne insulators for item 9(a), (b), (c), (d) &amp; (e)</b>					0.00	0	0.00	
9(ax)(i)	Porcelain (CD-1050 mm)	Set	3924.66	0.00	14	54,945.24	0	54,945.24	
9(ax)(ii)	Composite (CD-1050 mm)	Set	2481.22	0.00	2	4,962.44	0	4,962.44	
9(ax)(iii)	Composite (CD-1600 mm)	Set	4587.12	0.00	2	9,174.24	0	9,174.24	
11(ax)	<b>Supply of 9-Tonne Insulator for item 11(a)(i) &amp; 11(a)(ii)</b>					0.00	0	0.00	
11(ax)(i)	Porcelain (CD-1050 mm)	Each	1962.33	0.00	10	19,623.30	0	19,623.30	
11(ax)(ii)	Composite (CD-1050 mm)	Each	1240.61	0.00	0	0.00	0	0.00	
11(ax)(iii)	Composite (CD-1600 mm)	Each	2293.56	0.00	0	0.00	0	0.00	
11(bx)	Supply of 25 kV Post Insulator for Item 11 (b)	Each	3947.24	0.00	10	39,472.40	0	39,472.40	
11(cx)	Supply of 3 kV Disc Insulator for Item 11 (c)	Each	422.92	0.00	0	0.00	0	0.00	
11(dx)	Supply of 11 kV Post Insulator for Item 11 (d)	Each	422.92	0.00	0	0.00	0	0.00	
12(ax)	<b>Supply of 9 Tonne and Sectioning Insulators for item No.12(a)</b>					0.00	0	0.00	
12(ax)(i)	Porcelain 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	6614.43	0.00	10	66,144.30	0	66,144.30	
12(ax)(ii)	Composite 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	5892.71	0.00	1	5,892.71	0	5,892.71	
<b>Page Total</b>						<b>10,82,454.42</b>	<b>0.00</b>	<b>10,82,454.42</b>	
1	2	3	4	5	6	7	8	9	
12(ax)(iii)	Composite 9-Tonne (CD-1600 mm) & Sectioning Insulator	Set	6945.66	0.00	0	0.00	0	0.00	
12(bx)	<b>Supply of 9 Tonne and Sectioning Insulators for item No.12(b)</b>								
12(bx)(i)	Porcelain 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	11266.53	0.00	0	0.00	0	0.00	
12(bx)(ii)	Composite 9-Tonne (CD-1050 mm) & Sectioning Insulator	Set	10544.81	0.00	0	0.00	0	0.00	
12(bx)(iii)	Composite 9-Tonne (CD-1600 mm) & Sectioning Insulator	Set	11597.76	0.00	0	0.00	0	0.00	
12(cx)	Supply of Sectioning Insulators for 12(c) and 12(cz)	Each	4652.00	0.00	0	0.00	0	0.00	
13(ax)	Supply of Post & Operating rod insulators for item 13(a)	Set	10291.00	0.00	10	1,02,910.00	0	1,02,910.00	
13(bx)	Supply of Post & Operating rod insulators for item 13(b)	Set	20582.00	0.00	0	0.00	0	0.00	
13(cx)	Supply of Post & Operating rod insulators for item 13(c)	Set	20582.00	0.00	8	1,64,656.00	0	1,64,656.00	
28(x)	Supply of Post insulators for item 28	Set	7894.00	0.00	2	15,788.00	0	15,788.00	
<b>Page Total</b>						<b>2,83,354.00</b>	<b>0.00</b>	<b>2,83,354.00</b>	
<b>Total for section-5</b>						<b>13,65,808.42</b>	<b>0.00</b>	<b>13,65,808.42</b>	

**Note :** Earlier, Item nos. 11(a)(i), 11(a)(ii), 11(b), 11(c) & 11(d) include supply as well as erection both. For similarity with other items, supply and erection have been separated. Supply portion is under section-5 (Insulators) and erection portion included in Section-1 (General).

<b>Quantity of Non-Schedule Items In C/w Electrification of Manesar- Patli Single Line Connectivity and Modification of Patli Yard HORC Line ( 10.3 TKM)</b>					
<b>Schedule -1 , Section-6</b>					
<b>Item No.</b>	<b>Brief Description of Items</b>	<b>Unit</b>	<b>Qty</b>	<b>Unit Rate of Supply &amp; Erection</b>	<b>Total Amt.</b>
<b>NS-1(a)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution clearance to OHE near by rectified" Board Size 400mmx270mmx2mm	Nos.	10	758.27	<b>7582.69</b>
<b>NS-1(b)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Power block working limit" Board Size 450mmx450mmx2mm	Nos.	5	1072.84	<b>5364.22</b>
<b>NS-1( c)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "caution unwired turnout" Board Size 900mmx600mmx2mm	Nos.	10	2859.55	<b>28595.46</b>
<b>NS-1(d)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Electric Engine Stop Board" Board Size 900mmx600mmx2mm	Nos.	5	2852.915	<b>14264.58</b>
<b>NS-1( e)</b>	Supply and erection of OHE caution board with supply of fixing material (Clamp,back flat strip & fastner) for "Caution live wire" Board Size 400mmx270mmx2mm	Nos.	20	521.125	<b>10422.5</b>
<b>NS-2</b>	Design,Manufacturing supply of retro reflective type sigma board as per RDSO drawing no. T1/DRG/OHE/PLTBRD/RDSO/00036/12/0 (Sixe-450mmx60mm) And RDSO Specification No. ETI/OHE/33A(12/97) Rev.8	Set	5	1485.208	<b>7426.04</b>
<b>NS-3(a)</b>	Fabrication, developing and supply of sectioning diagram, schematic and TSWR board Fabrication and supply of pre compressed particle laminated board white in colour with Aluminium beading 1/2" x 1/2" on all around the board and an arrangement of fixing/hanging on wall of adequate strength of top of board as required	Square foot	100	81.73	<b>8173.48</b>
<b>NS-3(b)</b>	Fabrication, developing and supply of sectioning diagram, schematic and TSWR board developing the sectioning diagram, schematic diagram & TSWR diagram with computerised digital printing on adhesive vinyl of adequate size as required.	Square foot	100	548.369	<b>54836.93</b>
<b>NS-4(a)</b>	Dismantling of Mast/Gantry	MT	4	4587.125	<b>18348.5</b>
<b>NS-4(b)</b>	Extra on erection under power block for Item No. NS-4a	MT	4	4587.125	<b>18348.5</b>
<b>NS-5(a)</b>	Dismantling of Portal	MT	3	6426	<b>19278</b>
<b>NS-5(b)</b>	Extra on erection under power block for Item No. NS-5a	MT	3	6426	<b>19278</b>
<b>NS-6(a)</b>	Dismantling of a Copper/Aluminium Jumper	Each	0	360	<b>0</b>
<b>NS-6(b)</b>	Extra on erection under power block for Item No. NS-6a	Each	0	360	<b>0</b>
<b>NS-7(a)</b>	Shifting of OHE Termination (fixed) location from one mast/support to another.	Each	4	2871.25	<b>11485</b>
<b>NS-7(b)</b>	Extra on erection under power block for Item No. NS-7a	Each	4	2871.25	<b>11485</b>
<b>NS-8(a)</b>	Shifting of OHE Termination (Regulated) from one mast/support to another.	Each	4	3091.3	<b>12365.2</b>
<b>NS-8(b)</b>	Extra on erection under power block for Item No. NS-8a	Each	4	3091.3	<b>12365.2</b>
<b>NS-9(a)</b>	Adjustment on bracket assemblies for assemblies for lowering/raising the height of contact and catenary wire where Encumbrance is changed.	Each	5	2093.82	<b>10469.09</b>
<b>NS-9(b)</b>	Extra on erection under power block for Item No. NS-9a	Each	5	2093.82	<b>10469.09</b>
<b>NS-10(a)</b>	Adjustment on bracket assemblies for assemblies for lowering/raising the height of contact and catenary wire where Encumbrance is not changed.	Each	5	1914.7715	<b>9573.86</b>
<b>NS-10(b)</b>	Extra on erection under power block for Item No. NS-10a	Each	5	1914.772	<b>9573.8575</b>
<b>NS-11</b>	Loading, leading, Transportation, unloading and stacking of steel structure & Conductor etc from Dismatling site to Concern Engineer Incharge Store.	MT	20	3343.502	<b>66870.04</b>

<b>NS-12(a)</b>	Hiring & operating of 01 Nos. MUV (Multi Utility Vehicle) of loading capacity of one MT, Sitting capacity of 4 person 4 stroke, 4 Cylinder engine, factory build metal body cargo box type- Mahindra, TATA or similar type multi utility vehicle (with 24 Hours available) including major minor repairs, cost of lubricant, fuels, salary of driver, toll taxes and all other taxes complete operation & maintenance for running of 1200 KM in a month for the use of Electrical Department of HRIDC for supervision of work & for transportation of material/machines & other usage. The Vehicle shall run on pucca/latcha road and along the track. The Contractor shall have road permit for use vehicle in the state of Haryana.	Months	0	25643.600	0
<b>NS-12(b)</b>	Extra on Item NS-12a for more than 1200 KM (1x12x1500=18000)	Per KM	0	5.460	0
<b>NS-13</b>	Hiring of 1 No vehicle (Maruti Dzire or similar) on daily basis including all maintenance, major/minor repairs, cost of lubricants, fuels, driver, GST, taxes etc. complete (only extra hours, Night halt charges, Toll tax and parking charges will be paid extra) for the use of HRIDC officers.				
<b>NS-13 (a)</b>	Fix Charges up to Km 100 per day	Per Day	0	1169.000	0
<b>NS-13 (b)</b>	Extra charges beyond Km 100 per day per vehicle	Per Km	0	8.290	0
<b>NS-14</b>	Setting up of earthing Station at Switching post	Job	0	65313	0
<b>NS-15(a)</b>	Supply & Erection of Safety item with supply of fixing material (Plastic/wooden/gitti & Screw) for supply & erection of electric shock treatment chart (Glass framed) size 22"x28" complete with aluminium angle beading 1"x1" all around	Nos.	10	736.02	7360.2
<b>NS-15(b)</b>	Supply & Erection of Safety item with supply of fixing material (Plastic/wooden/gitti & Screw) for supply & erection of electric shock treatment chart & its first aid coloured calendar in Hindi & English Size 550mm x 900mm with plastic at top & bottom.	Nos.	10	55.332	553.32
<b>NS-16</b>	Route Mapping of OHE mast by Oliver G kit with use of GPS System in 25 KV AC OHE System of all siding of XXXX Division.	Km	9.9245	2103.015	20871.37237
<b>NS-17</b>	Lowering/Raising the height of OHE Termination on same Mast/support	Each	5	1468	7340
<b>NS-18</b>	Provision of Buried Rail	Job	0	65175	0
<b>NS-19</b>	Supply of 25 KV single pole Vacuum Circuit breaker.	Each	0	507423	0
<b>NS-20</b>	Erection, testing & commissioning of 25 KV single pole Vacuum Circuit breaker.	Each	0	6764	0
<b>NS-21</b>	Supply of 25 kV Potential Transformer (Type-II)	Each	0	100910	0
<b>NS-22</b>	Erection of 25 kV Potential Transformer (Type-II)	Each	0	945	0
<b>NS-23</b>	Supply of 25 kV Current Transformer (1500/750/5A)	Each	0	131428	0
<b>NS-24</b>	Erection of 25 kV Current Transformer (1500/750/5A)	Each	0	922	0
<b>NS-25</b>	Supply, Erection, Testing & commissioning of control & relay panel as per RDSO specification no. TI/SPC/PSI/PROTCT/6071 or latest suitable for one feeder CB & 2 BM	Nos.	0	2192702	0
<b>NS-26</b>	Provision of First Aid staff & nearest doctor name board/nearest fire fighting name and address board	Nos.	0	650	0
<b>NS-27</b>	Provision of First Aid box and stretcher with wooden box and hanging arrangement etc.	Nos.	0	11869	0
<b>NS-28</b>	Provision of Wooden key box with glass front in frame with hinges and locking arrangement 18x24x6 inch.	Nos.	0	2701	0
<b>NS-29</b>	Supply of hand Gloves (Tested for 25 kV AC)	Nos.	0	1155	0
<b>NS-30</b>	Provision of Portable fire fighting Dry Chemical powder 5 Kg ISI mark	Nos.	0	3270	0
<b>NS-31</b>	Provision of Portable fire fighting- CO2 fire extinguisher 10 Kg	Nos.	0	14527	0
<b>NS-32</b>	Provision of Portable fire fighting- Fire bucket 10 Ltrs	Nos.	0	320	0
<b>NS-33</b>	Provision of Portable fire fighting- Fire bucket Stand	Nos.	0	2139	0
<b>NS-34</b>	Supply & Erection of Electric Shock treatment chart & its first aid coloured calendar in Hindi & English Size-550mm x 900mm with plastic at top & bottom	Nos.	0	58	0
				<b>Total Amount</b>	<b>402700.13</b>